02 INFORMATION ABOUT PRINCIPAL INVESTIGATORS/PROJECT DIRECTORS(PI/PD) and co-PRINCIPAL INVESTIGATORS/co-PROJECT DIRECTORS

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.C.a. Submission of this information is voluntary and is not a precondition of award. This information will not be disclosed to external peer reviewers. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPROMISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Gayle L Dana

Gender: ☐ Male ☒ Female

Ethnicity: (Choose one response) ☐ Hispanic or Latino ☒ Not Hispanic or Latino

Race: (Select one or more)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☒ White

Disability Status: (Select one or more)
- ☐ Hearing Impairment
- ☐ Visual Impairment
- ☐ Mobility/Orthopedic Impairment
- ☐ Other
- ☒ None

Citizenship: (Choose one) ☒ U.S. Citizen ☐ Permanent Resident ☐ Other non-U.S. Citizen

Check here if you do not wish to provide any or all of the above information (excluding PI/PD name): ☒

REQUIRED: Check here if you are currently serving (or have previously served) as a PI, co-PI or PD on any federally funded project ☒

Ethnicity Definition:
Hispanic or Latino. A person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race.
Race Definitions:
American Indian or Alaska Native. A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
Asian. A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
Black or African American. A person having origins in any of the black racial groups of Africa.
Native Hawaiian or Other Pacific Islander. A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
White. A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

WHY THIS INFORMATION IS BEING REQUESTED:

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Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represented groups have the same knowledge of and access to programs and other research and educational oppurtunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records", 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records", 63 Federal Register 268 (January 5, 1998).

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PI/PD Name: Gregory A Bohach

Gender: ☒ Male ☐ Female

Ethnicity: (Choose one response) ☐ Hispanic or Latino ☒ Not Hispanic or Latino

Race: (Select one or more)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☒ White

Disability Status: (Select one or more)
- ☐ Hearing Impairment
- ☐ Visual Impairment
- ☐ Mobility/Orthopedic Impairment
- ☐ Other
- ☒ None

Citizenship: (Choose one) ☒ U.S. Citizen ☐ Permanent Resident ☐ Other non-U.S. Citizen

Check here if you do not wish to provide any or all of the above information (excluding PI/PD name): ☒

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PI/PD Name: William K Michener

Gender: ☒ Male ☐ Female

Ethnicity: (Choose one response) ☐ Hispanic or Latino ☒ Not Hispanic or Latino

Race: (Select one or more)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☒ White

Disability Status: (Select one or more)
- ☐ Hearing Impairment
- ☐ Visual Impairment
- ☐ Mobility/Orthopedic Impairment
- ☐ Other
- ☒ None

Citizenship: (Choose one) ☒ U.S. Citizen ☐ Permanent Resident ☐ Other non-U.S. Citizen

Check here if you do not wish to provide any or all of the above information (excluding PI/PD name): ☒

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PI/PD Name: Katherine Mitchell

Gender: ☐ Male ☒ Female

Ethnicity: (Choose one response) ☐ Hispanic or Latino ☒ Not Hispanic or Latino

Race: (Select one or more)
☐ American Indian or Alaska Native
☐ Asian
☐ Black or African American
☐ Native Hawaiian or Other Pacific Islander
☒ White

Disability Status: (Select one or more)
☐ Hearing Impairment
☐ Visual Impairment
☐ Mobility/Orthopedic Impairment
☐ Other
☒ None

Citizenship: (Choose one) ☒ U.S. Citizen ☐ Permanent Resident ☐ Other non-U.S. Citizen

Check here if you do not wish to provide any or all of the above information (excluding PI/PD name): ☒

REQUIRED: Check here if you are currently serving (or have previously served) as a PI, co-PI or PD on any federally funded project ☒

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List of Suggested Reviewers or Reviewers Not To Include (optional)

SUGGESTED REVIEWERS:
Not Listed

REVIEWERS NOT TO INCLUDE:
Not Listed

List of Suggested Reviewers or Reviewers Not To Include (optional)

SUGGESTED REVIEWERS:
Not Listed

REVIEWERS NOT TO INCLUDE:
Not Listed

List of Suggested Reviewers or Reviewers Not To Include (optional)

SUGGESTED REVIEWERS:
Not Listed

REVIEWERS NOT TO INCLUDE:
Not Listed

Corrected : 02/04/2009

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 09-1

NSF 08-595 **01/09/09**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

OIA - RESEARCH INFRASTRUCTURE IMPROV

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0919123

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/09/2009	2	01060000 OIA	7217	041654195	06/23/2009 8:30pm S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

886000024

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES ☐ NO ☒ IF YES, LIST ACRONYM(S)

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Nevada System of Higher Education

AWARDEE ORGANIZATION CODE (IF KNOWN)

0001305000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Nevada System of Higher Education
2601 Enterprise Road
Reno, NV. 895121666

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS
☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **2,000,000**	**36** months	**05/01/09**	

CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW

☐ BEGINNING INVESTIGATOR (GPG I.G.2)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.D, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
☐ EAGER* (GPG II.D.2) ☐ RAPID** (GPG II.D.1)
☐ VERTEBRATE ANIMALS (GPG II.D.6) IACUC App. Date _____
PHS Animal Welfare Assurance Number _____

☐ HUMAN SUBJECTS (GPG II.D.7) Human Subjects Assurance Number _____
Exemption Subsection _____ or IRB App. Date _____
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)
_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
Division of Hydrologic Sciences

PI/PD FAX NUMBER
775-673-7363

PI/PD POSTAL ADDRESS
2215 Raggio Parkway
NULL
Reno, NV 89512
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Gayle L Dana**	**PhD**	**1997**	**775-674-7538**	**gdana@dri.edu**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the Authorized Organizational Representative or Individual Applicant is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, and lobbying activities (see below), nondiscrimination, and flood hazard insurance (when applicable) as set forth in the NSF Proposal & Award Policies & Procedures Guide, Part I: the Grant Proposal Guide (GPG) (NSF 09-1). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

Conflict of Interest Certification

In addition, if the applicant institution employs more than fifty persons, by electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of the NSF Proposal & Award Policies & Procedures Guide, Part II, Award & Administration Guide (AAG) Chapter IV.A; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be dislosed to NSF.

Drug Free Work Place Certification

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Drug Free Work Place Certification contained in Exhibit II-3 of the Grant Proposal Guide.

Debarment and Suspension Certification

(If answer "yes", please provide explanation.)

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency? Yes ☐ No ☒

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Debarment and Suspension Certification contained in Exhibit II-4 of the Grant Proposal Guide.

Certification Regarding Lobbying

The following certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding $100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000.

Certification for Contracts, Grants, Loans and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, ''Disclosure of Lobbying Activities,'' in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Certification Regarding Nondiscrimination

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative is providing the Certification Regarding Nondiscrimination contained in Exhibit II-6 of the Grant Proposal Guide.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

(1) community in which that area is located participates in the national flood insurance program; and
(2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

(1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
(2) for other NSF Grants when more than $25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME **William E Schulze**	**Electronic Signature**	**Jan 9 2009 1:56PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
702-862-5590	**william_schulze@nshe.nevada.edu**	**702-862-5594**

* EAGER - EArly-concept Grants for Exploratory Research
** RAPID - Grants for Rapid Response Research

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 09-1

NSF 08-595 **01/09/09**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

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FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0919514

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/09/2009	2	01060000 OIA	7217	075746271	06/23/2009 8:31pm S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

826000945

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES ☐ NO ☒ IF YES, LIST ACRONYM(S)

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

University of Idaho

AWARDEE ORGANIZATION CODE (IF KNOWN)

0016261000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

University of Idaho
Office of Sponsored Programs
Moscow, ID. 838443020

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
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REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **1,999,998**	**36** months	**05/01/09**	

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☐ VERTEBRATE ANIMALS (GPG II.D.6) IACUC App. Date _____
PHS Animal Welfare Assurance Number _____
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_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
College of Agricultural & Life Sciences

PI/PD FAX NUMBER
208-885-6518

PI/PD POSTAL ADDRESS
Life Sciences Building

Moscow, ID 83844
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Gregory A Bohach**	**PhD**	**1985**	**208-885-6666**	**gbohach@uidaho.edu**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the Authorized Organizational Representative or Individual Applicant is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, and lobbying activities (see below), nondiscrimination, and flood hazard insurance (when applicable) as set forth in the NSF Proposal & Award Policies & Procedures Guide, Part I: the Grant Proposal Guide (GPG) (NSF 09-1). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

Conflict of Interest Certification

In addition, if the applicant institution employs more than fifty persons, by electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of the NSF Proposal & Award Policies & Procedures Guide, Part II, Award & Administration Guide (AAG) Chapter IV.A; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be dislosed to NSF.

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Debarment and Suspension Certification

(If answer "yes", please provide explanation.)

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency? Yes ☐ No ☒

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(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, ''Disclosure of Lobbying Activities,'' in accordance with its instructions.

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AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME **Larissa D LaBolle**	**Electronic Signature**	**Jan 9 2009 5:28PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
208-885-5154	**larissal@uidaho.edu**	**208-885-5752**

* EAGER - EArly-concept Grants for Exploratory Research
** RAPID - Grants for Rapid Response Research

Corrected : 02/04/2009

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 09-1

NSF 08-595 **01/09/09**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

OIA - RESEARCH INFRASTRUCTURE IMPROV

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NSF PROPOSAL NUMBER

0918635

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/08/2009	2	01060000 OIA	7217	868853094	06/23/2009 8:31pm S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

856000642

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES ☐ NO ☒ IF YES, LIST ACRONYM(S)

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

University of New Mexico

AWARDEE ORGANIZATION CODE (IF KNOWN)

0026633000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

University of New Mexico
1700 Lomas Blvd. NE
ALBUQUERQUE, NM. 871310001

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS ☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative Research: Cyberinfrastructure Development in the Western Consortium of Idaho, Nevada, and New Mexico**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **1,999,994**	**36** months	**05/01/09**	

CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW

☐ BEGINNING INVESTIGATOR (GPG I.G.2)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.D, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
☐ EAGER* (GPG II.D.2) ☐ RAPID** (GPG II.D.1)
☐ VERTEBRATE ANIMALS (GPG II.D.6) IACUC App. Date _____
PHS Animal Welfare Assurance Number _____
☐ HUMAN SUBJECTS (GPG II.D.7) Human Subjects Assurance Number _____
Exemption Subsection _____ or IRB App. Date _____
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)
_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
Department of Biology

PI/PD FAX NUMBER
505-277-2541

PI/PD POSTAL ADDRESS
LTER Network Office, MSC03 2020
1 University of New Mexico
Albuquerque, NM 871310001
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
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CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

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AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME **Lydia Salas**	**Electronic Signature**	**Jan 8 2009 4:14PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
505-277-2258	**ldsalas@unm.edu**	**505-277-4185**

* EAGER - EArly-concept Grants for Exploratory Research
** RAPID - Grants for Rapid Response Research

Project Summary

Introduction. The Western U.S. faces daunting challenges. Populations are increasing; demand for fresh water exceeds the available supply; and regional and global climate change and variability affect natural resources, disturbance regimes, and the region's economies and citizens. In 2008, Idaho, Nevada, and New Mexico independently submitted NSF EPSCoR Track 1 Research Infrastructure Improvement (RII) proposals that shared a common theme and addressed a global challenge: climate change and its effects on water resources, ecosystems, and the environment. Following up on their Track 1 RII awards, the three states formed a Consortium to pursue cyberinfrastructure (CI) improvements that would leverage their resources so that the cumulative impact of NSF RII investments in the three states could exceed the sum of the parts. The impetus for this Track 2 proposal has been the recognition of the complexity and scale of the scientific challenge and subsequent ramifications for science, education, and economic development

Project Goal and Objectives. *The goal of this project is promote knowledge transfer to scientists, educators, students, and citizens within and beyond the Consortium by enhancing state CI, and to enable the community science that is required to address regional to global scientific and societal challenges.* To meet this goal, the Consortium proposes three high priority objectives:

1. Increase connectivity and bandwidth. Significant effort will focus on promoting communication and collaboration by improving connectivity infrastructure within the Consortium. Proposed and future Consortium efforts related to improving research competitiveness, STEM education, and economic development rely on this basic infrastructure.

2. Enhance data and model interoperability. The Consortium will promote discovery by supporting community-based climate change science through enhanced interoperability between models and other software components, improved access to and usability of Consortium data products through the adoption of standards-based data management and access models, and new data assimilation, analysis, and visualization capabilities.

3. Utilize CI to integrate research with education. The Consortium will enhance learning by focusing particularly on graduate student and postdoctoral researcher development; extending cyber-enabled science education into middle and high schools and extracurricular programs; and improving outreach to business and industry.

Project activities designed to enable the Consortium to achieve these objectives are described below.

Overarching Outcome. Track 2 investments will enhance the ability for our Consortium to better address 21st Century grand scientific and societal challenges related to climate change through increased competitiveness for research funding and sustained partnerships among our jurisdictions.

Activities designed to increase connectivity and bandwidth (Objective 1). The high speed networking connectivity activities in Track 2 will focus on improving communication and connectivity within and between the states. Each state in the Consortium is in a different phase of CI development and requires different CI to achieve Consortium goals.

Idaho: Idaho will upgrade infrastructure to deliver improved network connections to key university researchers' labs and desktops. Idaho will also work to connect difficult-to-access sites within Idaho by adding to, enhancing, and using the Idaho Regional Optical Network (IRON).

Nevada: The initial focus in Nevada is to increase the connectivity *into* the state network. The next step will be to improve connectivity *within* the state through several networking and video conferencing upgrades, as well as networking monitoring tools across the state.

New Mexico: New Mexico activities will enhance connectivity to academic institutions by establishing a distributed computing and collaboration infrastructure that consists of compute nodes at portals or gateways at Tribal colleges and Hispanic-Serving Institutions throughout the state.

Outcomes from increasing connectivity and bandwidth. EPSCoR Track 2 investments in connectivity will facilitate new data-intensive research, scientific collaborations, distributed experiments, grid-based data analysis, IP videoconferencing, social networking, and cyber-enabled learning. Network

improvements on Consortium campuses will remove bandwidth bottlenecks and allow faculty involved in climate-related research at each university to fully utilize available bandwidth for research and education.

Activities designed to achieve data and model interoperability in support of community science (Objective 2). Community science and virtual organizations are essential for addressing complex, large-scale challenges like climate change. The proposed collaborative CI development will overcome existing challenges by focusing on two closely related activities.

1. Creating a model and software interoperability framework: The team will establish a model and software interoperability framework based on emerging national and international standards, along with scenarios and applications that make use of that framework. The framework will allow users to specify, maintain and update—through a central user interface and a common methodology—a collection of software tools, and the interconnections between tools needed to accomplish climate research tasks.

2. Building an interoperable data archive: The Consortium will implement a data archive model that is based upon open data and metadata standards and supports standard data interoperability models. The interoperable data archive will enable streamlined discovery of and access to data products generated by all three state EPSCoR programs. These activities will use web interfaces to communicate the availability of data, models, training, and activities of researchers; will leverage existing national/international resources; and will make any code that is developed available through open source outlets.

Outcomes from achieving data and model interoperability: EPSCoR Track 2 investments will provide new model and data interoperability solutions and an integrative software framework that will transform exploration, experimentation, and innovation in climate research. Project activities build upon existing resources within Idaho, Nevada, and New Mexico, and are designed to leverage other major NSF-supported initiatives (including CUASHI HIS, GEON, and CSDMS). The project will significantly reduce the difficulty in finding, accessing, and using the diverse data products available in the Consortium. Consortium results (data and models) and resources (archives) will become readily accessible to the broader community of environmental scientists, decision makers, students, and the public.

Activities utilizing CI to integrate research with education (Objective 3). The Consortium faces many challenges in helping to meet the national need for a 21st century workforce that is scientifically capable and CI-literate. Using climate change as the underlying theme, we propose three activities designed to expand CI awareness, enhance use of CI, and better integrate quantitative reasoning, data analysis, and climate change modeling with education.

1. CI training workshops: A series of training opportunities to develop CI capacity and hands-on experience with climate modeling and scientific information systems will be provided for students, postdoctoral associates, and faculty.

2. Cyberlearning materials: New cyber-enabled curriculum and education materials will be created and implemented for middle school and high school science education.

3. Industry CI Days: An Industry CI Days program will be piloted in NM with business and industry as a target audience to increase CI awareness and promote economic development opportunities.

Outcomes from increased integration of research and education: EPSCoR Track 2 investments in education and training programs will build human resources capacity in our Consortium by increasing awareness, skills, and knowledge in the areas of climate change and cyberinfrastructure. The activities will support a “students in STEM” pipeline approach that begins with middle and high school education, extends to professional training for graduate students, postdoctoral associates, and faculty, and promotes CI awareness to business and industry. These new investments will complement Track 1 resources that support undergraduate engagement in climate change research.

Communication and Dissemination. We will foster scientific literacy and improve educational and research capacity within the Consortium through three dissemination and communication activities: (1) establishing effective internal communications among the Consortium’s partners to enable efficient sharing of data and information; (2) creating coordinated mechanisms to communicate project results, benefits, and processes to scientists, citizens, and stakeholders within the Consortium and other EPSCoR jurisdictions; and (3) developing cyberlearning tools for educational outreach. A centerpiece for communication is an annual tri-state CI meeting that will include Track 1 and 2 members. Faculty,

graduate students, and postdoctoral associates will share ideas and present their work at the meeting. *These tri-state meetings represent an unprecedented leap in collaborations and information sharing between our states.*

Management, Coordination, and Evaluation. The Consortium's management and coordination plan draws on the strengths of each state's EPSCoR program structure. To ensure timely progress and long-term success, there are four primary elements in the CI management structure: (1) State Committees; (2) EPSCoR offices and Management Team; (3) CI Component Teams; and (4) external evaluation and assessment. The Management Plan also includes a postdoctoral mentoring plan. Communication mechanisms to support project management include the annual tri-state CI meeting, NSF EPSCoR Project Director and National meetings, and online video and/or teleconferences. The External Advisory Committee and External Evaluator will evaluate progress and provide the Management Team with input to help ensure successful attainment of the project's goals.

Diversity. The Consortium is committed to improving access to cyberinfrastructure for underrepresented groups and geographically disadvantaged populations and to increasing diversity in the 21st Century workforce. Three principal activities will help the Consortium to make meaningful progress in achieving diversity goals: (1) invest in the connectivity solutions and human resources that enhance access to CI; (2) maximize geographic, ethnic, cultural, physical, and gender diversity in Track 2 programs; and (3) develop realistic accountability metrics and mechanisms. Close coordination with and leveraging of Track 1 resources are central to our diversity plan.

Sustainability. Consortium CI development activities will be sustained by: (1) commitments to long-term support by individual states and institutions for Track 2 activities; (2) development of new proposals that make use of and provide continued CI support; and (3) creation of new partnerships and strengthened collaborations (e.g., CSDMS, NCAR, National Laboratories, state and federal agencies).

Intellectual Merit and Broader Impacts:

Intellectual Merit: Climate change affects all natural environments. In the Western U.S., climate change impacts may be especially pronounced due to the tight coupling between climate and regional hydrology, and its ramifications for the water supply, disturbance regimes (e.g., fire, drought), the region's economy, and quality of life. The proposed cyberinfrastructure developments will enable atmospheric scientists, climatologists, hydrologists, engineers, social scientists, economists, and others to more effectively share standardized and interoperable data and models, and to more easily develop regionally coupled atmosphere-land surface-hydrology-socioeconomic models. Consortium institutions and states will be linked to more than 200 other Internet2 universities, government research laboratories, companies, and many research facilities throughout the world, facilitating data-intensive research, collaborative development, distributed experiments, grid-based data analysis, and experimentation using high performance networking, social networking, and cyber-enabled learning. Improvements in connectivity and enhanced interoperability and accessibility of data and models will enable the Consortium to realize its community science objectives and transform the way our states do research. Moreover, Track 2 investments will support effective participation in national and international virtual organizations—e.g., National Ecological Observatory Network, the Consortium of Universities for the Advancement of Hydrologic Science, Inc.—that work to solve problems associated with global climate change.

Broader Impacts. The proposed CI investments in the Consortium will achieve broad impact and add value by leveraging existing resources and infrastructure within the institutions, jurisdictions, and regions. The institutions that will benefit from increased connectivity include rural institutions and those that serve Hispanic and Native American students and faculty. Open access to the data and models developed within the Consortium and made available through the data archive and the model interoperability framework ensure that scientific products can be broadly disseminated and readily used by scientists, engineers, and students throughout the world. Moreover, the project will make usable high-quality environmental data, information, and models available for STEM education and outreach. The Consortium's education programs are designed to have far-reaching impact by: (1) developing new CI skills and climate modeling expertise for graduate students, postdoctoral associates, and faculty; (2) integrating cyberlearning and climate change science into middle and high school science education, especially targeting rural schools and schools that reach Hispanic and Native American students; and (3) developing a Industry CI Days Program that promotes CI awareness in business and industry.

TABLE OF CONTENTS

For font size and page formatting specifications, see GPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	3	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) **(Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**	25	
References Cited	2	
Biographical Sketches (Not to exceed 2 pages each)	14	
Budget (Plus up to 3 pages of budget justification)	22	
Current and Pending Support	6	
Facilities, Equipment and Other Resources	3	
Special Information/Supplementary Documentation	13	
Appendix (List below.) **(Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**		
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Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico

Introduction. The Western U.S. faces daunting challenges. Populations are increasing; demand for fresh water exceeds the available supply; and regional and global climate change and variability affect natural resources, disturbance regimes, and the region's economies and citizens. Responding to these challenges, in 2008, Idaho, Nevada, and New Mexico independently submitted NSF EPSCoR Track 1 Research Infrastructure Improvement (RII) proposals that focused on infrastructure to support research on climate change, water resources, and related challenges.

In spring 2008, the state Project Directors created the Western Consortium (ID, NV, and NM; hereafter "Consortium") to identify key areas of overlap and opportunities for leveraging resources so that the cumulative impact of NSF RII investments in the three states could exceed the sum of the parts. The Consortium agreed to: (1) hold a combined annual meeting to facilitate regional partnerships that support "critical mass" in key scientific areas; (2) convene meetings among the Consortium's project leadership to identify and act on leveraging opportunities; and, (3) key to this proposal, form a Cyberinfrastructure (CI) Committee that will identify and adopt data, metadata, communication, and web standards and protocols, as well as coordinate regional cyberinfrastructure development.

The CI Committee has coordinated Track 1 CI Strategic Plans among the three states and identified common CI challenges and needs. The Consortium utilized a consensus-based approach to prioritize the challenges and needs that support the Track 1 climate change focus, and that serve as the basis for Track 2 efforts. In determining needs, the Committee also took into account recommendations for our states and region resulting from the 2007 EPSCoR Cyberinfrastructure Assessment Workshop in Lexington KY (NSF, 2007). Through this process, the CI Committee identified three priorities for the Consortium, all supporting the underlying theme of climate change research: (1) improving connectivity within, between, and beyond the Consortium states and institutions; (2) achieving data and model interoperability to support community science; and (3) utilizing CI to integrate research with education. The Committee matched state-level expertise with the three priority areas so that common regional objectives could be optimally realized. We envision that this collaborative, multi-faceted effort will transform communication, climate change science, and education in our region. Moreover, a key outcome will be sustained partnerships among our jurisdictions that will enhance our competitiveness for research funding and enable us to better address 21st Century grand scientific and societal challenges.

Roadmap to this Proposal. Section 1 provides an overview of the current status of the Consortium's CI landscape. **Section 2** summarizes relevant CI activities supported by NSF for each state. **Section 3** describes the Consortium's plan to increase connectivity and bandwidth, create data and model interoperability solutions, and use CI to integrate research and education. **Section 4** documents how the proposed CI will benefit underrepresented groups within the Consortium. **Section 5** presents our plan for communicating results throughout the Consortium. **Section 6** includes our evaluation and assessment plan. **Section 7** explains how the CI activities will be sustained beyond this project. **Section 8** describes how Consortium activities will be coordinated and managed across the three states, and includes the mentoring plan for postdoctoral associates. **Section 9** concludes with a synopsis of the project's intellectual merit and broader impacts.

1. Status of the Consortium's Cyberinfrastructure Landscape

Cyberinfrastructure planning within each state, coupled with past NSF EPSCoR investments, has enhanced research opportunities in the Consortium by improving connectivity, increasing high performance computing capacity, and adding visualization and collaboration technologies. Significant challenges remain, particularly with respect to increasing connectivity to smaller, more remote institutions, supporting data and model interoperability, and training a CI-literate workforce. Here, we discuss how each state's existing and proposed CI landscape fits into the overall research and education vision.

1.1 Idaho

The primary public high performance computing facilities in Idaho consist of Beowulf clusters in its universities. The University of Idaho (UI) has about 256 nodes divided among three clusters, and is about to add 512 nodes, each of which is more than twice as fast as anything it has currently. Boise State University (BSU) has a cluster with 256 nodes, and Idaho State University (ISU) has a small cluster of Xservers (50-60 nodes). The ISU and BSU facilities are integrated into genomics and proteomics cores,

respectively. UI facilities are primarily dedicated to statistical modeling and computational biology. Idaho also has state-of-the art remote sensing and GIS research and teaching facilities. For example, at the Idaho Water Center in Boise, ISU has computational workstations, a server, and supporting hardware and software, and a compressed video IP-based system. The Water Center also hosts Idaho's Hydrologic Information System (HIS) database. The UI in Moscow hosts a dual wireless smart board and very high-resolution projector system to enable simultaneous presentation of geospatial imagery. Boise State has a 3-D visualization facility. A CAVE facility is planned at the new Center for Advanced Energy Studies building in Idaho Falls. Two Idaho universities also host Access Grid Nodes to support collaboration.

Idaho's universities are connected to the Internet, Internet2, and other global information networks through multiple partnerships. ISU partners with the Utah Education Network, which gives it access to Internet2 and the National Lambda Rail (NLR) and membership in the Front Range GigaPop. The UI is linked to Internet2 via the Pacific Northwest GigaPoP (through Seattle) with a 2.4Gb/s hookup as a result of the National Institutes of Health IDeANet's Lariat project. BSU recently connected to Internet2 and NLR through the Idaho Regional Optical Network (IRON). Chartered in late 2007, IRON associates include BSU, UI, the Idaho Department of Administration, Washington State University, Idaho National Lab, Brigham Young University-Idaho, Lewis-Clark State College, and the Idaho Hospital Association.

Idaho also has invested in distance education and streamlining access to geospatial information. Idaho's extensive network of compressed video facilities includes over 75 video sites that facilitate research collaborations and distance education in the absence of high-speed connectivity throughout much of the State. The Idaho Geospatial Committee recognized INSIDE (Interactive Numeric and Spatial Information Data Engine) Idaho, operated through the UI, as the State of Idaho's official statewide geospatial data clearinghouse. INSIDE Idaho serves as the mechanism to share data, resources, technologies, and expertise to meet the increasing demands for Idaho's geospatial information by educational institutions, government and business professionals, and citizens.

1.2 Nevada

Computing has been expanding in Nevada through campus-based initiatives. With the National Supercomputing Center for Energy and the Environment (NSCEE), the University of Nevada at Las Vegas (UNLV) has a 32 CPU SGI, an I2 Visualization lab, several clusters, and a large robotic tape library. The other research campuses have focused on consolidation of various computer clusters in order to create a larger resource. At the University of Nevada at Reno (UNR) the campus grid currently has several hundred core and several disk arrays. The Desert Research Institute (DRI) has a 44 CPU SGI Altix, a 32 CPU SGI Altix, and several small clusters. DRI has also implemented a shared campus grid that has consolidated several clusters at its two major campuses.

Connectivity for the educational and research institutions in Nevada is handled through a Nevada System of Higher Education (NSHE) sponsored organization called NevadaNet – a robust statewide backbone network that provides data connectivity and IP based video conferencing services to approximately 200 predominately rural Nevada locations. These sites include NSHE college campuses, K-12 schools, hospitals, Native American communities, and some state and federal government entities.

NevadaNet consists of a backbone connecting four major hub sites: Las Vegas, Elko, Reno, and Carson City. From these major hub sites, radial spurs consisting of primarily full or fractional T1 leased circuits extend to the individual rural site locations. The major part of the network is based out of two metro rings: one in the north (Reno), and the other in the south (Las Vegas). These two metro rings are connected by a 1GB/s leased fiber link with 2 OC3 circuits through Salt Lake City as backup. Connectivity to Commodity Internet is available from the south ring via a 1 GB/s line. Connectivity to Commodity Internet as well as Internet 2 and NLR is available through a 2 GB/s link from the north ring over the I-80 corridor to CENIC in Sacramento. UNR, UNLV, and DRI each have 10 GB/s networks on campus between buildings with 1 Gb/s to desktops (10 Gb/s can be provided where needed).

Connectivity for distance education and research is provided through IP-based video conferencing hardware and software as well as locations to use the video conferencing. NevadaNet provides Video/Collaborative Conferencing capabilities, with the campuses providing the endpoint hardware. There are several Connectivity Rooms used for Access Grid Network and distance education connections, some of which were funded through a previous NSF EPSCoR grant (2002-2004). The Track 2

cyberlearning component will utilize CI capabilities established through the Track 1 and Track 2 projects for training faculty, students, and postdocs, and outreach to K-12 classrooms.

1.3 New Mexico

The New Mexico Science and Technology Plan recommended a specific initiative for enhancing statewide CI capacity. The initiative — the NM Computing Application Center (NMCAC) — includes as its centerpiece the recently commissioned *Encanto*, an SGI/Intel High Performance Computer system (HPC) capable of 172 trillion calculations per second (172 teraflops) which, for a short time at least, makes it one of the most powerful supercomputers in the world. NMCAC also includes three "exemplars" (2 teraflop systems with the same architecture) that are located at the three research universities: the University of New Mexico (UNM), New Mexico Tech (NMT), and New Mexico State University (NMSU). Cumulatively, the four HPCs provide significant computing power required for the climate change, hydrological, and socioeconomic modeling efforts described in our recently funded RII Track 1 project.

In addition to the $11M investment in NMCAC, New Mexico is advancing connectivity to all colleges and universities throughout the state. In keeping with the NM Science and Technology Plan, each university will have state-of-the-art visualization centers and distance education facilities. The architecture is based on a hub-and-spoke model, whereby the research and regional universities serve as the hubs for high-speed connections to the state's regional universities and Tribal and community colleges. The State is contributing $1M to Track 2 as cost-share to support the increased connectivity among colleges and universities statewide. This increased connectivity will enable implementation of an ambitious plan by the New Mexico Higher Education Department that will allow courses taught at one university to be delivered electronically to other schools. This capacity for distance education is critical in New Mexico where requisite faculty members are not present on every campus and travel times between campuses are long.

2. Results from Relevant Prior Support

Past EPSCoR investments have enhanced existing CI and created new capacity throughout the Consortium. Here, we highlight some of the most relevant NSF EPSCoR-supported activities that were designed to increase capabilities with respect to networking and communication, computing and visualization, and information dissemination and delivery.

2.1 Idaho

Since 1989, NSF EPSCoR awards have helped transform Idaho's academic R&D infrastructure and have catalyzed a transition from individual research projects to community-science-oriented efforts that utilize CI. In 2000, EPSCoR (EPS-0080935) helped establish an independent, self-sustaining research Institute for Bioinformatics and Evolutionary Studies whose research emphasizes parallel and distributed bioinformatics, simulation and analysis, statistical analyses, and self-repairing fault tolerant programs. The grant provided a powerful, expandable Beowulf computing system for teaching and research and led to an interdisciplinary graduate program in Bioinformatics and Computational Biology at the UI.

In 2001, Idaho received EPSCoR RII award EPS-0132626, with three research foci: biocomplexity, neuro-fuzzy computing, and nanomaterials. The computing focus resulted in computational infrastructure at the UI. The Biocomplexity focus resulted in Idaho's first Access Grid Nodes at UI and ISU. Other CI-related accomplishments include standard NSF grants related to: (1) Idaho's participation in GEOscience Network (GEON) (EAR-0225421) for interdisciplinary information integration and tool sharing, and (2) funding (EAR-0549324 and EAR-0650855) for the national INTERdisciplinary alliance for digital Field data ACquisition and Exploration (INTERFACE) for collaborative development of software tools, data management capacity, and community training support for geoscientists. EPSCoR funds also enabled creation of a GeoVisualization facility at UI for advanced analysis and interpretation of digital databases.

Through NSF EPSCoR award EPS-0447689, BSU and the Idaho Water Center improved hardware and achieved a high bandwidth connection that increased access to the Hydrologic Information System (HIS) Server that supports the Idaho Experimental Watershed Network (IEWN). Publishing of data using WaterOneFlow web-services makes the IdahoWaters node compatible with the WATERS network of hydrologic information systems. The RII also facilitated community (public domain) software development including web interfaces, the EPA BASINS model, and an open standards-based GIS software system (MapWindow.org) that has been downloaded by 107,000 users throughout the world.

Idaho's newest NSF EPSCoR RII (EPS-0814387) includes CI to support research on *Water*

Resources in a Changing Climate. Output and simulations from modeling, downscaled climate scenarios, hydrologic data, and field data will be organized and managed for efficient use and dissemination. Three areas for CI emphasis are: (1) collaboration and communication through web-based desktop sharing and conferencing software; (2) storage, exchange, management, and analysis of time series and point observation data by enhancing a data management and sharing system, as well as future and parallel statewide research, with hardware, software, and new web development; and (3) exchange, management, and analysis of spatial and remote sensing data. Idaho researchers are central to Track 2 data management, archiving, and model interoperability efforts (Section 3.2).

2.2 Nevada

Nevada has used NSF EPSCoR funding to create nationally competitive programs that have increased total NSF awards to the State. Since 1989, CI has played an integral role in the success of its programs by providing state-of-the-art computing resources in support of instrumentation and facilities such as the UNR Genomics Center (EPS-9977809) and the Nevada Center for Bioinformatics (EPS-0132556).

The Advanced Computing in Environmental Sciences (ACES) program (EPS-0132556) initiated a new strategic direction of advanced computing, modeling, and visualization in 2001. ACES created a communications grid, based on dispersed Access Grid nodes, which is now a statewide resource that facilitates communication within the academic community in Nevada. ACES also established and equipped the DRI VisLab, a state-of-the-art scientific visualization laboratory. Around the same time, the Army's Simulation and Training Technology Center (STTC) funded the “CAVE project," a suite of high-end virtual reality visualization systems. The merger of ACES with the CAVE in 2005 formed the Center for Advanced Visualization, Computation, and Modeling (CAVCaM) with the vision to utilize developing technologies in computer graphics, computer interfaces, and scientific computing for the enhancement of environmental science research. The CAVCaM will soon move to its new, largely state-funded, $20M DRI facility that will feature the western United States’ first six-sided CAVE.

Nevada NSF EPSCoR took a new CI direction in 2004 with the formation of a statewide program in Cognitive Information Processing (CIP) (EPS-0447416). CIP uses non-human computational systems to mimic common but complex mental processes. The CIP program focuses on surveillance and security applications using real-time computer interpretation of visual images; modeling and inversion of environmental data; bioinformatics data-mining techniques for analyzing nucleic acid and protein sequence information; and design and control of bio-mimetic robotic systems. Within three years of its inception the CIP program built significant new capacity by hiring 10 new faculty members with expertise in bioinformatics, biorobotics, modeling and inversion, and computational intelligence in games.

Nevada’s most recent NSF EPSCoR RII award in 2008 (EPS-0814372) utilizes CI to integrate a multidisciplinary program in Climate Change Science, Education, and Outreach. A data portal is the CI centerpiece and will provide data storage, documentation, and archiving from multiple sources. Software frameworks will aid data analysis and integration of information from different sources. Data structures and standards will permit exchange and integration of data with existing and planned observational networks (e.g., CUASHI, NEON). New computing clusters for advanced climate modeling plus other networks and resources will be linked via high bandwidth networks enabling real-time monitoring. Interactive visualization of science data for researchers, the public, and decision-makers will be enabled using DRI’s CAVCaM and a new “Solutions Room” at UNLV. The CI structure will include virtual organizations that will bring together geographically scattered communities and individuals to facilitate interdisciplinary research, education, and outreach. Nevada will lead the Consortium’s efforts related to connectivity and bandwidth (Section 3.1) and in the area of cyberlearning (Section 3.3).

2.3 New Mexico

New Mexico became an EPSCoR state in December 2000 and in March 2002 received a RII award (EPS-0312632) focusing on natural resources, nanotechnology, and connectivity. This support significantly increased connectivity through the addition of T1 lines to three regional universities in 2003, doubling their capacity. RII1 developed the Institute for Natural Resource Analysis and Management (INRAM), a collaborative of statewide facilities supporting biodiversity databases, state-of-the-art chemical analyses, and GIS development and training. Key components of INRAM are now written into the Federal Southwest Forest Health and Wildfire Prevention Act of 2004. In 2005, AAAS determined that INRAM had attained its goals and become self-sustaining.

A second award in March 2005 (EPS-0447691) built on the first award and addressed three critical issues of state and national importance: nanotechnology, education, and water. RII2 contributed to the purchase of a supercomputer cluster for nanoscience research at UNM which is available to EPSCoR researchers statewide, and purchased computing clusters and storage at UNM and NMT for hydrology data storage, analysis, and modeling. A key achievement was the development of New Mexico EPSCoR Fluxnet, an 18-site high density ET network with real-time instrumentation in the Rio Grande corridor (>60,000 km^2) from northern NM mountains to the Mexican border. RII2 also increased connectivity between ground-based and satellite-based data and the analysis and modeling facilities, and enabled timely visualization and dissemination of geospatial model outputs through open standards.

A third award in 2008 (EPS-0814449) improves observational modeling and analysis of high elevation hydroclimatology by strengthening the instrumentation and modeling infrastructure. Relevant CI components include: deployment of collaboration software; network connectivity upgrades at NMT; data acquisition/processing/management support at UNM, NMT, and NMSU; replacement data and application servers; data acquisition, processing, service, and client interface/portal programmers at UNM; and supercomputer code development support resources at the NMCAC to facilitate the execution of complex hydrologic, climate, and economic models. The enhancements will allow for mirrored data ingest and storage at NMT and UNM, and web and web-service-based data (ground observations, remote sensing imagery, model outputs, and synthesis products) distribution to partner colleges and universities, state agencies, and the public. Products available through the portal will range from raw data and processed geospatial products, virtual products generated based upon user queries, basic transformation and analysis tools and services, online visualization tools, and standards-based imagery and data services. New Mexico will lead model and data interoperability (Section 3.2) and cyberlearning (Section 3.3) efforts.

New Mexico EPSCoR also helped establish a new Bureau for Math and Science Education at the Public Education Department which helped shape a comprehensive long-range strategic plan for math and science education reform (*A Strategic Action Plan for Advancing Math and Science Education in New Mexico, 2007-2010*). The Track 2 cyberlearning component will allow us to support this Strategic Plan.

3. CI Development for the Western Consortium of Idaho, Nevada, and New Mexico

Many of the most vexing problems facing humanity are so complex, pervasive, and large-scale that they cannot be solved through traditional collaborations among a few researchers (NAS 2004). To address such problems, the concepts of *community science* and *virtual organizations* have evolved where facilities supported through cyberinfrastructure make computing infrastructure, data, models, collaboration and visualization tools, and intellectual capacity available to large interdisciplinary research communities.

Previous RII activities within the Consortium focused on building state-specific infrastructure capacity and expertise with respect to scientific disciplines in the individual states. For the first time, the current RII awards to Idaho, Nevada, and New Mexico share a common overarching theme and challenge—climate change. State-specific foci of scientific interest and expertise and long-term Consortium investments are shown in Figure 1. The impetus for this Track 2 proposal has been the recognition of the complexity and scale of the scientific challenge coupled with deteriorating economic conditions in the three states and subsequent ramifications for science, education, and economic development. ***The goal of this project is promote knowledge transfer to scientists, educators, students, and citizens within and beyond the Consortium by enhancing state CI, and enabling the community science needed to address regional to global scientific and societal challenges.*** To meet this goal, the Consortium proposes three high priority objectives that will enhance CI, enable community science, and promote knowledge transfer to scientists, educators, students, and citizens within and beyond the Consortium.

Objective 1: Significant effort will focus on promoting communication and collaboration by improving connectivity infrastructure within the Consortium. Proposed and future Consortium efforts to improve research competitiveness, STEM education, and economic development rely on this basic infrastructure.

Objective 2: We will promote discovery by supporting community-based climate change science through enhanced interoperability between models and other software components, providing improved access to and usability of Consortium data products by adopting standards-based data management and access models, and supporting new data assimilation, analysis, and visualization capabilities.

Objective 3: The Consortium will enhance learning by utilizing CI to integrate research with education. The Consortium will focus on graduate students, postdoctoral researchers, and faculty

development; extend science education into middle and high schools; and improve outreach to business and industry.

Each of the three CI improvement activities supporting these objectives is described in detail below. First, the CI challenge is described. Second, we specify the activities that are designed to address the challenge. Next, we highlight the deliverables and milestones, and then link the activities to the resources that are required. We conclude with a description of expected project outcomes, explaining how the improvement activity meets present needs, and positions the Consortium to tackle future challenges.

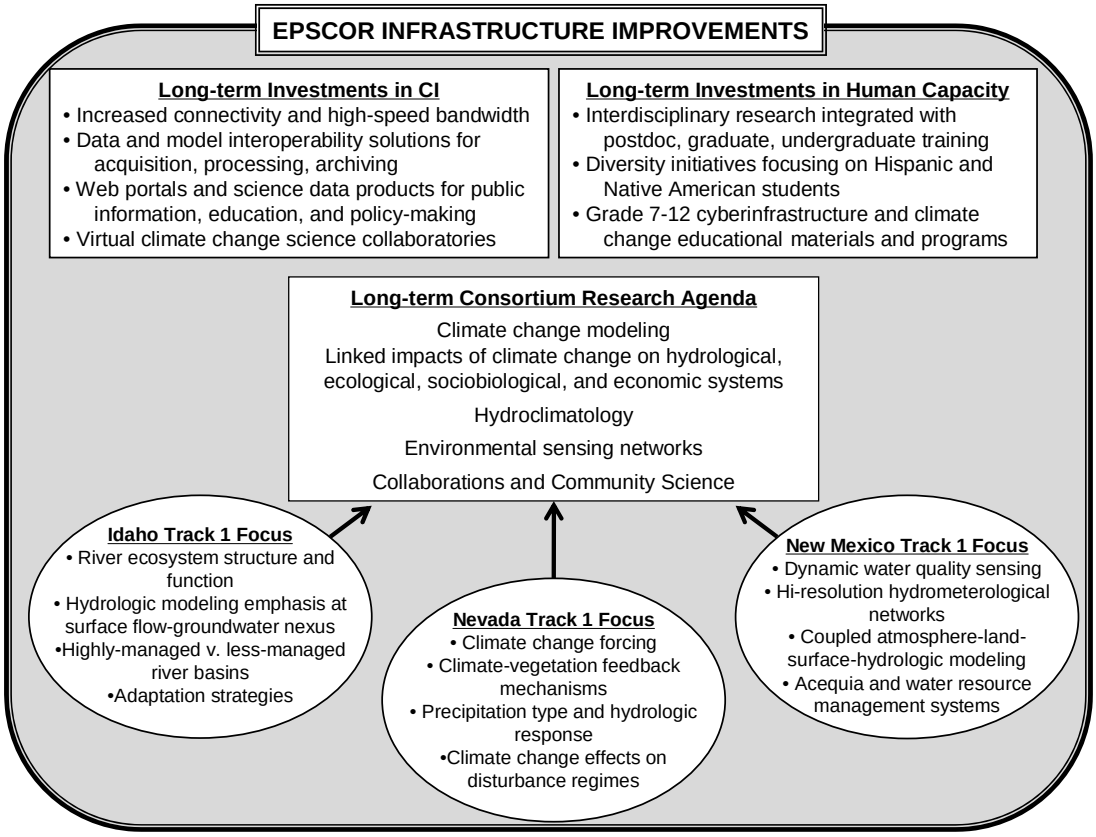

Figure 1. State-specific EPSCoR RII Cyberinfrastructure and Human Capacity Investments, long-term Consortium-based research, and Track 1 research foci.

3.1 CI Improvement Activity: Increased Connectivity (Objective 1)

3.1.1 The Consortium's Cyberinfrastructure Challenge

Increased connectivity and high-speed bandwidth are essential for supporting community science and addressing our common needs to enable collaborative climate change research and to support learning among educators, students, scientists, and engineers in virtual communities. EPSCoR states lag non-EPSCoR states in cyberinfrastructure, as described in the *EPSCoR Cyberinfrastructure Assessment Workshop* (Odom, 2006). Western EPSCoR states are at a distinct disadvantage due to the large distances between major population centers and the geographically dispersed communities. Track 2 investments in communication and networking infrastructure will enable climate change scientists, other researchers, and educators to develop a virtual organization among the three states. Members of the Consortium will have greater access to the worldwide scientific community; in turn, research and education products developed within the Consortium will be broadly accessible.

3.1.2 CI Improvement Activities

The high speed networking connectivity activities in Track 2 will focus on promoting communication and collaboration by improving connectivity within and between the states (Figure 2). Each state in the Consortium is in a different phase of CI development (Section 1). Idaho is improving campus connectivity

and is also now focused on the development of the Idaho Regional Optical Network (IRON) to connect sites within the state and to increase throughput between researchers. Nevada began improving its connectivity several years ago and has recently focused on visual connectivity and collaboration rooms as well as computational infrastructure; it now seeks to improve both its high-speed network connectivity and its visual connectivity. New Mexico has recently focused on backbone upgrades up the Rio Grande basin and proposes to improve connectivity to 4-year institutions across the state and to enhance visual and collaborative connectivity.

Idaho. Idaho seeks to upgrade infrastructure to deliver between 100 Mb/s and 1Gb/s network connections to key university researchers' labs and desktops. IRON will also help connect difficult-to-access sites within Idaho, including research facilities of importance to present and past EPSCoR RII Track 1 programs in southern Idaho such as the UI Research and Extension (R&E) Center in Kimberly and the Fish Culture Experiment Station in Hagerman.

The long-term goal is to enable the Kimberly R&E Center and faculty associated with Idaho's new Track 1 RII award to increase WAN connections to Gb/s via IRON. This will aid transfer of large remote-sensing and hydrologic datasets for Track 1 research. Track 2 will provide support to add a new IRON Point of Presence (POP) in southern Idaho. This will stimulate the growth and success of IRON by increasing the opportunity for connections to UI facilities throughout the State, and connections for the College of Southern Idaho and Idaho Hospital Association sites.

Nevada. The initial focus in Nevada is to increase the connectivity *into* the state network. This will take the form of improved connectivity in the north from NevadaNet in Reno to CENIC in Sacramento. This connection upgrade for I1 and I2 from 2 GB/s to 10 GB/s will require switch blade changes and configuration, as well as annual connection fees. As part of the Track 2 project, NevadaNet will provide significant state match for this important connectivity.

With the connectivity increased into the state, the next step is to improve connectivity *within* the state through several networking and video conferencing upgrades, as well as networking monitoring tools across the state. Some of these networking and hardware upgrades will increase bandwidth capabilities of parts of NevadaNet in preparation for a state-funded new fiber run from the north to the south of the state. The new fiber will dramatically increase NevadaNet's connectivity and bandwidth, particularly to one of the states four year colleges and some of its satellite campuses along the path of this fiber.

New Mexico. Enhancing connectivity to academic institutions is key to supporting and strengthening STEM education in order to build the future science and technology workforce. Because of its importance, the work proposed in this section will be funded by the state and serve as the match for New Mexico's portion of this Track II proposal; therefore, no NSF funds are requested for this activity.

New Mexico plans to establish a distributed computing and collaboration infrastructure that consists of compute nodes at portals or gateways at college campuses throughout the state. Connection bandwidths from each gateway to the central computing facility will range from only a few Mb/s to hundreds of Mb/s. Through Wire New Mexico and other initiatives, New Mexico will work to increase connectivity to a minimum of DS-3, with many portals expected to have OC-3 or greater connectivity.

3.1.3 Deliverables and Milestones

Idaho.

- Formalize a plan for the UI to utilize IRON to access university facilities in southern Idaho (year 1).
- Purchase and install networking equipment at state universities for LAN upgrades and building uplinks that provide 1 to 10Gb/s service to several key research buildings (years 1-2).
- Purchase and install an aggregation switch (Point of Presence) on IRON. Aggregate traffic onto IRON's backbone in Twin Falls to include sites in Hagerman and Kimberly (years 2-3).

Nevada.

- Purchase and install switch upgrades for network connectivity upgrades: from NevadaNet in the north to CENIC in Sacramento, as well as NevadaNet connectivity to Elko and other parts of the state (years 1-3).
- Purchase and install networking monitoring and security software and hardware (years 2-3).
- Purchase and install video conferencing hardware in the north and south (years 1-2).

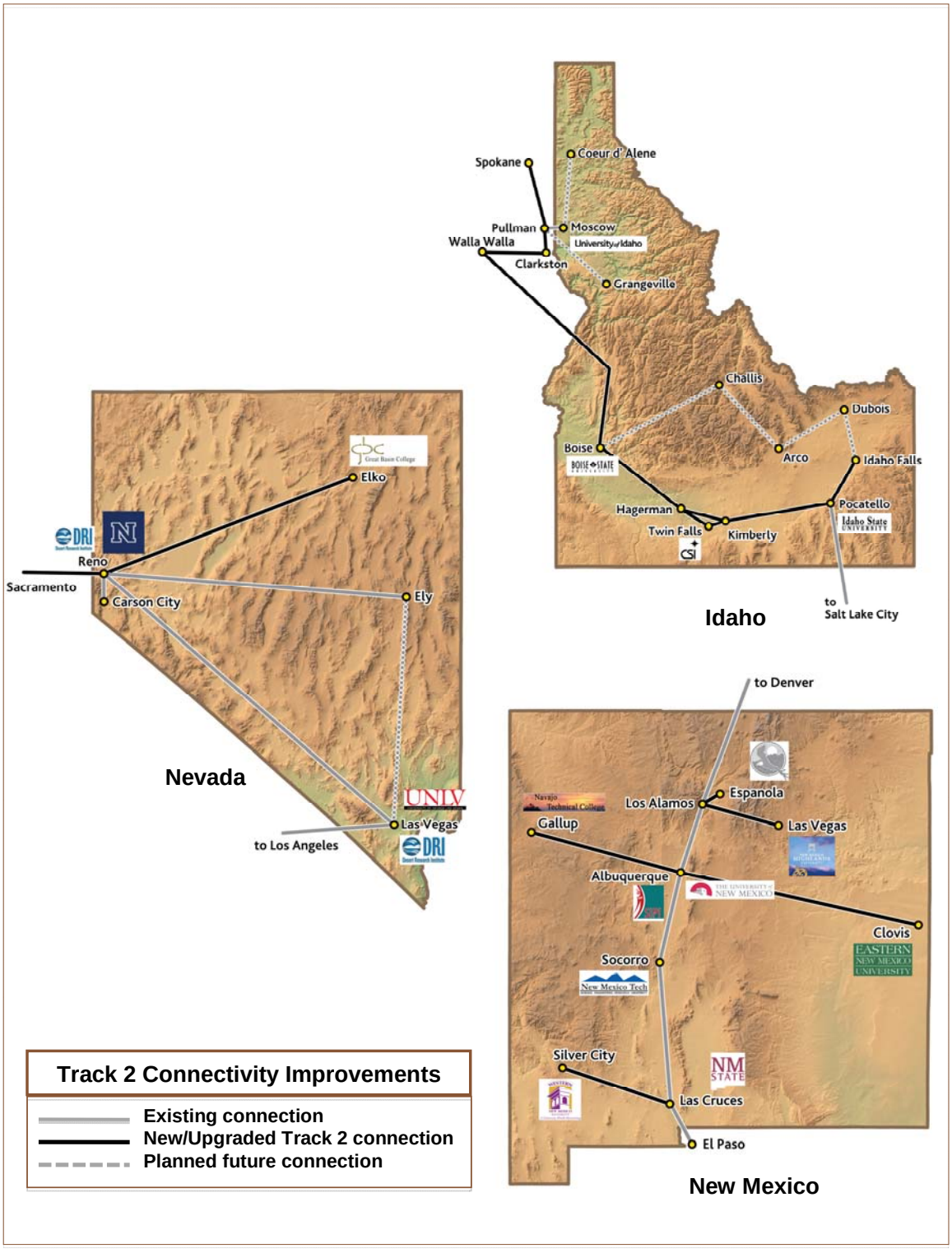

Figure 2. Proposed Track 2 improvements in connectivity and bandwidth, which will promote communication and collaboration within the Western Consortium. In addition to serving the major research universities and state colleges, these improvements will also help connect community colleges, tribal colleges, and minority serving institutions in geographically disadvantaged areas.

New Mexico.

- Purchase and install gateways at the three large research campuses and connect them to six Hispanic-serving and Native American-serving campuses in New Mexico (years 1-2).
- Purchase and install software for integrating all components of the gateway systems into a single, user-friendly system along with data compression software to minimize the amount of bandwidth needed for connectivity between the sites (years 1-3).

3.1.4 Resources Required

Idaho.

- Networking equipment at state campuses, including hardware to improve access and distribution.
- Aggregation switch on IRON at Twin Falls to create a POP.
- Subscription to enhanced bandwidth service via IRON.

Nevada.

- Switch upgrades for network connectivity.
- Network monitoring and security software and hardware.
- Videoconferencing hardware in the north and south.
- Cost-share by the State of Nevada includes the NevadaNet CENIC connection at the 10 Gb/s bandwidth and operation cost of networking and videoconferencing equipment.

New Mexico.

- Equipment provided as cost-share by the State of New Mexico to the gateway campuses will have the following capabilities: (1) teleconferencing between multiple sites; (2) high definition (1080p) videoconferencing; (3) 3-D high definition (1080p) stereo visualization; (4) instructor workstation and up to 35 student workstations; (5) Silicon graphics 16-core (3.0 GHZ processor) blade server with file storage system; (6) integrated graphical user interface; (7) Blu-Ray DVD player, stereo sound system, and distributed microphones; and (8) high definition video camera and a document camera. The videoconferencing and 3-D stereo visualization will employ one of three systems: overhead front projection system, rear projection system, or dual-display system (DLP, plasma, or LCD).
- State of New Mexico cost-share will purchase and install software for integrating all components of the gateway systems into a single, user-friendly system along with data compression software to minimize the amount of bandwidth needed for connectivity among sites.

3.1.5 Outcomes

EPSCoR Track 2 investments in connectivity will facilitate new data-intensive research, scientific collaborations, distributed experiments, grid-based data analysis, social networking, and cyber-enabled learning. Network improvements on Consortium campuses will remove bandwidth bottlenecks and allow university faculty involved in climate-related research at each university to take full advantage of available bandwidth for research and education.

EPSCoR Track 2 funds will promote communication and collaboration by:

- Providing faculty and research staff in the Consortium states with access to expanded research bandwidth, linking campuses to Internet2 universities as well as governmental research laboratories, companies, and research facilities throughout the world.
- Enabling scientists to access visualization facilities and out-of-state high performance computing facilities for advanced modeling related to climate change (e.g., hydroclimatological modeling).
- Supporting network capabilities to mirror data with other universities in the Consortium.
- Positioning the Consortium in the future to connect K-12 schools as well as provide for economic development and other opportunities that can result from high-bandwidth access (e.g., distance STEM education, tele-health instruction and support, and sharing of economic and community development materials).

3.2 CI Improvement Activity: Enabling Community-based Climate Change Science through Model and Data Interoperability Solutions (Objective 2)

3.2.1 The Consortium's Cyberinfrastructure Challenge

Community science, with its multidisciplinary collaboration, is essential for addressing complex, large-scale challenges like climate change. Current collaborations among researchers within the Consortium in

climate modeling, hydrologic response, and changes to landscape or stream ecology tend to be opportunistic and discipline-specific, resulting in steep learning curves in model applications and duplicative efforts in assembling data sets. Moreover, supporting community science in the field of climate change has barriers due to disparate data sets and computational models (Zhou and Cruz, 2007; Bulatewicz and Cuny, 2006; Kohout et al, 2001). For instance, each state struggles with 'first mile' challenges related to the efficient ingestion of data and model outputs and the generation of metadata related to these products. In particular, regional climate model outputs are needed to drive surface processes models (Shulz et al, 2005; Nerheim, 2008). While all three states have some capabilities to downscale output from regional climate models, they do not cover the region that encompasses the Consortium. Therefore, the Consortium needs to share, expand, and link regional climate models of the intermountain west to existing modeling efforts to evaluate the consequences of regional climate change. An overarching challenge is to provide cyberinfrastructure that will promote discovery and add value to the existing research community by enabling Consortium scientists to interact more effectively regionally and to contribute to global research related to climate change.

3.2.2 CI Improvement Activities

The proposed collaborative CI development overcomes existing challenges by focusing on two closely related activities: (1) establishing a model and data interoperability software framework based on emerging national and international standards, along with scenarios and applications that make use of that framework; and (2) the implementation of a Consortium data archive model that is based upon open data and metadata standards and supports standard data interoperability models. These activities will use web interfaces to communicate the availability of data, models, training, and activities of researchers (Section 5), will extensively leverage existing national/international resources, and will make any code that is developed available through open source outlets.

Each state will contribute to achieving overall Consortium objectives according to their specific strengths and capacity. Teams of multi-state collaborators are engaged in each activity, with individual states providing leadership and expertise where appropriate (Section 8). For instance, Idaho will provide leadership with respect to data communication standards (identification and implementation); experimental watershed networking; and integrated modeling using web-services. Nevada will lead the development of a new generic software interoperability framework; prototype application scenarios that couple models across environmental sciences, projects, and states; assist with definition and implementation of data exchange standards; deploy new CRUD (create/update/delete) services; and contribute to installation of replicated database and file systems across the Consortium. New Mexico will lead development of the base framework for the interoperable data archive and will partner with Nevada and Idaho in the development and testing of the software interoperability framework. Details about the two CI improvement activities are provided below.

(1) Model and Data Interoperability Framework. The framework will allow users to specify, maintain and update—through a central user interface and a common methodology—software tools (wrappers), as well as the interconnections between tools needed to accomplish climate research tasks. The system will link the models in specific sequences of operation and will allow more efficient and unified data exchange (Zhou and Cruz, 2007; Bulatewicz and Cuny, 2006; Chin et al, 2006). The framework will enable physically consistent coupling of atmospheric and hydrologic models with disparate temporal and spatial discretizations in order to support enhanced hydroclimatic simulation and prediction. This effort will be coordinated with the NSF-funded Community Surface Dynamics Modeling System (CSDMS), which produces protocols for community-generated, open software for the study and prediction of environmental systems and processes. Furthermore, CSDMS distributes model software and tools that are compatible with the established protocols (see CSDMS Letter of Collaboration to NM). The atmospheric model will be the Weather Research and Forecast Model (WRF) developed at the National Center for Atmospheric Research (NCAR). Surface process and hydrologic models will be evaluated for coupling with WRF based on interactions with CSDMS scientists and software engineers.

Specific actions include:

- *Design and implementation of the software interoperability framework (NM, NV, ID)*. New Mexico will evaluate and use the Earth System Modeling Framework (ESMF), OpenMI (Model Interoperability), and the Common Component Architecture (CCA) frameworks to develop and implement the core software infrastructure for coupling the WRF atmospheric model to hydrologic and surface processes

models such as TopoFlow, TRibs, and CHILD. Nevada will design and implement solutions for model interconnectivity focusing on user interface (Chin et al, 2006) and Human-Computer Interaction (HCI) aspects (Benyon et al, 2005; Heim, 2007). Idaho will provide feedback on the framework's design and operational capabilities.

- *Testing and usability studies (NV, NM)*. Nevada and New Mexico will test software (Sommerville, 2006) and perform usability studies (Tullis and Albert, 2008) that involve stakeholders from the groups that are targeted in the Track 1 projects, including researchers in environmental sciences, educators, policy-makers, students, and the public.
- *Creation and runs of specific research scenarios using the framework (NV, NM)*. Consortium scientists who model atmospheric, hydrologic, and ecological processes will run use-case scenarios that include: (i) multi-model watershed analysis and monitoring, (ii) coupling of atmospheric and hydrologic models, and (iii) downscaling of regional climate models to local scales.

Development and implementation of interoperability tools supporting data analysis and visualization involves three Consortium activities that are led by Idaho:

- *Demonstrate the extension from distributed server-based data storage and sharing to operational modeling systems in a fully-linked, modular, extensible, and reproducible system (ID, NV, NM)*. This effort will combine the strengths of the standards-based WaterML data communication language (from CUAHSI) with the OpenMI standard for communication of inputs, outputs, and parameters between multiple climate-water models or sub-models using open source software libraries and commercial off the shelf (COTS) software, as appropriate.

(2) Interoperable Data Archive. Our goal is to create an interoperable data archive that will enable streamlined discovery of and access to data products generated by all three state EPSCoR programs. We will develop data management systems that are based upon a core set of open standard formats and interfaces. This goal will be accomplished through: (1) the development of increased infrastructure (personnel, connectivity, storage capacity, and software components); (2) the identification, selection, and implementation of core interoperability formats and interface standards; (3) the integration of existing resources (e.g. WATERs) into the data interoperability framework; and (4) development of enhanced analysis tools that make use of the developed data interoperability capabilities.

The specific interoperability standards that will be targeted for implementation within the archive include the CUASHI HIS/WaterML; geospatial standards from the Open Geospatial Consortium (OGC); NetCDF; and the OpenMI specification for communication of data input/outputs and parameters between models in a workflow for model integration. Current and emerging nationally- and internationally-compliant metadata standards such as Federal Geographic Data Committee (U.S.) and ISO 19115 (international) geospatial metadata standards will be adopted as metadata standards by the Consortium.

Specific actions include:

- *Definition of data and metadata format standards for data and metadata representation and communication (NM, ID)*. New Mexico will define formats that will be supported for data and metadata ingestion, internal data and metadata storage standards, and deliverable data and metadata formats for end users. Idaho will identify and implement data and metadata format standards and tools for storing and delivering spatial and temporal observation data for water resources, climate, and related projects in the Consortium. Idaho will implement and configure the HIS databases and file systems required to enable access to shared data for each participating institution.
- *Develop, Create/Update/Delete (CRUD) service model for management of archive content across three states (NM, ID, NV)*. New Mexico, in coordination with Idaho and Nevada, will define resource model, and states associated with archive resources; define REST-style archive actions that create new archive objects; update existing objects; and delete objects. CRUD services will be implemented for management of archive objects within mirrored systems. This effort will be coordinated for inter-state mirroring; intra-state mirroring will be a parallel activity. The Idaho HIS server will be utilized and updated for this task.
- *Develop the required database and file systems and configuration of those systems for replication across all three states (NM)*. Database models will be designed and deployed, and based upon data and metadata standards. A file system will be implemented that enables efficient and scalable

management of file-based archive objects and that is based on identified data and metadata storage formats and CRUD service design.

- *Coordinate data ingestion from existing watersheds, facilities, and networks (ID, NM)*. Scientists from the Consortium and beyond will benefit from improved first mile data ingestion, expanding upon the Idaho Experimental Watershed Network sites. Idaho will co-locate the servers from Track 1 and 2 with the Idaho Department of Water Resources (IDWR) to create an Environmental Observatory Data Management facility at the Idaho Water Center in Boise (see IDWR Letter of Collaboration to ID). The postdoctoral scientist at BSU will serve as a liaison between field data collection sites in the IEWN and the Hydrologic Information System experts at ISU. The person will serve as a high-end user of the HIS in order to inform field scientists on how to best organize field data collection methods to take advantage of the HIS, and how to optimize data delivery methods. The proposed Data Manager will be located at the Center. The data manager will supervise the ingestion of new data into the data system, help Consortium researchers and state agencies access the data and information, and facilitate researchers' access to state data sources. This new position, along with existing personnel from IDWR, the University of Idaho, and Idaho State University will create a critical mass of 16 IT support people at the Water Center, with additional expertise from Boise State University. This investment will overcome barriers related to inadequate CI support, a key limiting factor to cyberinfrastructure development in the EPSCoR states (Odom, 2006).

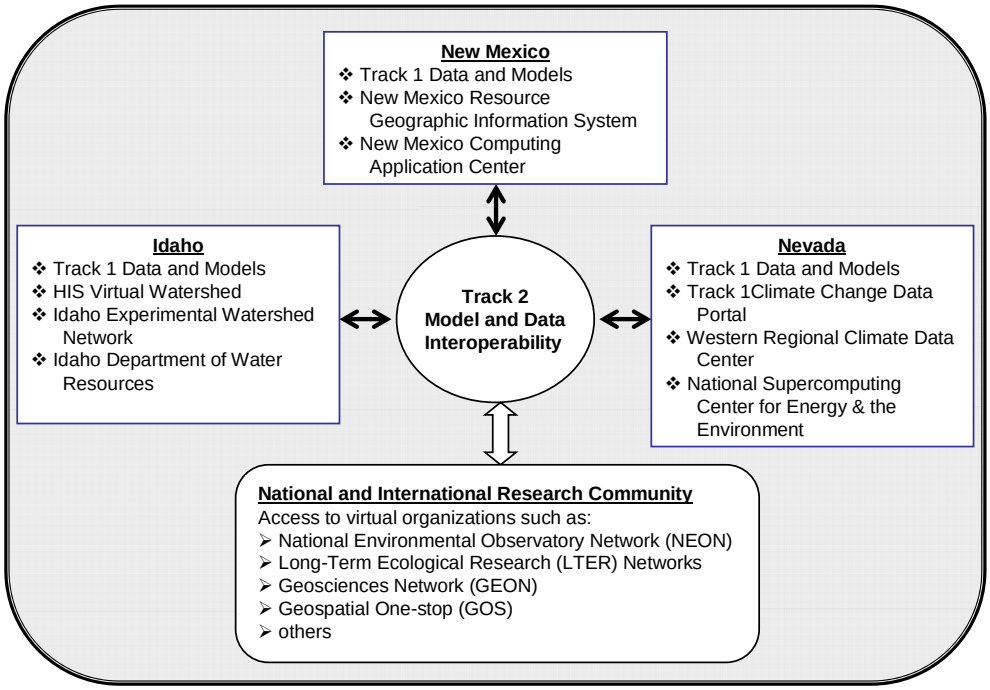

Figure 3: Model and Data Interoperability objective leverages and builds on existing State and National initiatives.

3.2.3 Deliverables and Milestones

Model and Data Interoperability Framework.

- Evaluation of the Common Component Architecture (CCA) and OpenMI environments for coupling WRF to surface process and hydrologic models and selection of one of these environments for further development (year 1).
- Evaluation and selection of appropriate surface process and hydrologic models for coupling to WRF, focusing on both hydroclimatic and hydrometeorological time scales (year 1).
- Requirements analysis and design of interface between WRF atmospheric model and surface process/hydrologic models, focusing on the disparate temporal and spatial scales and associated mass and energy conservation requirements for coupling such models (year 1).

- Design, development, and usability testing of a generic software interoperability framework (year 1: initial prototype, year 2: operational prototype, year 3: enhanced prototype).
- Development of prototype Initialize, Run, Finalize (IRF) wrapper code for WRF for coupling with surface process and hydrologic models focusing on hydroclimatic and hydrometeorological time scales (year 2).
- Build out full-featured coupling software infrastructure for WRF and selected surface process and hydrologic models (year 2).
- Comprehensive testing of model coupling, focusing on the development of reproducible test cases and on confirmation of required mass and energy conservation (year 3).
- Publication of reference test cases, delivery of software to CSDMS repository (year 3).

Interoperable Data Archive.

- Definition of data and metadata format standards for the data products to be archived (year 1).
- Implementation of the CRUD services for management of archive objects within the mirrored systems (year 1: initial prototype, year 2: deployment).
- Development of required database and file systems, and configuration of those systems for replication across all three states (year 1: initial prototype, year 2: operational prototype, year 3: deployment).
- Develop complete use case(s) and specific scenarios using the interoperability framework (e.g. involving HIS, WaterML, OpenMI) (year 2: initial prototype, year 3: deployment).
- Develop and implement interoperability tools supporting data analysis and visualization (HIS, WaterML, OpenMI (years 1-3).

3.2.4 Resources Required

Idaho.

- A full time data manager (to be partially cost-shared during the award).
- Two postdoctoral associates for model interoperability, networking, archiving, and HIS activities.
- Summer faculty salary related to the HIS.
- Computer hardware (cost share) for development and deployment of the interoperable data archive.

Nevada.

- Summer faculty salaries for project management and software interoperability framework development.
- Postdoctoral associate and graduate research assistant costs related to software frameworks, data archives, and tools and applications development.
- Computer hardware for development and deployment of the interoperable data archive.

New Mexico.

- Two postdoctoral research scientists who will develop and implement connectivity between WRF and surface process and hydrologic models.
- One graduate student to support HIS implementation.
- Staff, research faculty, IT contractor, and costs related to the development and deployment of the interoperable data archive.

3.2.5 Outcomes

EPSCoR Track 2 investments will provide new model and data interoperability solutions and an integrative software framework that will transform exploration, experimentation, and innovation in climate research. Project activities build upon existing resources within Idaho, Nevada, and New Mexico, are designed to leverage other major NSF-supported initiatives (including CUASHI HIS, GEON, and CSDMS), and will result in open source solutions that will be available to the broad community (Figure 3).

EPSCoR Track 2 funds will promote discovery and enhance research productivity and competiveness by:

- Supporting development and implementation of a new model for optimized data storage and management that will significantly reduce the difficulty in finding, accessing, and using the diverse data products available in the Consortium.
- Creating an integrative software framework that allows researchers to be more effective.

- Enabling Consortium results (data and models) and resources (archives) to be readily accessible to the broader community of environmental scientists, decision makers, students, and the public.
- Providing a coordinated pathway for dissemination of measurements and model results to researchers, educators, and stakeholders that are involved in Track 1 activities related to regional climate change.

3.3 CI Improvement Activity: Using Cyberinfrastructure to Integrate Research with Education (Objective 3)

3.3.1 The Consortium's Cyberinfrastructure Education Challenge

Using CI to address complex scientific and societal challenges will require a new level of technical competence in the 21st century workforce. The Consortium faces three principal challenges in helping to meet the national need. First, there is a need to train graduate students, postdoctoral associates, and faculty with the skills that will enable them to effectively utilize CI to address climate change and other grand scientific challenges. Second, we need to better develop quantitative reasoning, data analysis, and modeling skills in our middle and high school students. Third, we need to improve our outreach to leaders from business and industry in our states, educating them about new CI technologies and associated economic development opportunities. We cannot meet this challenge by simply developing physical cyberinfrastructure (increasing connectivity and computing capacity); we must also build human capacity.

3.3.2 CI Education and Cyberlearning Activities

Using climate change as the underlying theme, we propose three activities that are designed to expand CI awareness, increase use of CI, and better integrate quantitative reasoning, data analysis, and climate change modeling with education (Figure 4). First, a series of training opportunities to develop CI capacity and provide hands-on experience with climate modeling and scientific information systems will be provided for graduate students, postdoctoral associates, and faculty. Second, new cyber-enabled curriculum and education materials will be created and implemented for middle school and high school science education. Third, we will expand CI awareness and promote economic development opportunities by hosting CI Days, with business and industry as a target audience. Details about the three objectives are below.

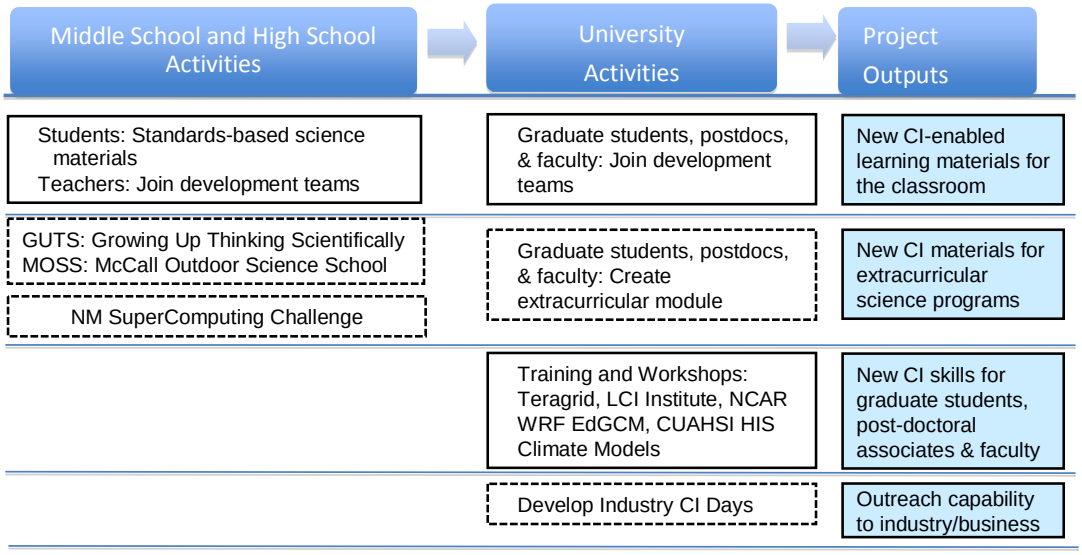

Figure 4: Cyberlearning pipeline: education and outreach activities. Solid-line boxes are Consortium-wide activities. Dashed-line boxes are state-specific or prototype programs.

(1) Training for graduate students, postdoctoral associates, and faculty. The combined faculty of the Consortium states host many students and postdoctoral associates who are or will be involved in Track 1 and 2 hydrology, atmospheric science, computer science, and related disciplines. The Track 2 project provides an opportunity to utilize CI to further integrate their research activities with professional training. We will mentor them in their professional development and provide CI training opportunities. We will

leverage existing workshops in cyberinfrastructure and computational science that have been developed by national research laboratories, universities, and professional organizations. The Consortium will sponsor graduate students, postdoctoral associates, and faculty to attend relevant workshops and courses. In addition, customized training workshops in climate modeling and use of scientific information systems will be developed and offered. Specific CI training opportunities will include:

- *Linux Clusters Institute (LCI) Workshop*. The LCI was founded by the UNM Center for High Performance Computing, the National Center for Supercomputing Applications (NCSA), and IBM. It has become a premier international forum to share information on management, administration, and scientific computing techniques for high performance computing. The annual LCI workshop is a four or five-day event offering state-of-the-art, hands-on experiences in high performance clustered computing. The Consortium will sponsor student, postdoctoral associate, and faculty attendance to the annual LCI International Workshops, where they will gain valuable experience in applications, tools, user environments, and administration of large-scale clustered systems.
- *The National Center for Atmospheric Research (NCAR) Advanced Climate Modeling Workshops and Short Courses*. NCAR offers domain-specific training in meteorological and climate modeling. Participants from the Consortium will join scheduled workshops and attend short training sessions customized to meet specific needs. For example, Consortium students may attend a 5-day tutorial offered by the NCAR Mesoscale and Microscale Meteorology lab that provides a comprehensive overview of components of the Weather Research and Forecasting (WRF) modeling system.
- *TeraGrid Workshops*. TeraGrid is an NSF-sponsored open scientific discovery infrastructure that uses high-performance network connections to integrate high-performance computers, data resources and tools, and high-end experimental facilities. We will coordinate delivery of TeraGrid online tutorials and Web-based conferencing for new and novice researchers. Each state lead for education will work in coordination with TeraGrid outreach and education staff to deliver workshops and seminars covering high-performance computing topics relevant to our participants, including scientific workflow tools, an introduction to parallel computing, data applications and management, and portal design.
- *"Introduction to Climate Modeling" developed and conducted by the Consortium Universities*. Introductory climate modeling concepts will be taught in training sessions using EdGCM, an educational climate modeling system developed by Columbia University (http://edcgm.columbia.edu) and supported by NSF. The climate model at the core of EdGCM was developed at NASA's Goddard Space Institute for Space Studies (GISS) and is an updated version of the GISS Model II (Hansen et al., 1983). EdGCM allows students to directly manipulate a general circulation model, and students without extensive theoretical background can execute models and analyze and understand their behavior. In addition, Nevada will take the lead in developing an introductory overview of climate models and a comparison of climate modeling approaches. More advanced workshops will center on atmospheric, hydrological, and climate models in a high performance computing environment. Three major archives of climate model information and results will be introduced with hands-on instruction for: (1) the NCAR Earth System Grid, which integrates supercomputers with large-scale data and analysis servers located at national labs and research centers; (2) Intergovernmental Panel on Climate Change (IPCC) model runs; and (3) the worldwide archive of climate model results on the Lawrence Livermore data base (Program for Climate Model Diagnosis and Intercomparison, PCMDI).
- *"Introduction to the Hydrologic Information System (HIS)" developed by the Consortium of Universities for Advancement of Hydrologic Science (CUAHSI).* Idaho will take the lead in coordinating training for the HIS, an integrated system of Web services, standards, and procedures that provide access to data for hydrologic analysis. Idaho will offer an annual workshop for Consortium participants. The workshop will focus on topics necessary to understand and use the system, such as HIS architecture, uploading data into the system, and application interfaces.

(2) Integrating cyberlearning and climate change science into middle school and high school science education. Consistent with community science concept, a team approach will be used to develop and implement cyberlearning materials for use by teachers in middle school and high school science classes and to create extracurricular hands-on learning experiences. With climate change as a unifying theme, students will gain knowledge about CI and computational science. Understanding the impact of climate change and its future predictions requires understanding science as a modeling process

and requires our use of interactive digital tools that support the ability to accurately model the complexity of large systems (Gilbert & Boulter, 2003). Interpreting these models will require "computational literacy" (diSessa, 2001). In addition, extracurricular activities that teach and utilize computational tools and introduce CI topics will be developed and expanded. Specific activities are described below.

- *Development of cyberlearning materials related to computational climate science (ID, NV, NM)*. Teams comprised of faculty, educational materials development experts, teachers, and graduate students in each state will collaborate to develop cyberlearning materials related to computational climate science. Research faculty will provide scientific leadership; education faculty will provide pedagogical leadership; graduate students and postdoctoral associates will learn how to communicate scientific knowledge to a diverse non-expert audience; and teachers will shape the materials to meet student needs and satisfy state educational requirements. All team members will be learning about and using cyberinfrastructure. We propose to fund one team per state each year.

  Educational content will engage learners in the results and findings that emerge from the Track 1 research projects on hydrological, ecological, and socio-economic impacts of climate change through a Web-based delivery and support mechanism that utilizes real-time computational analysis and visualization tools. The teams will define a focused topic in climate change science and specify the audience (grade band) and objectives for cyberlearning materials. Educational materials development will follow the Construct Centered Design (CCD) process, developed by the NSF-supported National Center for Learning and Teaching Nanoscale Science and Engineering (NCLT), which has been demonstrated to be successful for learning materials development (Shin et al., 2008).

  Nevada will lead these efforts and will host a Web site and data portal to facilitate and coordinate curriculum projects. The Web site will be a workspace and resource test bed that will: (1) support communication among the materials development teams, (2) provide access to the data and models applicable to the EPSCoR Track 1 projects; (3) offer a clearinghouse of raw digital materials for project development; and (4) disseminate education materials. The cyberlearning materials developed by the project will utilize open source software environments. To promote wide use, all materials will comply with the Sharable Content Object Reference Model (SCORM). Use of this format ensures that the learning objects can be ‘plugged into’ commercial courseware products and open source content management systems. In addition, we plan to use existing NSF-supported cyberlearning resources like Interactive Multi-Media Exercises (IMMEX) or the Web-based Inquiry Science Environment (WISE) for the framework and delivery of materials.

- *Middle and high school extracurricular activities that teach and utilize computational tools and introduce CI topics (ID, NM)***.** Opportunities for informal education occurring outside the classroom have been demonstrated to be highly motivational for students and their attitudes toward science and career decisions (Falk, 2001). Idaho and New Mexico have particular interests in investing in extracurricular venues—in addition to classrooms—for utilizing cyber-enabled learning materials. In Idaho, extracurricular programs will be coupled with the development of learning materials teams and products described above. New Mexico will focus on two established extracurricular programs.

  Several extracurricular programs in Idaho have particular relevance to the science theme of the Tracks 1 and 2 projects. These programs include the McCall Outdoor Science School (MOSS), which provides a residential field campus experience with hands-on science activities for students and teachers; Project Water Education for Teachers (WET), which offer teachers accredited workshops providing interdisciplinary water education materials and instruction; the Boise WaterShed Environmental Education Center, which promotes water stewardship by teaching people of all ages how to protect and conserve resources; and the Palouse Discovery Science Center (PDSC), which promotes science, math, and technology literacy through educational programs, exhibits, teaching collections, and activities. Such programs have strong relationships with middle and high school teachers and students. Track 2 investments will enable extracurricular programs such as these to work with several teachers in the co-development of materials. Many other teachers and professionals will be trained to use those materials so that they can incorporate them into their classrooms and education centers.

  New Mexico will utilize two established extracurricular programs: GUTS (Growing Up Thinking Scientifically) and the New Mexico Supercomputing Challenge. The NSF-funded GUTS program for middle school students provides support for teachers who are interested in building after-school

science clubs. Students and teachers in the club explore science topics and research methods through modeling and simulation in areas such as ecosystems, epidemiology, and pollution. New Mexico will lead in developing new modeling activities that provide the clubs with simulation datasets and exercises on climate change topics. The New Mexico Supercomputing Challenge involves high school students in team-based activities that develop computationally-based science projects. Track 2 will support the Supercomputing Challenge at additional schools, expanding to locations that have access to the newly installed NMCAC Gateways (Section 1). The Supercomputing Challenge will also be used as a model to recruit teacher and community mentors to help newly-formed teams focus on climate change-based projects.

(3) Improving CI awareness in business and industry. A new "Industry CI Days" aimed at businesses and industry will be piloted in New Mexico. "Campus CI Days" was begun in 2005 by CIDays.org, a partnership of national organizations that assists college and university campuses in strategic planning for cyberinfrastructure development. In 2008, New Mexico Highlands University (NMHU) hosted a very successful Campus CI Days activity for the state. Specific activities include:

- *Creation of a new government and industry-centered outreach effort – Industry CI Days – based on the 2008 NMHU Campus CI Days*. Industry CI Days will bring together state, regional, and national CI project leaders to demonstrate examples of CI-enabled industrial successes and educate businesses and industry about CI opportunities and emerging technologies. This new CI Days approach will be facilitated by the New Mexico Computing Applications Center (NMCAC), which has strong business and industry contacts, and is aligned with state economic development activities.
- *Attendance by Idaho and Nevada representatives at the "Industry CI Days" to determine whether this model has potential to be duplicated in their jurisdictions*.

3.3.3 Deliverables and Milestones

- Graduate student, postdoctoral associate, and faculty training in computation, climate change and CI:
  - Identify participants, national training, and workshops; coordinate attendance (years 1–3).
  - Develop and offer customized training in climate modeling and HIS (year 1 at annual Tri-state CI meeting; years 2–3, centralized or rotated among states).
- Middle and high school educational materials development:
  - Establish development teams and create portal site for education materials (year 1).
  - Develop education materials (years 1–3).
  - Formative evaluation of educational materials (years 2–3).
  - Dissemination of educational materials (years 2–3).
- Middle and high school extracurricular CI activities:
  - Establish development teams and collaborations (year 1).
  - Develop climate change CI activities for partners and fund implementation (years 2–3).
- Industry CI Days:
  - Design, coordinate, advertise, and deliver Industry CI Days program (years 2–3).

3.3.4 Resources Required

All three states will need travel resources for graduate student, postdoctoral associate, and faculty attendance at training sessions and workshops. Additional resources are described below.

Idaho.

- Faculty salary, graduate students, and teacher stipends for educational materials development.
- Summer salary for faculty to coordinate materials development and offer HIS training and workshop.

Nevada.

- Faculty salary, graduate students, and teacher stipends; related expenses for development and implementation of educational materials in classrooms and for extracurricular activities.
- Summer salary for science faculty to develop and offer climate model training and workshop.
- Travel to national educational research conference to disseminate new materials.

New Mexico.

- Salary to develop curriculum and expand extracurricular programs: Education Director, Education Outreach Coordinator, two Masters of Science Teaching graduate students, and teacher stipends.

- Program costs to expand GUTS and NM Supercomputing Challenge: teacher stipends, materials and supplies, in-state travel for participant students.

3.3.5 Outcomes

EPSCoR Track 2 investments in education and training programs will build human resources capacity in our Consortium by increasing awareness, skills, and knowledge in the areas of climate change and cyberinfrastructure. The activities will support a "students in STEM" pipeline approach that begins with middle and high school education, extends to professional training for graduate students and postdoctoral associates, and promotes CI awareness in business and industry. These new investments will complement Track 1 resources that support undergraduate engagement in climate change research.

EPSCoR Track 2 funds will enhance learning and discovery by:

- Supplementing existing degree programs in our states with professional training and workshop opportunities that better prepare graduate students, postdoctoral associates, and faculty, and foster the next generation of CI-literate scientists and engineers able to solve climate change problems.
- Providing teaching tools that will broaden participation in, and understanding of, computational thinking and modeling in general, and climate change science in particular.
- Enabling students to interactively use educational versions of the climate models and test various climate change scenarios.
- Strengthening existing middle and high school extracurricular science education programs, such as MOSS in ID, and GUTS in NM, allowing them to reach more schools, teachers, and students.
- Creating climate change science learning materials for the classroom that meet state science education standards and that will be adopted and used by schools.

4. Diversity Plan

4.1 The Opportunity and the Challenge

The Consortium encompasses a region that is rich in ethnic, cultural, linguistic, socio-economic, and geographic diversity. New Mexico has the highest percentage of people of Hispanic ancestry of any state (44%); the Hispanic population of Nevada (24.5%) is expected to account for the highest population growth in that state in the next few decades; and the Hispanic population in Idaho (9%) is the largest minority in the state, with a growth rate greater than 36% since 2000. Although Native Americans constitute 1% of the national population, they represent 2% of the population in Nevada and Idaho and almost 10% of the population in New Mexico. Nevada has 18 federally recognized tribes, Idaho has 7, and New Mexico has 21 distinct recognized tribal governments.

New Mexico, Idaho, and Nevada are experiencing many complex educational, cultural, and economic challenges. For instance, the three states have large rural areas with attendant problems of rural poverty and a large number of first generation college students. All three states fall below the national average of 24% for persons with a college degree: Idaho at 21%, Nevada at 18%, and New Mexico at 22%.

The Consortium has a unique opportunity and special responsibility to address the national shortages in our S&T workforce by educating a new generation of STEM professionals that includes more of the nation's underrepresented populations. This responsibility requires tackling racial and gender inequities, and addressing the growing economic disparity between rural and urban population centers.

4.2 Consortium Activities

The Consortium is committed to improving access to cyberinfrastructure for minority populations and geographically disadvantaged populations and to increasing diversity in the future workforce of our states. Our plan is focused on three principal activities that are designed to help us make meaningful progress in achieving diversity goals: (1) invest in the connectivity solutions and human resources that enhance access to CI; (2) maximize geographic, ethnic, cultural, and gender diversity in Track 2 programs; and (3) develop realistic accountability metrics and mechanisms. Close coordination with and leveraging of Track 1 resources are central to our diversity plan.

(1) Investing in Connectivity and Human Resources. The EPSCoR Track 2 CI funds will enable the three states to make major improvements in the inclusiveness of remote areas, rural centers, small colleges and regional universities, Native American tribes and peoples, and persons with disabilities in our nation's evolving cyber-enabled social and educational structures. Approximately one third of the

Consortium's funding is being applied to improving connectivity. In Idaho, resources will extend connectivity to rural areas by adding a POP and subscription to bandwidth on the IRON network in southern Idaho near Twin Falls; this provides the opportunity for colleges, K-12 schools, and hospitals in the region to obtain affordable high-speed connectivity. In the near term, the UI research facilities will benefit from improved access; in the long term this investment should improve high-speed bandwidth to UI Extension sites in many of Idaho's rural counties via IRON. In New Mexico, $1M of state match will be invested in gateways that provide access and collaboration technologies to four Hispanic Serving Institutions (New Mexico Highlands, Eastern, Northern, and Western Universities) and two Native American-serving campuses (Southwest Indian Polytechnic Institute (SIPI) and Navajo Technical College (NTC)). Nevada, through NevadaNet, will bring connectivity to smaller four-year and satellite campuses as a first step towards a longer-term statewide connectivity implementation for 2-year colleges.

Significant EPSCoR resources are being committed to personnel who will assume responsibility for meeting diversity goals. The Idaho EPSCoR program will have a full time Diversity and Outreach Specialist as part of their RII Track 1 plan. Likewise, Nevada EPSCoR has an Education and Outreach Coordinator, and New Mexico EPSCoR has recently contracted with a Native American education specialist from Taos Pueblo, who will integrate Track 2 CI activities into the larger Track 1 outreach and education plan. These EPSCoR staff will coordinate stakeholder communication in rural areas of their states, and design and implement programs for realizing diversity goals such as those described below.

(2) Maximizing Participation of Underrepresented Groups. Teacher and student program participants will be selected from the applicant pool so as to maximize geographic, ethnic, cultural, and gender diversity. For example, teachers for the materials development teams lead by Nevada will be selected from smaller and rural schools, or schools with a large minority student population. Similarly, the middle and high school extracurricular programs in CI will actively strive to broaden participation. In New Mexico, for instance, the GUTS program will be extended to three tribally-controlled middle schools.

Diversity coordinators in the Consortium will prototype a social networking solution (e.g., using FaceBook) that enables peer-mentoring in order to increase diversity in STEM. Successful minority STEM students will be guided to share experiences and advise freshmen students and others. Mentors can make younger students aware of opportunities and programs. Consortium staff will also network with other programs that encourage diversity, and seek their support, either through funding or expertise, to expand our knowledge base of successful strategies for working with diverse populations. These programs include: NSF AGEP, Louis Stokes AMP, and ADVANCE programs; the NIH Bridges program; and others such as the American Indian Higher Education Consortium (AIHEC), the American Indian Science and Engineering Society (AISES), the Hispanic Association of Colleges and Universities (HACU), and Mathematics Engineering Science Achievement (MESA).

(3) Providing Accountability. The Consortium will establish a Diversity Committee that will meet at the annual joint CI meeting of Track 1 and Track 2. Diversity Committee members will work with the evaluator to create metrics to measure progress and assess performance. The committee will share best practices and provide guidance on improvements that can be made by individual states and institutions.

Each EPSCoR program exists within organizational frameworks that are committed to broadening the participation of underrepresented groups in STEM. These organizations include NSF and higher education systems. For example, Nevada State Higher Education has the Chancellor's Diversity Forum, which brings together community leaders and leaders of higher education to discuss matters of diversity and inclusion; Idaho is developing an NSF EPSCoR-sponsored workshop for a Native American Graduate Research Center at UI; and all higher education institutions in the state of New Mexico participate in the ongoing discussions and working group activities of the New Mexico Higher Education Department Division of Educational Equity and Access (DEEA). Participation by EPSCoR faculty and leadership in these activities is important, encouraged, and financially supported.

5. Dissemination and Communication Plan

The goal of the Dissemination and Communication Plan is to foster scientific literacy and improve educational and research capacity within the Consortium through three dissemination and communication activities: (1) establishing effective internal communications among the Consortium's partners to enable efficient sharing of data and information; (2) creating coordinated mechanisms to communicate project

results, benefits, and processes to scientists, citizens, and stakeholders within the Consortium and other EPSCoR jurisdictions; and (3) developing cyberlearning tools for educational outreach.

(1) Establishing effective internal communications among the Consortium's partners to enable efficient sharing of data and information. The Consortium will use cyber-collaboration technologies, including Adobe Connect Pro-video and web conferencing, and teleconferencing. Each state will serve as a host or named organizer for Adobe Connect; other partners (e.g., agencies) can be added as named organizers on an as-needed basis. Project management and document sharing will be facilitated by the web-based tool BaseCamp, which will be hosted by UNM's Earth Data Analysis Center.

A centerpiece for communication is an annual tri-state CI meeting that will be held adjunct to the Track 1 meeting held each spring. Faculty, graduate students, and postdoctoral associates will share ideas and present their work at the meeting, and training workshops may also be offered. The tri-state meetings signify an unprecedented leap in collaboration and information sharing between our states.

(2) Creating coordinated mechanisms to communicate project results, benefits, and processes to scientists, citizens, and stakeholders within the Consortium and other EPSCoR jurisdictions. The external gateway for project information will be Nevada's, Idaho's, and New Mexico's Climate Change Web Portals (Track 1). Each portal will have a common CI Consortium interface. The CI Committee will design and administer mechanisms to manage the flow of CI project information to these web portals.

The Consortium's annual CI meetings will provide a forum for information exchange by encouraging participation from stakeholders, scientists, and NSF EPSCoR Program Managers from the Consortium and other EPSCoR and non-EPSCoR jurisdictions. Quarterly electronic newsletters will keep participants and stakeholders apprised of the Consortium's activities, products, and accomplishments.

(3) Developing cyberlearning tools for education and outreach. Through a strong Cyberlearning component the Consortium will increase scientific and computational literacy and improve educational capacity by: (1) providing access to CI-related workshops and course; (2) creating new educational materials and in-service activities for teachers; and (3) hosting annual workshops on utilizing cyber tools for the development of educational materials. The Consortium's cyberlearning activities will broaden participation in and understanding of computational thinking and climate change science.

6. Evaluation and Assessment Plan

The objectives of the project's mixed-methods (NSF, 1997) formative and summative evaluation processes are to use qualitative and quantitative data to: (1) provide information to refine and improve project implementation at both the state and Consortium levels; (2) measure progress of the project in meeting its goals, objectives, and annual metrics; (3) assess the impact of the project in developing strong inter-jurisdiction collaborations that address regionally relevant and nationally important climate change science and education; and (4) assess the project's impact on enhancing discovery, learning, and economic development through the use of CI. The project's administrative team in collaboration with the external evaluator and the external advisory committee will continuously monitor how well the project is moving toward the anticipated goals as assessed by the annual metrics which will be developed immediately after the grant award. State-level feedback will be collected periodically using existing Track 1 RII infrastructure (including the ~25 metrics reported annually to NSF: numbers of publications, patents, grant awards, etc.) and communicated to the jurisdictional-level administrative team. Implementation and progress monitoring phases of the formative evaluation (NSF, 2002) will be assessed by the external evaluator using targeted surveys, observations, and interviews as well as longitudinal analysis of Tracks 1 and 2 RII data collected by each state. Participant demographics will be disaggregated by gender, race, ethnicity, geography (rural, suburban, urban), and disability. Majors of undergraduate, graduate and postdoctoral participants will be included in the disaggregation of demographics.

The external evaluator, Rose Shaw, Ph.D. in Applied Statistics, is accomplished at working with multiple-site, collaborative projects. She has extensive experience evaluating NSF STEM and infrastructure improvement projects (RII, NUE, GK12, LSC, CETP, IGERT, ITEST, LSAMP Phases I, II, II and BD, ADVANCE, and MSP). She has also evaluated projects funded by the USDOE (Colorado statewide evaluator of Reading First, Title III, Title VII, Upward Bound), and States (Arizona Board of Regents-TQE, Colorado-MSP). She was an invited member of the NSF national site-visit team that evaluated the University of North Carolina-Chapel Hill MSP (2004), and was part of a team that developed an evidenced-based framework for the national evaluation of NSF's EPSCoR program (2007).

The external evaluator will collect concrete, meaningful project data and will present qualitative and quantitative analyses of the data in interim and annual reports to the PI/PD who will disseminate findings to appropriate stakeholders including NSF. The external evaluator will document the extent to which the project meets the anticipated outcomes, measures long-term sustainability, provides sustained development that addresses intra/inter-jurisdictional and national climate change issues, implements internal evaluation components, and effectively uses evaluation feedback. The external evaluator may use the following processes to satisfy the evaluation objectives: interviewing the PI/co-PIs to gain insights into the project planning/implementation and to ascertain the project's anticipated and actual outcomes, on-site observations of project activities, interviews, critiquing the project's internal evaluation processes, and reviewing whether the processes are well-suited for implementation and progress monitoring, identifying project strengths, and making recommendations for improvement. The external evaluator will use some formative evaluation data in the summative evaluation to assess the project's impact.

Formative, process and summative evidence-based evaluation questions will include: In what ways have state and regional high speed network infrastructure and connectivity to multiple institutions improved and enhanced the national networking of research and education enterprises? How have acquisition and support of new computing resources and data handling services resulted in increased scientific competitiveness? In what ways have the modeling and simulation tools established by the project enhanced climate change research? Have the cyberinfrastructure improvement activities resulted in new forms of connectedness, interoperation, and effective participation in national and international projects and virtual organizations? How are the strategy-focused activities contributing to the Consortium's vision for future research and innovation? What significant and measurable value is being added to research capability in S&T areas? What strategies are successfully engaging diverse participation in the STEM enterprise at the state and Consortium levels? What did the annual SWOT (strengths, weaknesses, opportunities, and threats) analysis reveal and how are the weaknesses and threats being addressed with improvements, refinements and proactive changes? What is the evidence of sustainability?

7. Sustainability Plan

Consortium CI development activities will be sustained through three primary mechanisms including: (1) commitments to long-term support by individual states and institutions for Track 2 activities, (2) development of new proposals that make use of and provide continued CI support, and (3) new partnerships. Sustainability efforts are discussed below.

(1) Long-Term State and Institutional Support for Track 2 Activities

Connectivity and bandwidth. Increased connectivity supports the Consortium's efforts to achieve community science, research, and education goals, and adds significant value to each State's existing CI. Consequently, each state plans to maintain and expand upon Track 2 connectivity improvements. In Idaho, connectivity enhancements to the IRON network and the campus LAN improvements are both integral elements of the institutional plans for connectivity and will be maintained by the Idaho institutions and the growing partnerships within the IRON Consortium. Network and video connectivity improvements in Nevada will be sustained by NevadaNet. Likewise, the State of New Mexico will maintain connectivity to the six Tribal colleges and Hispanic-Serving Institutions supported by Track 2 investments.

Model and Data Interoperability Solutions. A key outcome of the Track 2 investments will be the formation of an Idaho Environmental Data Center housed in the Idaho Water Center and sustained by the Idaho Department of Water Resources (IDWR) Information Technology Division. This co-location of the IDWR IT Division and the academic climate change data, HIS data, and Virtual Watershed information from the Idaho Experimental Watershed Network will result in a greater depth of IT support for the state data and will improve communications between state agencies, federal agencies, and the Universities within this Consortium. The state data manager initially funded by Track 2 will be located within the Water Center, and sustained by the University of Idaho. The generic software interoperability framework and other software tools developed in this project will be shared, updated and maintained through the CSDMS model archive (http://csdms.colorado.edu/wiki/index.php/Main_Page). New Mexico data archive enhancements will be integrated into the New Mexico Resource Geographic Information System (RGIS, http://rgis.unm.edu), providing long-term support for the storage and delivery of the developed data products and services via state and USGS funding.

Cyberlearning. Sustainability of cyberlearning components will focus on institutionalization of the activities developed during the project. Collaborative relationships forged during the Track 2 project period will continue, with research teams sponsoring graduate student and postdoctoral associate participation in training workshops and to utilize CI in their collaborations. Consortium institutions will develop CI-enabled training activities that can be adopted into curricula at respective institutions and offered remotely to partner institutions via the Access Grid Network and other CI mechanisms. For example, Nevada (UNR) will develop a graduate level class on Climate Modeling in the Atmospheric Sciences Graduate Program that will be offered to students from partner institutions.

Ensuring sustainability of the cyberlearning materials created for both formal and informal education involves addressing four key issues: (1) producing adaptable, high quality materials; (2) alignment of the materials with the existing science standards; (3) broad availability and dissemination, particularly through web portals; and (4) adoption of resources by schools and school districts. These will be accomplished by connecting materials with schools, initially via the Track 2 teams and extracurricular partnerships, and subsequently by continued use and adaptation by other schools and organizations. All of the Consortium institutions have outreach components through which cyberlearning materials can be distributed. In Nevada, this will involve the Raggio Center for STEM Education on the UNR campus and the Center for Mathematics and Science Education on the UNLV campus. In Idaho, cyberlearning materials can be distributed by programs like Project WET, BoiseWatershed, MOSS, and science centers, as well as through NSF-funded GK-12 partnerships with school districts and the Idaho Teachers Association. Outreach programs in New Mexico include the New Mexico Public Education Department, the Earth's Birthday Project, Santa Fe Institute's GUTS Program, the New Mexico Supercomputing Challenge, and programs associated with the New Mexico Computing Application Center.

(2) Proposal Development and Enhancing Future Competitiveness

Combined, Track 2 investments will enable Consortium participants to partner with each other and with scientists beyond the three states to compete for additional external funding from NSF and other agencies. For example, collaborators develop proposals for funding from NSF's Office for Cyberinfrastructure and various Directorates including the Biological Sciences, Geosciences, Computer and Information Science and Engineering, as well as Cross-cutting Programs. Because the climate change theme also encompasses social and economic impacts, collaborators will also be able to expand their grant-seeking into programs such as Coupled Human and Natural Systems and to submit proposals on Complexity Science and Large-scale Interdisciplinary Research to the Directorate of Social, Behavioral, and Economic Sciences. In addition to NSF, teams will be competitive for NASA's Research Opportunities in Space and Earth Sciences, and the Department of Defense's Broad Agency Announcements for basic and applied research in Environmental Sciences (in particular, Atmospheric Sciences) and Computing and Information Sciences (in particular, Software and Intelligent Systems). Track 2 investments will enable Consortium participants to use CI for education and training. This will enable collaborators to become more competitive in proposals to education-oriented programs, such as the NSF IGERT and GK-12 programs, Scholarships for STEM, and STEM Talent Expansion Programs.

(3) New Partnerships

Sustainability will be fostered by creation of new partnerships and collaborations (e.g., CSDMS, NCAR, National Laboratories, state, and federal agencies) that result from the project activities. CI investments will also facilitate growing collaborations with researchers at the Pacific Northwest Laboratory, University of Washington Climate Impacts Group, and Washington State University Laboratory for Atmospheric Research, all of which are working on climate change in the Pacific Northwest. The proposed hydrologic information systems (HIS) servers and databases for point observations will make the Consortium states among the first members of the new CUASHI Water Data Federation. This relationship with the NSF-sponsored CUAHSI will serve to help facilitate long term use and advancement of the system.

Milestones for Sustainability. By the end of the project these key milestones will be met:

- All proposed connectivity and bandwidth improvements will maintained by identified state entities.
- The Idaho Environmental Data Center will be situated in and maintained by the IDWR.
- The Idaho State Data Manager will be fully funded and institutionalized by the UI.
- The software interoperability framework and other software tools will be shared, updated, and maintained by CSDMS.

- The NM data archive enhancements will be integrated into the NM RGIS.
- All states will incorporate sponsorship of graduate students and postdoctoral associates in CI training and utilization.
- All states will develop CI-enabled training activities for use in curricula
- UNR will develop a graduate level class on Climate Modeling.
- Cyberlearning materials developed will be distributed through existing state outreach mechanisms.
- Collaborative proposals will be submitted to NSF and other funding agencies.
- New partnerships will begin in year 1, and firmly in place by the end of the project.

8. Management and Coordination Plan

The Consortium's management and coordination plan draws on the strengths of each state's EPSCoR program structure. There are four primary elements of the Consortium's CI management structure: (1) State Committees, (2) EPSCoR offices and Management Team, (3) CI Component Teams, and (4) evaluation and assessment (Figure 5). The Consortium management and coordination plan also includes a postdoctoral mentoring plan and coordination mechanisms.

8.1 Project Management Structure and Functional Roles of Components

State EPSCoR Committees. A State Committee that includes members from community, government, private, and academic sectors from all regions of their respective states oversees each state's EPSCoR program. State Committees are a catalyst for integrating academic research capacity with state S&T plans and priorities.

Idaho's 18-member State Committee establishes policies, criteria, and procedures necessary to ensure that EPSCoR goals and objectives are met including to (1) guide and coordinate the state effort under federal-wide EPSCoR; (2) exercise quality control through the use of external reviewers; and (3) ensure that research supported under EPSCoR is consistent with state economic, human resource development, and S&T strategies. It also oversees the business of the Idaho EPSCoR office and monitors the selection, progress, and implementation of the EPSCoR-like programs in the State.

Nevada's 12-member EPSCoR Advisory Committee advises the State EPSCoR Director on strategic directions for sustained health and growth of Nevada's EPSCoR programs; connects science and technology advancements to an educated workforce, and ensures economic development and diversification; supports and assists in the development of science and technology in the State of Nevada, including education, research, and technology transfer; and informs legislators, businesses, committees, associations, and other interested parties about the importance of EPSCoR in Nevada and the critical role science and technology play in economic development.

New Mexico's EPSCoR Committee is the primary governing body for NM EPSCoR. It recommends the focus areas for NM EPSCoR; assists EPSCoR in enhancing the state's research infrastructure through partnerships with universities, national laboratories, and industry; promotes research and collaboration among the NM universities; increases opportunities for K-graduate education and training; helps develop the state workforce of scientists and engineers; and promotes economic development.

State EPSCoR Offices and Management Team. A strong basis for effective management of the Consortium is rooted in the collaboration created in 2008 by ID, NV, and NM in their RII Track 1 climate change programs. The Track 2 Management Team will be led by the three state Project Directors: Dr. Greg Bohach (ID), Dr. Gayle Dana (NV), and Dr. William Michener (NM), with administrative coordination and outreach assistance from their state EPSCoR office staff. Because Nevada is the lead organization, Dr. Dana will be the Lead PI and primary Consortium liaison with NSF. The PIs will be responsible for overall project management, budgetary and reporting oversight, and ensuring evaluation and assessment requirements are met. One PI/Co-PI will Chair the Management Team, with the Chair rotating annually. The Chair will ensure that interjurisdictional meetings and activities are scheduled and implemented. EPSCoR office staff of each state will provide web, editing, and communications support for the project.

CI Component Teams. Each project component has an overall faculty lead to ensure component goals and objectives are met: Dr. Fred Harris (NV) for Connectivity/Bandwidth; Dr. Karl Benedict (NM) for Model/Data Interoperability; and Dr. Katherine Mitchell (NM) for Cyberlearning. State faculty leads are also identified to oversee state-specific component activities. Each state will assign an individual to serve as a CI program coordinator and assist with the day-to-day management of the Consortium's activities.

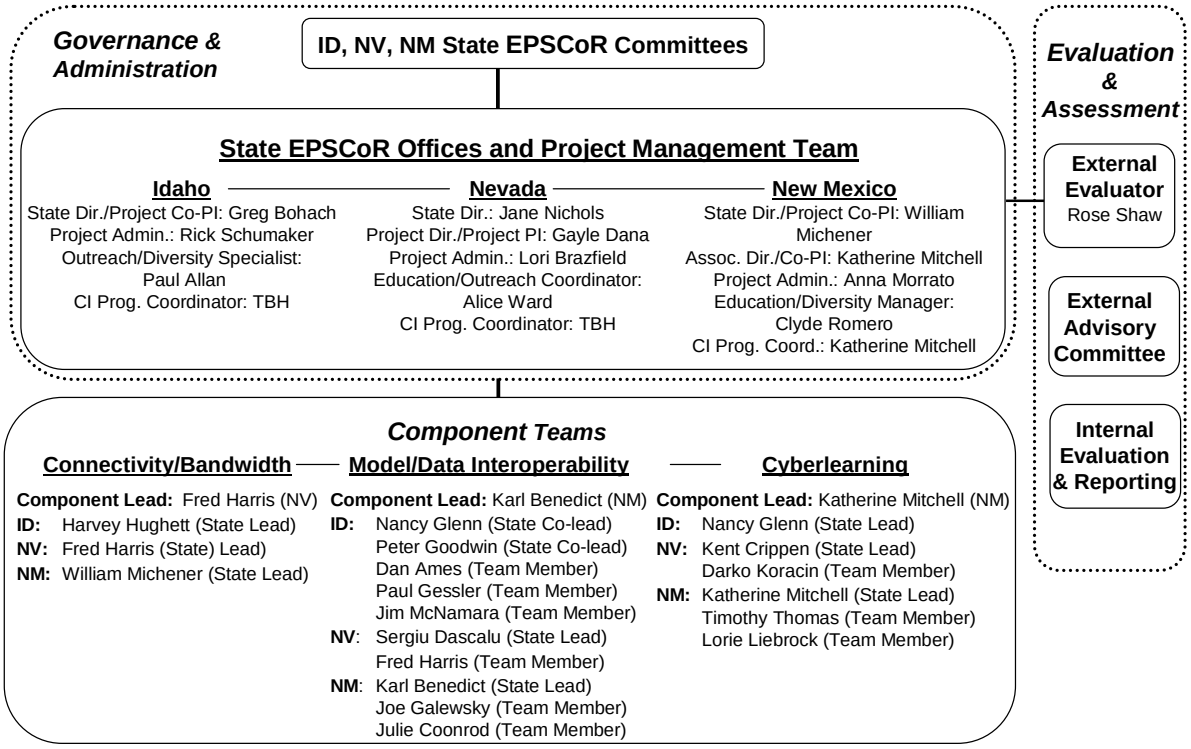

Figure 5: Organizational Chart

Evaluation and Assessment. The Management team will work in concert with the External Evaluator (Dr. Rose Shaw), an External Advisory Committee, and Internal Evaluation to monitor how well the project is moving towards its goals. The External Advisory Committee (EAC) and External Evaluator will interact with researchers and their coworkers as well as the Management Team by attending the annual meeting held in rotating state locations. The EAC will (1) review progress toward achieving outcomes of the projects; (2) make constructive suggestions for improving and/or changing the direction of the work underway; and (3) advise the Management Team. Committee members have been selected to ensure that internationally and nationally recognized experts will review the subject areas.

Western Consortium External Advisory Committee Members

Dr. Francine Berman	University of California, San Diego
Dr. Kelvin Droegemeier	University of Oklahoma
Dr. Jordan Powers	National Center for Atmospheric Research
Dr. Robert Sherwood	Indiana University, Bloomington
Dr. Henry Neeman	University of Oklahoma
Dr. David Tarboton	Utah State University
Dr. Janice Gobert	Worchester Polytechnic Institute
Dr. Alan Hevner	University of South Florida

Postdoctoral Mentoring Plan. The Consortium has adopted a theme of inclusion and engagement for mentoring of postdoctoral associates. Mentoring will include early career development such as cultivating professional networks, guidance on teaching, engagement in outreach, and participation in learning materials development. They will also receive training in grantsmanship, manuscript preparation, and responsible conduct of research. In particular, Consortium postdoctoral associates will participate in the annual week-long New Mexico Faculty Leadership Program where they will learn project management, leadership, communication, and related skills from internationally recognized experts. Climate change science and CI cross many disciplines; therefore, postdoctoral associates will be integrated into the CI and climate change teams, where they will learn interdisciplinary collaboration via active engagement with professionals from other disciplines.

Under the guidance of senior faculty members, postdoctoral associates will also be involved in organizing scientific forums (conferences, workshops, and/or symposia) and reviewing related research

work submitted to these forums. In addition, the postdoctoral associates will work jointly with their advisors to publish research papers and will deliver presentations at national conferences. Postdoctoral associates will also be trained by faculty members to mentor graduate students involved in the project.

8.2 Coordination Mechanisms

Integration of cross-jurisdictional and cross-disciplinary science will be coordinated via several mechanisms that are described in more detail in the Dissemination and Communication Plan. These mechanisms include collaboration enabled by annual tri-state CI meetings, BaseCamp, and Adobe Connect Professional online meetings. The Management Team will review the progress of the project semiannually. With the advice of the EAC, the Management Team will take corrective actions as necessary to ensure successful attainment of the project's goals. The lead PIs will also meet several times a year at the NSF EPSCoR Project Director and National meetings. Lead PIs will meet monthly via Adobe Connect to discuss project management and progress. Project coordinators will participate in bi-weekly online video and/or teleconferences to ensure effective coordination of project details.

Management and coordination mechanisms appear in the budget as travel costs for participants, and material and supply costs for the state hosting the annual CI Consortium meetings; travel and honoraria for External Advisory Committee annual site visits; and Adobe Connect service costs for NV. BaseCamp is provided by UNM's Earth Data Analysis Center at no cost to the Consortium. Travel costs for the PDs to attend NSF EPSCoR PD and National EPSCoR meetings are covered in each state's Track 1 budget.

9. Conclusion: Intellectual Merit and Broader Impacts

9.1 Intellectual Merit. In the Western U.S., climate change impacts may be especially pronounced due to the tight coupling between climate and regional hydrology, and its ramifications for the water supply, disturbance regimes (e.g., fire, drought), the region's economy, and quality of life. The proposed cyberinfrastructure developments will enable atmospheric scientists, climatologists, hydrologists, engineers, social scientists, economists, and others to more effectively share standardized and interoperable data and models, and to more easily develop regionally coupled atmosphere-land surface-hydrology-socioeconomic models. Enhanced connectivity to research universities, Tribal colleges, regional universities, field stations, and other academic organizations will have broad-ranging impact on research and education enterprises throughout the Consortium. Our institutions and states will be linked to more than 200 other Internet2 universities, government research laboratories, companies, and many research facilities throughout the world, facilitating data-intensive research, collaborative development, distributed experiments, grid-based data analysis, and experimentation using high performance networking, social networking, and cyber-enabled learning. Community science will be enabled by the shared capabilities for model interoperability, data assimilation, analysis, and visualization that will be developed by the Consortium. Most importantly, the combined improvements in connectivity and enhanced interoperability and accessibility of data and models will enable the Consortium to realize its community science objectives, and to participate in national and international virtual organizations that work to solve problems associated with global climate change.

9.2 Broader Impacts. From its inception, the proposed CI investments in the Consortium were designed to achieve broad impact and to add value by leveraging existing resources and infrastructure within the institutions, jurisdictions, and regions. The institutions that will benefit from increased connectivity include rural institutions and those that serve Hispanic and Native American students and faculty. Open access to the data and models developed within the Consortium and made available through the data archive and the model interoperability framework ensure that scientific products can be broadly disseminated and readily used by scientists, engineers, and students throughout the world. Moreover, the project will make usable high-quality environmental data, information, and models available for STEM education and outreach, including classroom and laboratory use and student research. The Consortium's education programs will have far-reaching impact by: (1) developing new CI skills and climate modeling expertise for students, postdoctoral associates, and faculty; (2) integrating cyberlearning and climate change science into middle and high school education, especially targeting rural schools and schools that reach large numbers of Hispanic and Native American students; and (3) developing an Industry CI Days Program that increases awareness of emerging CI technologies among business and industry representatives.

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http://csdms.colorado.edu/wiki/index.php/Main_Page

Weather Research and Forecast Model (WRF) http://www.wrf-model.org/index.php

Interactive Multi-Media Exercises (IMMEX) http://www.immex.ucla.edu/

McCall Outdoor Science School http://www.pcei.org/moss/

Project GUTS http://www.santafe.edu/education/k12-project-guts.php

The Super Computing Challenge http://www.challenge.nm.org/sti/

Web-based Inquiry Science Environment (WISE) http://wise.berkeley.edu/

CI Days www.CIDays.org

List of Project Participants in the Western CI Consortium of Idaho, Nevada, and New Mexico

Name	State	Institution	Role – Project Team
Senior Personnel			
Gayle Dana	NV	Desert Research Institute	Lead PI, Management Lead
William Michener	NM	Univ. New Mexico	Co-PI, Management Co-Lead & Connectivity/Bandwidth State Lead
Katherine Mitchell	NM	Univ. New Mexico	Co-PI, Management Co-Lead & Cyberlearning Consortium Lead
Gregory Bohach	ID	Univ. Idaho	Co-PI, Management Co-Lead
Sergiu Dascalu	NV	Univ. Nevada Reno	Model/Data Interoperability State Lead
Fred Harris	NV	Univ. Nevada Reno	Connectivity/Bandwidth Consortium Lead & Model/Data Interoperability team member
Kent Crippen	NV	Univ. Nevada Las Vegas	Cyberlearning State Lead
Darko Koracin	NV	Desert Research Institute	Cyberlearning team member
Faculty Assoc. TBD	NV	Univ. Nevada Las Vegas	Cyberlearning team member
Faculty, TBD	NV	Univ. Nevada Las Vegas	Cyberlearning team member
Karl Benedict	NM	Univ. New Mexico	Model/Data Interoperability Consortium Lead
Julie Allred Coonrod	NM	Univ. New Mexico	Model/Data Interoperability team member
Joseph Galewsky	NM	Univ. New Mexico	Model/Data Interoperability team member
Lorie Liebrock	NM	New Mexico Tech	Cyberlearning team member
Tim Thomas	NM	Univ. New Mexico	Cyberlearning team member
Peter Goodwin	ID	Univ. Idaho	Model/Data Interoperability State Co-Lead
Nancy Glenn	ID	Idaho State Univ.	Model/Data Interoperability State Co-Lead Cyberlearning State Lead
Paul Gessler	ID	Univ. Idaho	Model/Data Interoperability team member
Dan Ames	ID	Idaho State Univ.	Model/Data Interoperability team member
James McNamara	ID	Boise State Univ.	Model/Data Interoperability team member
Faculty Assoc., TBD	ID	TBD	Cyberlearning team member
Post Doctoral Scholars			
TBH	NV	Univ. Nevada, Reno	Model/Data Interoperability team member & Connectivity/Bandwidth team member
TBH	NM	Univ. New Mexico	Model/Data Interoperability team member
TBH	ID	Idaho State Univ.	Model/Data Interoperability team member
TBH	ID	Boise State Univ.	Model/Data Interoperability team member
Other Professionals			
Lori Brazfield	NV	NV System Higher Ed.	Project Administrator
Alice Ward	NV	NV System Higher Ed.	Education & Outreach Coordinator
Lisa Contreras	NV	NV System Higher Ed.	Communications Specialist
TBH	NV	Desert Research Institute	CI Program Coordinator
Anna Murrato	NM	Univ. New Mexico	Project Administrator
Clyde Romero	NM	Univ. New Mexico	Education/Diversity Manager
TBH	NM	New Mexico Tech	NMCAC Education Outreach Coordinator & Cyberlearning team member
TBH	NM	New Mexico Tech	NMCAC Gateway Support - Cyberlearning
TBH	NM	New Mexico Tech	NMCAC Workforce/Awareness Cyberlearning
Harvey Hughett	ID	Univ. Idaho	Connectivity/Bandwidth State Lead
Rick Schumaker	ID	Univ. Idaho	Project Administrator
Althea Flegel	ID	Univ. Idaho	Program Coordinator
Paul Allan	ID	Univ. Idaho	Outreach/Diversity Specialist
TBH	ID	Univ. Idaho	CI Project Coordinator
TBH	ID	Univ. Idaho	Data Manager & Model/Data Interoperability team member

List of Project Participants in the Western CI Consortium of Idaho, Nevada, and New Mexico, continued

Name	State	Institution	Role – Project Team
Graduate Students			
TBH	NV	Univ. Nevada Reno	Model/Data Interoperability team member
TBH	NV	Univ. Nevada Reno	Connectivity/Bandwidth team member
TBH	NV	Univ. Nevada Las Vegas	Cyberlearning team member
TBH	NM	Univ. New Mexico	Model/Data Interoperability team member
TBH	NM	New Mexico Tech	Cyberlearning team member
TBH	ID	TBD	Cyberlearning team member

Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute

Professional preparation

University of California, Davis	Zoology	B.S., 1976
San Francisco State University, CA	Ecology and Systematic Biology	M.A., 1981
University of Nevada, Reno	Hydrology/Hydrogeology	Ph.D., 1997

Appointments

2007-present	Project Director, Nevada NSF EPSCoR
2005-2007	Associate Project Director, Nevada NSF EPSCoR
2003-present	Associate Research Professor, Desert Research Institute (DRI), Division of Hydrologic Sciences
2004	Interim Director, Center for Watersheds and Environmental Sustainability, DRI
2003	Deputy Director, Center for Watersheds and Environmental Sustainability, DRI
1998-2003	Assistant Research Professor, DRI, Division of Hydrologic Sciences
1998-present	Nevada Space Grant Faculty Coordinator, DRI
1993-1997	Research Assistant, DRI
1984-1992	Research Specialist, Marine Science Institute, U.C. Santa Barbara

Five publications closely related to proposed project

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5. Doran, P.T., C.P. McKay, G.D. Clow, G.L. Dana, A.G. Fountain, T. Nylen, and W.B. Lyons. 2002. Valley Floor climate observations from the McMurdo dry valleys, Antarctica, 1986-2000. Journal of Geophysical Research (Atmospheres) 107: ACL (13)1-12.

Five Other Significant Publications

1. Dana, G.L. R. E. Davis, A. G. Fountain, and R. A. Wharton, Jr. 2002. Satellite-Derived Indices of Stream Discharge in Taylor Valley, Antarctica. Hydrological Processes 16:1603-1616.

2. Fountain, A.G., W.Berry Lyons, M.B. Burkins, G. L. Dana, et al., 1999. Physical controls on the Taylor Valley Ecosystem, Antarctica. Bioscience 49 (12):961-971.

3. Lewis, K.J., A.G. Fountain, and G.L. Dana. 1999. How important is terminus cliff melt?: A study of the Canada Glacier terminus, Taylor Valley, Antarctica. Global and Planetary Change 22:105-116.

4. Dana, G.L., R.A. Wharton, Jr., and R. Dubayah. 1998. Solar radiation in the McMurdo Dry Valleys, Antarctica. *In* Ecosystem Processes in a Polar Desert: The McMurdo Dry Valleys, Antarctica, Ant. Res. Ser. 72: 39-64. Ed. by J. Priscu, AGU, Washington DC.

5. Fountain, A.G., G. Dana, K.J. Lewis, B.H. Vaughn, and D.M. McKnight. 1998. Glaciers of the McMurdo Dry Valleys, Southern Victoria Land, Antarctica. *In* Ecosystem Processes in a Polar Desert: The McMurdo Dry Valleys, Antarctica, Ant. Research Ser. 72:65-75. Edited by J. Priscu, AGU, Washington, D.C.

Synergistic activities

1. Serve on Nevada State Committee: Women in Higher Education of the American Council on Education.

2. Serve on the Executive NSF EPSCoR Project Director's Committee.

3. Co-Chaired Lake Tahoe Science Advisory the Lake Tahoe Basin CA

4. Developed NSF-funded research course for Nevada high school students and teacher

5. Served on panel for USDA proposals and as reviewer for NSF, USDA, and USGS proposals and WRR, Hydrological Sciences, JAWRA journals.

Collaborators and other affiliations

Collaborators and Co-authors

S. Borleske (Delaware Biotechnology Institute)
R. Carroll (DRI)
F. Choobineh (UNL)
A. Fountain (PSU)
V. Grubisic (DRI)
D. Johnson (UNR)
D. Koracin (DRI)
D. McGraw (DRI)
W. Michener (UNM)
W. Miller (UNR)
T. Nylen (PSU)
A. Panorska (UNR)
P. Schweitzer (UAF)
J. Shreeve (UI)
W. Stockwell (Howard Univ.)
R. Susfalk (DRI)
S. Tyler (UNR)
J. Van Houten (UVM)
P. Verburg (DRI)

Graduate and Postdoctoral Advisors

S. Bowen (Master's Advisor) - retired
R.A. Wharton, Jr. (Ph.D. Graduate Advisor) – S. Dakota School of Mines and Technology

Thesis Advisor and Postgraduate-scholar Sponsor

Susan Burak (M.S. in progress)

Kent J. Crippen
Department of Curriculum & Instruction
University of Nevada-Las Vegas
4505 Maryland Parkway
Las Vegas, NV 89154-3005
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Professional Preparation

B. S., Education, University of Nebraska-Lincoln, 1991 Nebraska Teaching Certificate: Natural Science, Chemistry

M. Ed., Curriculum & Instruction, University of Nebraska-Lincoln, 1996 Minor: Biochemistry

Ph.D., Administration, Curriculum & Instruction (Instructional Technology), University of Nebraska-Lincoln, 2001 (Analysis of Learning at an Advanced Placement Chemistry Web Site)

Appointments

Associate Professor of Science Education and Technology, University of Nevada Las Vegas, 2001-present.

Research Assistant Professor of Instructional Technology, University of Nebraska-Lincoln, 2000-2001.

Publications

Publications Most Relevant to Proposed Project

Crippen, K. J., Biesinger, K. D., Muis, K. R., & Orgill, M. (accepted). The Role of Goal Orientation and Self-Efficacy in Learning from Web-based Worked Examples. *Journal of Interactive Learning Research*.

Biesinger, K. D., & Crippen, K. J. (2008). The Impact of an Online Remediation Site on Performance Related to High School Mathematics Proficiency. *Journal of Computers in Mathematics and Science Teaching*, 27(1), 5-17.

Crippen, K. J., & Earl, B. L. (2007). The impact of Web-based worked examples and self-explanation on performance, problem solving, and self-efficacy. *Computers & Education*, 49(3), 809-821.

Brooks, D. W., & Crippen, K. J. (2006). Web-Based Practice and Assessment Systems in Science. In J. J. Mintzes & W. H. Leonard (Eds.), *Handbook of College Science Teaching: Theory, Research, and Practice*: NSTA Press.

Schraw, G., Crippen, K. J., & Hartley, K. D. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education*, 36(1-2), 111-139.

Five Other Significant Publications

Crippen, K. J., Biesinger, K. D., & Orgill, M. (2007, 4/6). Achievement goal orientation as a predictor for learning in an online environment for undergraduate chemistry. *Proceedings of the National Association of Research in Science Teaching (NARST) Annual Meeting*, New Orleans, LA.

Archambault, L., & Crippen, K. J. (2007). The sites teachers choose: A gauge of classroom Web use. *Contemporary Issues in Technology and Teacher Education: General*, 7(2).

Kumar, D. D., & Crippen, K. J. (2005). Science education in review: Response to the Secretary's Summit of 2004. *Journal of Science Education and Technology*, 14(2), 143-145.

Crippen, K. J. (2003). Rethinking course assessment: Creating accountability with Web-based tools. *Journal of Science Education and Technology*, 12(4), 431-438.

Crippen, K. J., & Brooks, D. W. (2002). An analysis of student learning at a testing web site emphasizing descriptive chemistry. *Journal of Computers in Mathematics and Science Teaching*, 21(2), 183-201.

Synergistic Activities

Associate Director of UNLV's Center for Mathematics and Science Education.
Associate Editor of the Journal of Science Education and Technology.
PI for three major, state funded professional development projects for K12 science and mathematics teachers.
Co-PI for multiple collaborative proposals to IES and NSF to support mathematics and science education initiatives for southern Nevada.
Member of research and development team for Web-based graduate chemistry courses (NSF ESI-9819377).

Collaborators

Abuloum, Amjad (Hashemite University, Jordan)
Asay, Loretta (Clark County School District)
Brooks, David (UNL)
Cantrell, Pamela (BYU)
Earl, Boyd (UNLV)
Ewing-Taylor, Jacque (Nevada-Reno)
Farley, John (UNLV)
Kang, Nam-Hwa (Oregon State)
Kumar, David (Florida Atlantic University)
Muis, Krista (McGill, Canada)
Orgill, MaryKay (UNLV)
Schraw, Gregg (UNLV)
Smith, Ken (Nevada-Reno)

Graduate Advisor

Dr. David W. Brooks, University of Nebraska-Lincoln

Thesis Advisor and Postgraduate-Scholar Sponsor

Dr. Leanna Archambault, Arizona State University
Dr. Kevin Biesinger, Clark County School District
Dr. Kevin Kirk, Clark County School District

Sergiu Dascalu
Associate Professor
University of Nevada, Reno

Professional Preparation

Dalhousie University, Halifax, Canada	Computer Science	PhD, 2001
Polytechnic University of Bucharest, Romania	Automatic Control	MS, 1982

Appointments

University

07/02 - present *Associate Professor* (since 07/1/2008) and Assistant Professor (07/02-06/08), Department of Comp. Sci. & Engineering, University of Nevada, Reno. Areas: Software Engineering, Human-Computer Interaction.
Director, Software Engineering Laboratory (SOELA), UNR.

09/93 - 10/01 Research Assistant and Lecturer, Dalhousie University, Canada.

09/85 - 08/93 Assistant Professor (09/85-09/90) and Reader (09/90-08/93), Faculty of Control and Computers, Polytechnic University of Bucharest, Romania.

Industry

01/02 - 06/02 Senior Systems Consultant, Alpas Solutions, Toronto, Ontario, Canada.

01/91 - 07/93 Software Engineer, Alget Software Company, Bucharest, Romania.

09/82 - 09/84 Control Systems Engineer, Digital Equip. Maintenance Co., Romania.

Five Related Publications

Elpern, J. and S. Dascalu (2008). *A Framework for Understanding the Open Source Revolution*, Chapter 14 in Pierre Tiako (ed.), *Designing Software-Intensive Systems*, IGI Global, pp. 439-454.

Karam, M., Smedley, T., and S. Dascalu (2008). Unit level test adequacy criteria for visual dataflow languages and a testing methodology. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, **18** (1): 1-40.

Quiroz, J., Shankar, A., Dascalu, S., and S. Louis (2007). Software Environment for Research on Evolving User Interface Designs. *Procs. of the 2nd Intl. Conf. on Software Engineering Advances,* IEEE Computer Society Press, pp. 84/1-6.

Dascalu, S., Buntha, S., Saru, D. and N. Debnath (2006). Software tool for naval surface warfare simulation and training. *Journal of Computational Methods in Science and Engineering* **6** (5-6) 2: 427-444.

Kallman, J., Minaie, P., Truppi, J., Dascalu, S., and F.C. Harris, Jr. (2004). Software modeling for open distributed network monitoring systems. Springer Verlag, *Lecture Notes in Computer Science* ***3126***: 158-169.

Five Additional Publications

Karam, M., Dascalu, S., Safa, H., Santina, R., and Z. Koteich (2008). A product-line architecture for web service-based visual composition of web applications. *Journal of Systems and Software* **81** (6): 855-867.

Goodman, P., Zou, Q., and S. Dascalu (2008). Framework and implications of virtual neurorobotics, *Frontiers in Neuroscience* **2** (1): 123-128.

Dascalu, S., Fritzinger, E., Cooper, K. and N. Debnath (2007). A Software Tool for Requirements Specification. *Procs. of the 2nd Intl. Conf. on Software and Data Technologies (ICSOFT-2007*), Barcelona, Spain, pp. 319-326.

Nicolescu, M., Leigh, R., Olenderski, A., Louis, S., Dascalu, S., Miles, C., Quiroz, J., and R. Aleson (2007). A training simulation system with realistic autonomous ship control. *Computational Intelligence Journal* **23** (4): 497-516.

Quiroz, J., Dascalu, S., and S. Louis (2007). Human Guided Evolution of XUL User Interfaces. *Proceedings of the ACM CHI International Conference on Human-Factors in Computing Systems (CHI-2007)*, San Jose, CA, pp. 2621-2626.

Synergistic Activities Relevant to Proposed Project

Three Best Paper Awards: 21st Intl. Conf. on Computer Applications in Industry and Engineering (CAINE-2008), Honolulu, HI, 2008; 21st Intl. Conf. on Computers and Their Applications (CATA-2006), Seattle, WA, 2006; and 11th Intl. Workshop on Information Technologies & Systems (WITS-2001), New Orleans, LA, 2001.

Lemelson Award for Innovation and Entrepreneurship, College of Eng., UNR, 2005.

Program Chair/Co-Chair of 5 international conferences (between 2003 and 2009).

Member of the Technical Program Committee of over 50 international conferences.

Nominee, UNR Outstanding Undergrad Research Mentor Award 2007 and 2008.

Coordinator of the UNR IEEE Colloquia Series.

Vice-Chair, IEEE Northern Nevada Section.

Member of NSF review panels 2007 and 2008.

Collaborators & Other Affiliations

Denis Beller (UNLV)
Norm Brown (Quadrant One, Inc., Arlington, VA)
Wendy Calvin (UNR)
Kendra Cooper (U. of Texas at Dallas)
Gayle Dana (DRI)
Walter Dosch (U. of Lübeck, Germany)
Philippe Dugerdil (U. of Applied Sciences, Geneva)
Phil Goodman (UNR)
Frederick C. Harris, Jr. (UNR)
Nick Lancaster (DRI)
Shahram Latifi (UNLV)
Sushil Louis (UNR)
Scott Mensing (UNR)
Monica Nicolescu (UNR)
Tom Piechota (UNLV)
David Thomas (UNR)
Andy Trzynadlowski (UNR)
Yaakov Varol (UNR)

Graduate and Post Doctoral Advisors

Peter Hitchcock (PhD advisor), Peter Bodorik, Bill Phillips, Trevor Smedley (Dalhousie University, Canada); Greg Butler (Concordia University, Montreal, Canada).

Thesis Advisor and Postgraduate-Scholar Sponsor

Graduate students advised in the past: 21 MS in Computer Science who graduated between 2003 and 2008: Olusegun Akinwale, Sermsak Buntha, Tihomir Calic, Maryann Chandy, Carol Freinkel, Eric Fritzinger, Ning Hao, Moynul Haque, Nicola Herndon, John Jusayan, Robert Larmore, Michael McMahon, Muhanna Muhanna, Burcu Nemutlu, Manish Nilawar, Sohei Okamoto, Mubeen Parkar, Juan Quiroz, Gigi Shum, Sagar Talekar, Sravanthi Yendluri.

Graduate students currently advised: 4 PhD in Computer Science and Engineering students: Sermsak Buntha, Muhanna Muhanna, Sohei Okamoto, and Saul Reed; and 6 MS in Computer Science students: Sathya Chandrasekar, Cory Fleming, Kai Huang, Colin King, Hrishikesh Kulkarni, and Bilal Nemultu.

Frederick C Harris, Jr.
Professor
University of Nevada, Reno

Professional Preparation

BS, 1986 Bob Jones University	Mathematics
MS, 1988 Bob Jones University	Educational Administration
MS, 1991 Clemson University	Computer Science
PhD, 1994 Clemson University	Computer Science

Appointments (academic/professional, beginning w/ most recent)

7/2007 – present, Full Professor, Dept. of Comp. Science and Engr., Univ. of Nevada, Reno
7/2007-9/2008 Interim Sr. Director, Center for Advanced Visualization, Computation, and Modeling, DRI
7/2004 – present Affiliated Faculty, Division of Atmospheric Sciences, Desert Research Institute
7/2000-6/2007 Associate Professor, Dept. of CSE, UNR
8/1994-6/2000 Assistant Professor, Dept. of CSE, UNR

Five Related Publications

Sherman B, Su S, McDonald P, Mu Y, Harris F, "Open-source Tools for Immersive Environmental Visualization," *IEEE Computer Graphics and Applications,* Vol. 27, No. 2, March/April 2007, pp 88-91.

Vert, G., Harris, F., Nasser, S., "Spatial Data Authentication Using Mathematical Visualization," *International J. of Computer Science and Network Security*, Vol. 7, No. 1, pp 267-274. 2007.

Tan P, Harris F, "A Low-Cost Algorithm for Multicast Routing," *Congr. Numer.*, Vol. 145 (2000), p. 81-96.

Westphal B, Harris F, Dascalu S, "Snippets: Support for Drag-and-Drop Programming in the Redwood Environment," in *J. of Universal Computer Sci.* Vol. 10, No. 7, (2004), pp 859-871

Vert G, Dascalu S, Harris F, Buntha S, "A Visual Environment for the Characterization of State Changes in Computer Systems," *Proceedings of the International Conference on Security and Management (SAM-06)*, Las Vegas, NV, June 2006, pp. 435-440.

Five Additional Publications

Brette R, Rudolph M, Carnevale T, Hines M, Beeman D, Bower J, Diesmann M, Morrison A, Goodman P, Harris F, Zirpe M, Natschlager T, Pecevski D, Ermentrout B, Djurfeldt M, Lansner A, Rochel O, Vieville T, Muller E, Davison A, El Boustani S, and Destexhe A, "Simulation of networks of spiking neurons: A review of tools and strategies," *Journal of Computational Neuroscience,* Vol. 23, December, 2007, pgs 349-398.

Yi B, Harris F, Wang L, and Yan Y, "Real-Time Natural Hand Gestures," *Computing in Science and Engineering,* Vol. 7, No. 3, May/June 2005, pp. 92-97.

Macera JC, Goodman PH, Harris F, Drews R, and Maciokas JB, "Remote-Neocortex Control of Robotic Search and Threat Identification," *Robotics and Autonomous Systems*, Vol. 46, No. 2, February 2004, pp 97-110.

Dunbar J, Harris F, Hedetniemi SM, Hedetniemi ST, McRae AA, and Laskar RC, "Nearly Perfect Sets in Graphs," *Discrete Math.*, Vol. 138 (1995), pp. 229-246.

Geist R, Offutt AJ, Harris F, "Estimation and Enhancement of Real-Time Software Reliability Through Mutation Analysis," *IEEE Trans. on Comp.*, Special Issue on Fault-Tolerant Computing, Vol. 41, No. 5 (1992), pp. 550-558.

Synergistic Activities Relevant to Proposed Project

- Editor or Assoc. Editor, Conf Proceedings: IS '96, SERP '04, SERP '05, CAINE '08
- Program Committee member for annual conferences: CAINE, CATA, IEEE VR, SEDE, ICIW, ACHI, IWSSA, ITNG
- Best Paper Award: CAINE 2008, CATA 2006, SCI 2003, ACM SE 1992

- Who's Who Among America's Teachers, 7th edition (2002), 6th edition (2000), 5th edition (1998), 4th edition (1996).
- F. Donald Tibbitts University Distinguished Teacher Award, Univ. of Nevada, Reno, 2005

Collaborators & Other Affiliations

University of Nevada, Reno collaborators: Rawan Alkadi, Marcos C. Bagby, Mark Ballew, Scott Bassett, Jason Baurick, William E. Brandstetter, Adrienne Breland, Sermsak Buntha, Maryann Chandy, David D. Colborne, Sergiu M. Dascalu, Rich Drewes, Michael Dye, Dwight D. Egbert, Sherif Elfass, Ali Erol, James Frye, Justin T. Gethoffer, Philip H. Goodman, Roger V. Hoang, Lance Hutchinson, Joseph Jaquish, Matthew Knaus, Josh Koberstein, Robert Larmore, Marcel Levy, Michael J. McMahon, Joseph D. Mahsman, Siraj Malik, Roberto C. Mancini, Kim P. Martin, James Motta, Mukesh Motwani, Rakhi Motwani, Muhanna Muhanna, Jeremy Murray, Monica Nicolescu, Michael A Penick, Jesse D. Phillips, Jason C. Porterfield, Fares Qedan, Juan C. Quiroz, Alexander Redei, Ryan A. Romero, Karen Schlauch, Matthey R. Sgambati, Michael J Smith, John D. Studebaker, Brett Sulprizio, Danny Taylor, Ed Tumbusch, Hiroko Uda, Yaakov Varol, Gregory Vert, Brian Westphal, Christine J Wilson, Xiaolu Zhang, Milind Zirpe

Desert Research Institute, Nevada: Grant M. Kelly, Phil McDonald, Yi Mu, William Sherman, Simon Su

Other Collaborators

Ameya Amberdekar (Vishwakarma I. of T., India)
Pushkar Apte (Vishwakarma I. of T., India)
David Beeman (UC Boulder)
Nikhil Beke (Vishwakarma I. of T., India)
Abhijit Bhoite (Vishwakarma I. of T., India)
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David T. Brown (Balley)
James M. Bower (UT San Antonio)
Ted Carnevale (Yale)
Andrew P. Davison (CNRS France)
Alain Destexhe (CNRS France)
Markus Diesmann (RIKEN Japan)
Mikael Djurfeldt (KTH Stockholm)
Bard Ermentrout (U of Pittsburgh)
Michael Hines (Yale)
Marcel Karam (AUB, Lebanon)
John L. Kenyon (EPFL)
James G. King (EPFL)
Anders Lansner (KTH Stockholm)
Abigail Morrison (RIKEN Japan)
Yi Mu (DRI)
Eilif Muller (KIP, Heidelburg)
Sara Nasser (TGen)
Thomas Natschlager (SCC Hagenberg)
Dejan Pecevski (Tech Univ Graz)
Olivier Rochel (Univ of Leeds, UK)
Michelle Rudolph (CNRS)
Manolo E. Sherrill (SNL)
Jeff Stuart (UC Davis)
Danelee Sura (U. Politehnica, Bucharest)
Thierry Vieville (INRIA France)
Ling Wang (Sichuan Normal, China)
Brian Yusong Yan (Sichuan Normal, China)
Beifang Yi (Salem State)

Graduate and Post Doctoral Advisors

Dr. Stephen T. Hedetniemi, School of Computing, Clemson University
Dr. Robert M. Geist, School of Computing, Clemson University

Thesis Advisor and Postgraduate-Scholar Sponsor

Judith R. Fredrickson, PhD CSE, UNR, 2006. Assistant Professor, TMCC

Beifang Yi, PhD CSE, UNR 2006. Assistant Professor, Salem State Univ.

Sara Nasser, PhD CSE, UNR 2006. Post Doctoral Associate, TGEN

MS UNR: Roger V Hoang (2008) UNR; David T. Brown (2008) Balley; Jeremy W. Murray (2008) IGT; Michael J. Smith (2008) PC Doctor; John R. Kearney (2008) John Deere; Jesse D. Phillips (2008); Adrienne Breland (2008) UNR; John L. Kenyon (2008) EPFL; Milind A Zirpe (2007) IGT; Michael P. Dye (2007); William E. Brandstetter (2007); Michael A Penick (2007); Linda Humphrey (2006) Assoc Anestesiologist; Qunming Peng (2006) St Jude; Joe Jaquish (2005) NV ANG; Marcel Levy (2005) UNR; Jeff Stuart (2005) UC Davis; Jim King (2005) EPFL; Rich Drewes (2005) UNR; Scott Crow (2005) UNR; Bei Yuan (2004) UNR; Brian Westphal (2004)

Total PhD graduates: 3, MS Thesis graduates: 42

Darko Koracin

Research Professor
Desert Research Institute, and
Director, Atmospheric Sciences Graduate Program
University of Nevada, Reno

Professional preparation

University of Nevada, Reno	Physics-Atmospheric Physics	Ph.D., 1989
University of Zagreb, Croatia	Atmospheric Physics	M.S., 1982
University of Zagreb, Croatia	Geophysics and Meteorology	B.Sc., 1979

Appointments

2006-present	Director, Atmospheric Sciences Graduate Program, University of Nevada, Reno
2002-present	Research Professor, Desert Research Institute (DRI)
1997–2002	Associate Research Professor, Desert Research Institute (DRI)
1994–present	Graduate faculty member, UNR
1990–1997	Assistant Research Professor, DRI, UNR
1989–1990	Postdoctoral Research Associate, Atmospheric Physics, DRI, UNR

Five related publications

1. Vellore, R., D. Koracin, M. Wetzel, S. K. Chai, and Q. Wang, 2007: Challenges in mesoscale predictions of nocturnal stratocumulus-topped marine boundary layer and implications for operational forecasting. Wea. Forecasting, 22, 1101-1122.
2. Koracin, D., A. Panorska, V. Isakov, J. S. Touma, and J. Swall, 2007: A statistical approach for estimating uncertainty in dispersion modeling: an example of application in southwestern U.S. Atmos. Environ., 41, 617-628.
3. Isakov, V., A. Venkatram, J. Touma, D. Koracin, and T. L. Otte, 2007: Evaluating the use of outputs from comprehensive meteorological models in air quality applications: A case study in Wilmington, CA. Atmos. Environ., 41, 1689-1705.
4. Bebis, G., R. Boyle, D. Koracin, and B. Parvin, Eds, 2005: Advances in Visual Computing. Lecture Notes in Computer Science, 3804, Springer, 755pp.
5. Cohn, S.A., J. Hallett, and D. Koracin, 1997: Blending education and research in atmospheric science - a case study. Physics Today, 50, 34-39.

Five other significant publications

1. Bebis, G., R. Boyle, B. Parvin, D. Koracin, P. Remagnino, A. Nefian, G. Meenakshisundaram, V. Pascucci, J. Zara, J. Molineros, H. Thiesel, and T. Malzbender, Eds., 2006: Advances in Visual Computing. Lecture Notes in Computer Science, LNCS 4291,Vol. I, 916pp, Springer, Berlin.
2. Bebis, G., R. Boyle, B. Parvin, D. Koracin, P. Remagnino, A. Nefian, G. Meenakshisundaram, V. Pascucci, J. Zara, J. Molineros, H. Thiesel, and T. Malzbender, Eds., 2006: Advances in Visual Computing. Lecture Notes in Computer Science, LNCS 4292, Vol. II, 906pp, Springer, Berlin.
3. Koracin, D., C. E. Dorman, and E. P. Dever, 2004: Coastal perturbations of marine layer winds, wind stress, and wind stress curl along California and Baja California in June 1999. J. Phys. Ocean., 34, 1152-1173
4. Koracin, D., J. Lewis, W. T. Thompson, C. E. Dorman, and J. A. Businger, 2001: Transition of stratus into fog along the California coast: Observations and modeling. J. Atmos. Sci., 58, 1714-1731.

5. Koracin, D., J. Frye, and V. Isakov, 2000: A method of evaluating atmospheric models using tracer measurements. J. Appl. Meteor., 39, 201-221.

Synergistic activities

- U.S. Fulbright Awards (2001, 2003, 2005): Senior Scientist Specialist – Environmental Modeling
- Chair, American Meteorological Society – Coastal Environment Committee (2007-present)
- Member, Renewable Energy Task Force, State of Nevada
- Associate Editor, Journal of the Geophysical Research – Atmosphere
- Invited reviewer for the U.S. state agencies (NSF, NASA, NOAA, and DOE), foreign agencies (Canada, Holland, Germany, and Slovenia) and over 30 peer-reviewed domestic and international journals.

Collaborators and other affiliations
Collaborators and Co-authors

Dr. George Bebis, Computer Science Department, University of Nevada, Reno
Dr. Gordana Beg Paklar, Institute of Oceanography and Fisheries, Split, Croatia
Dr. Edward Dever, Oregon State University, Corvalis, OR
Dr. Clive Dorman, Scripps Institution of Oceanography, San Diego, CA
Mr. Todd Eagleston, Nevada Power Company
Dr. Eric Fujita, DRI
Dr. Vlad Isakov, NOAA/ US Environmental Protection Agency, Rayleigh, NC
Dr. Julide Koracin, DRI
Dr. John Largier, University of California, Davis
Dr. John Lewis, NOAA and DRI
Dr. Anna Panorska, University of Nevada, Reno
Dr. Darrell Pepper, UNLV, Las Vegas
Dr. Jordan Powers, National Center for Atmospheric Research, Boulder, Colorado
Dr. Marc Schwartz, DOE, NREL
Dr. Deliang Tang, Columbia University, NY
Dr. Qing Wang, Naval Postgraduate School, Monterey, California

Graduate and Postdoctoral Advisors
Dr. Branka Penzar, University of Zagreb, Croatia (M.S.) - retired
Dr. David P. Rogers, Met Office, Great Britain (Ph.D.)

Thesis Advisor and Postgraduate-Scholar Sponsor
Narendra Adhikari, University of Nevada, Reno (M.S.)
Radian Belu, Postdoctoral Fellow (2008)
Sherri del Soldato, University of Nevada, Reno (M.S.)
Adam Kochanski, University of Nevada, Reno (M.S.; Ph.D,)
Marshall Liddle, University of Nevada, Reno (M.S.)
Jerrold McAlpine, University of Nevada, Reno (M.S.)
Ramesh Vellore, University of Nevada, Reno (Ph.D.) and Postdoctoral Fellow (2007-present)

Rose Shaw, External Evaluator

Professional Preparation

Dickinson ND State University	Math & Composite Science	BS, 1964
Kansas State University	Mathematics	MS, 1966
University of Northern Colorado	Applied Statistics	PhD, 1994

Appointments

1992-present; Statistics, Evaluation, and Assessment; owner of Metrica, Greeley, CO
1990-93; Evaluation Consultant; Sopris West, Inc., Longmont, CO
1970-93; Instructor, Assistant Professor, and GA, UNC Mathematics Department
1970-71, 1985, 1994; Instructor; Math and computer science, grades 7-12, Lab School
1967-70; Instructor, Math and computer science, Moorhead State University, MN
1964-67; GA and Instructor, Kansas State University, Math Department, Manhattan, KS

Selected Publications

Scheffel, Shaw and Shaw (2007). "The Efficacy of a Supplementary Multisensory Reading Program for First-Grade Students", Reading Improvement, 45(3)

Shaw & Shaw (2002). "DIBELS Oral Reading Fluency-Based Indicators of Third Grade Reading Skills for the Colorado State Assessment Program", Eugene, OR: University of Oregon. http://dibels.uoregon.edu/techreports/index.php

Shaw & Kling (1999). "The Use of Technology-based Focus Groups for Idea Generation", *Journal of Rehabilitation Administration*, vol 2, no 1, pp 5-18, September 1999

Cobb, Shaw, Bomotti & Millard (1999). "An Examination of Colorado's Teacher Licensure Testing", *Journal of Educational Research,* vol 92, no 3, pp 161-175, Jan-Feb, 1999

Selected Juried Presentations

Shaw and Shaw. *The Ability of DIBELS to Predict CSAP Reading Scores,* Colorado Regional Higher Education Assessment Conference, UNC, November 2003.

Cobb and Shaw, "A Validity Study of Colorado's Teacher Licensure Tests", American Association of Colleges of Teacher Education, New Orleans, LA, February 1998.

Selected External Evaluation Projects

External evaluator for over 70 projects in 14 states with extensive expertise assessing and evaluating demonstrable impacts and achievements both qualitatively and quantitatively including:

Culturally Relevant Ecology, Learning Progressions and Environmental Literacy, NSF Targeted MSP, Colorado State University, 2008-13

Nevada Infrastructure for Climate Change Science, Education, and Outreach, NSF infrastructure improvement grant (RII), Nevada System of Higher Education, 2008-13

Idaho Water Resources in a Changing Climate, NSF infrastructure improvement grant (RII), Idaho EPSCoR, 2008-13

Biotechnology Integration Opportunities for Teacher Education and Content (BIOTEC), Northern Arizona University GK12, 2008-2013.

Next Generation Biometrics: Achieving Strength in Molecular Recognition and Transport, NSF infrastructure improvement grant (RII), WV EPSCoR. 2006-09

Improving the Quality of AZ Teachers of Physics, Chemistry, Physical Science and Mathematics, Arizona Board of Regents Improving Teacher Quality grant. Arizona State University, 2006-08 and 2008-10

The Nanosystems Emphasis- Valuing Disciplinary Depth and Differences in Nanoscale Science and Engineering Teams, NSF Nanotechnology in Undergraduate Education grant; WVU, 2008-10.

*Biotechnology for Teachers: A Link between Content and Real-World Appl*ication, Arizona Board of Regents Improving Teacher Quality grant. Northern Arizona University, 2006-08

The Pulsar Search Collaboratory-A Comprehensive Project for Students and Teachers, NSF ITEST – National Radio Astronomy Observatory (NRAO), 2008-11

Ft. Morgan School District Mathematics and Science Partnership, CDE funded, a mathematics MSP, UNC and Wiggins school district are partners, 2007-10.

Northern Colorado High Plains MSP for Teachers and Students, ecology, CDE funded (USDE program), CSU and UNC with high-need LEAs, 2004-07.

Integrative Bioscience: Genes to Environment, NSF IGERT grant linking research with hands-on assessment. Department of Microbiology, Northern Arizona University, 2006-09

Advancing Women in Science, Mathematics and Engineering, NSF ADVANCE, Marshall University, Huntington, WV, 2006-09

Science Storm, University of Kentucky, KY-WV NSF Louis Stokes Alliance for Minority Participation (LSAMP). 2006-2008

Project Three R's: Rigor, Rigorous, Rigorously, USDE Title grant for AP and pre-AP, Yavapai County Education Service Agency, Arizona 2006-09

Colorado Reading First (CRF), statewide evaluator of the CDE NCLB Reading First. State grant from the USDE; $59 million. Formative and outcome; includes accountability and demonstrable impacts of CDE's reading programs, assessments and interventions 2002-08.

Shortgrass Steppe Mathematics and Science Partnership, CDE funded, a science MSP, Colorado State University, partners are two high-need school districts and UNC, 2007-10.

Northern Colorado High Plains MSP for Teachers and Students, CDE funded, CSU and UNC with high-need LEAs, 2004-07.

Needs assessment and program status of the Education, Outreach and Training Work Group of LTER, CSU, 2006.

Colorado Alliance for Minority Participation, Phase I, Phase II and Phase III. Three 5-year NSF LSAMP grants; CSU College of Engineering (with Ft. Lewis College, CSU-P, CU-B, CU-D, Trinidad Junior College, Pueblo CC, Navajo CC, MSCD, Front Range CC, and Jicarilla Apache, Navajo Nation, Southern Ute Tribe, and Ute Mountain Ute Tribes), 1998 to present.

NAU IGERT – Integrative Bioscience: Genes to Environment, NSF, linking research with hands-on assessment. Department of Microbiology, Northern Arizona University, 2006-11.

Improving the Quality of AZ Teachers of Physics, Chemistry, Physical Science and Mathematics, Arizona Board of Regents Improving Teacher Quality grant. Arizona State University, 2006-08.

Equity in Test Preparation for All Students (The ACT Project), Daniels Foundation funding to The Fund for Colorado's Future. Evaluation of impact of project on ACT scores and academic performance of low SES and minority juniors at Lincoln HS (Denver Public Schools) and Central HS (Pueblo City 60); included mentoring component. (2003-05)

Colorado Front Range GK12 brings research on human impacts on ecosystems along the Front Range into K-12 classrooms. NSF GK12 Project, Department of Biological Sciences at CSU in partnership with University of Northern Colorado. 2001-04 and 2005-2009

2004 Real Choice Grantees, Centers for Medicare and Medicaid Services, *National State-to-State Technical Assistance Program* grant to the Independent Living Research Utilization Program, Houston, TX. Technical assistance to Systems Change state grantees and advanced community living for people with disabilities, 2004-2008

RMTEC: Rocky Mountain Teacher Education Collaborative (original and supplemental). NSF CETP grants: 5-year original grant and 3-year supplemental grant. Member of 3-person evaluation team. Original project reformed STEM undergraduate courses to be interactive and real-world based. The supplemental summative evaluation project used a treatment-comparison group model that included classroom observations of 90 science and math classrooms. 1995-2003

Extremely Halophilic Bacteria: A Remarkably Tractable System for Teaching Molecular Techniques, Northern Arizona University, Biology Dept, NSF grants. 2000-01 & 2003-04

External evaluator of mentoring projects *Undergraduate Biological Sciences Education Program*. Two grants funded by the Howard Hughes Medical Institute. Chemistry and Biology Departments at Fort Lewis College, Durango, CO. Retrospective evaluation. 1997

Colorado Mathematics Middle School Teacher Enhancement Project, 4½ year NSF-supported project. Certified member of the national cross-site evaluation of NSF's LSCs. Collaborative of personnel from MSCD, CU-B, and the CDE. 1999-2003

Collaborators

Jane Jackson (University of Arizona)
Debora Scheffel (Colorado Department of Education),
Jack Shaw (Wireless Generation, NYC)
Norman Webb (University of Wisconsin)

Gregory A. Bohach,
EPSCoR Project Director
Professor, Microbiology, University of Idaho

Professional Preparation

University of Pittsburgh, Johnstown	Microbiology	B.S.	1975
Connemaugh Memorial Hospital, Johnstown	Med Tech	M.T. (ASCP)	1978
West Virginia University	Microbiology	M.S.	1982
West Virginia University	Microbiology	Ph.D.	1985
University of Minnesota	Microbiology	Post-doc	1988

Appointments

2009- Idaho EPSCoR Project Director
2004- Associate Dean/Research Director; College of Agricultural & Life Sciences Experiment Station, University of Idaho
2000- Director; Idaho Center for Study of Molecular and Cellular Basis of Host-Pathogen Interactions
1998- Professor in Dept. of Microbiology, Molecular Biology,& Biochemistry & Dept. Head, University of Idaho; Professor in the WWAMI Medical Program
1992- Research Affiliate; Univ. of Washington Regional Primate Research Center
1992- Affiliate Faculty; Univ. of Washington School of Medicine Dept. of Microbiology; Seattle
1988-2000 Assistant/Associate Professor; Univ. of Idaho
1985-1988 Postdoctoral; U. of Minnesota, Minneapolis (Dept. of Microbiology; P. Schlievert, Mentor)
1982-1984 Medical Technologist (part-time); WVU Medical Center, Morgantown, WV
1978-1980 Medical Technologist; Somerset Community Hospital, Somerset, PA

Representative Significant Publications (5 of 107)

Chi, YI, I Sadler, LM Jablonski, SD Callantine, CF Deobald, CV Stauffacher, and GA Bohach. 2002. Zinc-mediated Dimerization and its effect on activity and conformation of staphylococcal enterotoxin type C. J. Biol.Chem. 277:22839-22846.

Shompole, SK Henon, L Liou, K. Dziewanowska, GA Bohach, and KW Bayles. 2003. Biphasic intracellular expression of *Staphylococcus aureus* virulence and evidence for Agr- mediated diffusion sensing. Mol. Microbiol. 49:919-927.

Lee, SU, YH Park, LK Fox, WC Davis, and GA Bohach. 2003. Properties of human and bovine CD8+CD26+ T Cells I induced by a Microbial Superantigen. Adv. Exp. Med. Biol. 524:189-93.

Beaux, M.F, L. Wang, D. Zhang, D. Gangadean, D.N. McIlroy, N.H. Kwon, K. Dziewanowska, and G.A. Bohach. Fibronectin bonding to nanowires and their internalization by epithelial cells. 2006. J. Biomed. Nanotech. 2:1-6.

Kwon, N.H., M.F. Beaux II, C. Ebert, L. Wang, B.E. Lassiter, Y.H. Park, D.N. McIlroy, C.J.Hovde, and G.A. Bohach. 2007 Nanowire-based delivery of *Escherichia coli* O157 shiga toxin 1 A subunit into human and bovine cells. Nanoletters: 7:2718-23.

Additional Significant Publications

Fitzgerald JR, SR Monday, TJ Foster, GA Bohach, PJ Hartigan, WJ Meaney, CJ Smyth. 2001. Characterization of a putative pathogenicity island from bovine *Staphylococcus aureus* encoding multiple superantigens. J Bacteriol. 183:63-70.

Lee, SU, W Ferens, WC Davis, MJ Hamilton, YH Park, LK Fox, J Naessens, and GA Bohach. 2001. Identity of Activation Molecule 3 (ACT3) on superantigen stimulated bovine lymphocytes is CD26. Infect. Immun. 69:7190-7193.

Seo, K.S., S.U. Lee, Y.H. Park, W.C. Davis, L.K. Fox, and G.A. Bohach. 2007. Long-term staphylococcal enterotoxin exposure induces soluble factor mediated immunosuppression by bovine CD4 and CD8 T cells. Infect. Immun. 75:260-269.

Kolodziejek, AM, DJ Sinclair, KS Seo, DR Schnider, CF Deobald, HN Rohde, AK Viall, SS Minnich, CJ Hovde, SA Minnich, and GA Bohach. 2007. Phenotypic characterization of OmpX, an Ail homologue of Y. pestis KIM. Microbiol. 153: 2941-2951.

Huseby, M. K Shi, C.K, Brown, F. Mengistu, K.S. Seo, GA. Bohach, P.M. Schlievert, D.H. Ohlendorf, C.A. Earhart . **2007. S**tructure and biological activities of β hemolysin from *Staphylococcus aureus*. J. Bacteriol. 189:8719-26

Synergistic Activities

Technology Transfer: My laboratory discoveries have led to two patents, a company, (Idaho Immunodiagnostics, Inc.) and licensing agreements with LG Life Sciences and Endorex, Corp.

State-wide, regional and national research integration: As Idaho EPSCoR Director, Dr. Bohach is responsible for facilitating research collaboration among the three Idaho universities. He has participated administratively on the past two RII projects. Until 2009, he was the Associate Director for NIH-EPSCoR-IDeA. During that time, researchers received $53 million in NIH BRIN/INBRE and COBRE grants. Dr. Bohach is Director for the Idaho Experiment Station and oversees research at 13 land-grant research and extension centers in Idaho. He was elected as a regional representative to the National Association of IDeA Principal Investigators and serves on the EPSCoR Coalition and the NIH Task Force of the EPSCoR Foundation.

Collaborators & Other Affiliations

(a) Collaborators

Ahn, Jong Sam; UI
Airhart, Christina; UI
Beaux, Miles; UI
Brown, C. Kent; U. MN
Davis,William C.; WSU
Deobald, Claudia F.; UI
Dziewanowska, K.; UI
Earhart, Cathleen; U. MN
Ebert, Chad; UI
Etienne, J.; Univ. of Lyon
Ferens, Witold A.; UI
Fox, . K.; WA State Univ.
Gangadean, D.; UI
Hovde, Carolyn J.; UI
Huseby, Medora; U. MN
Hwang, S.Y.; Seoul Nat U
Kolodziejek, Anna M.; UI
Kwon, Nam Hoon; Seoul Natl Univ.
Lassiter, Brian E.; UI
Lee, Stephen S.; UI
Lee, Sangun; Tuffts Univ.
Lina, Gerard; U. of Lyon
McIlroy, David; UI
Mengistu, Fikre; U. MN
Minnich, Scott A.; UI
Minnich, Scott S.; UI
Ohlendorf, D.; U. MN
Park. Y. H.; Seoul Nat U
Rohde, Harold N.; UI
Sahn, Steve A.; Med. U. SC
Samuels, Sparrow UI
Schlievert, P. M.; U. MN
Schnider, Daerren R.; UI
Seo, Keun S.; UI
Shi, MK; U. MN
Sinclair, Dylan J. UI
Terman, D.S.; Jenomic, Inc.
Vandenesch, F; U. of Lyon
Viall, Austin K.; UI
Wang, Lidong; UI
Zhang, Daqing; UI

(b) Graduate and Postdoctoral Advisors

Graduate advisor: Irvin Snyder West Virginia Univ. (retired)
Postdoctoral mentor: Patrick Schlievert, University of Minnesota

(c) Thesis Advisor

Callantine, Scott; Intermountain Sci. Corp.
Crum, Kim; Bemidji State University
Deringer, James; University of Idaho
Jablonski, L.; Integrated Genomics, Chicago
Karst, Sheila; Univ. of AL, Birmingham
Kolodziejek, Anna M.; UI
Lee, Sang-un; Tuffts University
Li, Xianglu; University of Idaho
Monday, Steven; FDA Washington, DC
Norgard, Michelle; WA State University
Saddler-Riggleman, Ingrid; WA State U.
Seo, Keun S.; University of Idaho

Daniel P. Ames
Assistant Professor
Idaho State University

Department of Geosciences
Idaho State University
Pocatello, Idaho 83209-8072

Phone: 208-282-7851
Fax: 208-282-4414
Email: amesdani@isu.edu

Professional Preparation:

Utah State University, Civil and Environmental Engineering, B.S. 1996
Utah State University, Civil and Environmental Engineering, M.S. 1998
Utah State University, Civil and Environmental Engineering, Ph.D. 2002

Appointments:

2004-present: Assistant Professor, Dept. of Geosciences, Idaho State University
2002-04: Research Assistant Professor, Utah Water Research Lab, Logan, Utah
1998-02: Research Engineer, Utah Water Research Lab, Logan, Utah.

Publications related to this project:

Ames, D.P., Michaelis, C., Anselmo, A., Chen, L., and Dunsford, H. (2008). "MapWindow GIS." Encyclopedia of GIS. Springer, pp. 633-634.

Michaelis, C. and Ames, D.P., 2008. Evaluation and Implementation of OGC Web Processing Service for use in Client-Side GIS. *Geoinformatica*, DOI: 10.1007/s10707-008-0048-1.

Ames, D. P. "Going Open Source: Migrating EPA's BASINS Watershed Modeling System into the Open Source MapWindow GIS Platform." Proceedings of the 2005 Intermountain GIS Conference, Pocatello, ID.

Jolma, A., Ames, D.P., Horning, N., Mitasova, H., Neteler, M., Racicot, A., and Sutton, T., 2008. Environmental Modeling and Management Using Free and Open Source Geospatial Tools. *Encyclopedia of GIS*. Sashi Shekhar and Hui Xiong (Editors). Springer, New York, pp. 275-279.

Ames, D.P., Rafn, E., Van Kirk, R., and Crosby, B., 2008. Estimation of Stream Channel Geometry in Idaho using GIS-Derived Watershed Characteristics. *Environmental Modeling and Software* (in press).

Other Significant Publications:

Rafn, E., Contor, B. and Ames, D.P. (2008). "Evaluation of a Method for Estimating Irrigated Crop-Evapotranspiration Coefficients from Remotely Sensed Data in Idaho." ASCE Journal of Irrigation and Drainage Engineering (in press).

Michaelis, Christopher and Ames, Daniel P., (2007). Evaluation of the OGC Web Processing Service for Use in a Client-Side GIS: OSGeo Journal, Volume 1, pp. 50-55.

Ames, D. P., (2006). "Estimating 7Q10 Confidence Limits from Data: A Bootstrap Approach," J. Water Resour. Plng. and Mgmt., Volume 132, Issue 3, pp. 204-208.

Ames, D. P., Neilson, B. T., Stevens, D. K. and Lall, U. (2005) "Using Bayesian networks to model watershed management decisions: an East Canyon Creek case study." Journal of Hydroinformatics, Vol 7, issue 4. pp 267-282.

Synergistic Activities (last five years)

1. Partnership with the Pacific Northwest Regional Collaboratory to develop methods for managing and deploying environmental sensing data for researchers in a three state region.
2. Collaboration with USEPA Office of Water and Office of Research and Development to create open source hydrologic and environmental modeling and spatial analysis tools.
3. Partnership with Inland Northwest Research Alliance and participation on Water Resources Steering Committee.
4. Collaboration with Boise Center Aerospace Laboratory. Membership in AWRA and ASCE. Development of Idaho Geospatial Software Lab in Idaho Falls.
5. ISU representative for the Consortium of Universities for the Advancement of Hydrologic Sciences Inc.
6. Journal reviewer for JAWRA, Computers and Geosciences, Hydrology, and Environmental Modeling and Software.

Collaborators and Other Affiliations

(i) Collaborators (last 48 months)

Benjamin Crosby, Idaho State University
Nancy F. Glenn, Idaho State University
Scott Hughes, Idaho State University
Ari Jolma, Helsinki University of Technology
Jack Kittle, Aqua Terra Consultants
Upmanu Lall, Columbia University
Gerry Laniak, EPA, Athens
Randy Lee, Idaho National Lab
Paul Link, Idaho State University
Nancy Mesner, Utah State University
Ron Rope, Idaho National Lab
David Stevens, Utah State University
Leif Tapanilla, Idaho State University
David Tarboton, Utah State University
Keith Weber, Idaho State University
Luke White, Idaho National Lab
Thomas Windholz, Idaho State University

(ii) Graduate and Postdoctoral Advisors (current affiliations)

M.S: Upmanu Lall (Columbia Univ.).
Ph.D: Upmanu Lall (Columbia Univ.); David Stevens (Utah State Univ.)

(iii) Thesis Advisor and Postgraduate-Scholar Sponsor

M.S. Students (finished): Primary Advisor: Lailin (Forest) Chen, Kit Na Goh, Christopher Michaelis, Eric Rafn,
Co-Advisor: Jessica Mitchell, Kelli Taylor, Desi Staires
M.S. Students (in progress): Primary Advisor: Allen Anselmo, Danny Anderson, Guowen Hu, Ted Dunsford, Ahmad Aburizaiza, Brian Marchionni, Jeyakanthan Veluppillai, Nathan Arave.

Paul Edward Gessler
University of Idaho

Professional Preparation

B.Sc., 1986, Natural Resources (Soil Science), University of Wisconsin-Madison
M.Sc., 1990, Environmental Monitoring (Remote Sensing), University of Wisconsin-Madison
Ph.D., 1996, Resource Management and Environmental Science (Environmental Modeling), Australian National University. Dissertation: Statistical Soil-Landscape Modeling for Environmental Management
Postdoctoral Researcher, 1996-97, Department of Geography, University of California-Santa Barbara

Appointments

2003-present Associate Professor, Department of Forest Resources, University of Idaho,
1997-2003 Assistant Professor, Department of Forest Resources, University of Idaho,
2001-present Affiliate Faculty, Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE), Turrialba, Costa Rica,
1998-present Affiliate Faculty, Environmental Science Program, University of Idaho,
1990-97 Senior Experimental Scientist/GIS manager, Commonwealth Scientific and Industrial Research Organization (CSIRO) – Division of Land and Water, Canberra, Australia,
1988-90 Graduate Research Assistant, Environmental Remote Sensing Center, University of Wisconsin-Madison

Academic Administrative Appointments

1997-present Co-director, Geospatial Laboratory for Environmental Dynamics, UI College of Natural Resources.
1997-2008 Manager, Upper Midwest Aerospace Consortium Projects, Supervised 2 Postdocs
2002-2003 Co-director, Natural Resource Ecology & Conservation Biology Undergraduate Program, College of Natural Resources,.
1997-99 Manager, NASA funded Remote Sensing Center of Excellence Inland Northwest Remote Sensing Laboratory for Bioregional Analysis

Five Related Publications

Sesnie, S.E., P.E. Gessler, B. Finegan, and S. Thessler. **Accepted**. Integrating Landsat TM and SRTM-DEM derived variables with decision trees for habitat classification and change detection in complex neotropical environments. *Remote Sensing of Environment*. Special Issue: Earth observation for biodiversity and ecology.

Beck, R.N. and P.E. Gessler. 2008. Development of a Landsat time-series for the Inland Northwest and an application in forest status assessment. *Western Journal of Applied Forestry*. 23:1:53-60.

Eitel, J., D. Long, P.E. Gessler, and A.M.S.Smith. 2007. Using in-situ spectroradiometry to evaluate RapidEye satellite data for prediction of wheat nitrogen status. *International Journal of Remote Sensing.* Vol. 28. 18:4183-4190.

Gessler, P., R. Pike, T. Hengl, R.A. MacMillan and H.I. Reuter. 2008. The future of geomorphometry. Chapter 28 In: Hengl, T., Reuter, H.I. (eds.), *Geomorphometry: concepts, software, applications.* Developments in Soil Science, Vol. 33, Elsevier.

Nelson, A., H.I. Reuter and P. Gessler. 2008. DEM production methods and sources. Chapter 3 In: Hengl, T., Reuter, H.I. (eds.), *Geomorphometry: concepts, software, applications*. Developments in Soil Science, Vol. 33, Elsevier.

Five Additional Publications

Reuter, H.I., T. Hengl, P. Gessler and P. Soille. 2008. Preparation of DEMs for geomorphometric analysis. Chapter 4 In: Hengl, T., Reuter, H.I. (eds.), *Geomorphometry: concepts, software, applications*. Developments in Soil Science, Vol. 33, Elsevier.

Eitel, J.U.H., P.E. Gessler, A.M.S. Smith, and R. Robberecht. 2006. Suitability of Existing NIR and Novel SWIR Spectral Indices to Remotely Detect Water Stress in *Populus spp. Forest Ecology and Management.* 229:170-182

Lentile, L.B., Z.A. Holden, A.M.S. Smith, M.J. Falkowski, A.T. Hudak, P. Morgan, P.E. Gessler, N. Bensen, and C.H. Key. 2006. Remote sensing techniques to assess fire and fire effects. *International Journal of Wildland Fire*. 15:319-345

Gorsevski, P.V., P.E. Gessler, J. Boll, W.J. Elliot, and R.B. Foltz. 2006. Spatially distributed process modeling of landslide hazard. *Geomorphology*. 80, 3-4:178-198.

Falkowski, M.J., A.M.S. Smith, A.T. Hudak, P.E. Gessler, L.A. Vierling and N.L. Crookston. 2006. Automated Estimation of Individual Conifer Tree Height and Crown Diameter via Two-dimensional Wavelet Analysis of Lidar Data. *Canadian Journal of Remote Sensing*. 32, 2:153-161

Synergistic Activities Relevant to Proposed Project:
Leader and Principal Investigator of the IdahoView Program to coordinate the archiving and efficient access to existing and future remote sensing imagery. Coordinate statewide communication and training initiatives to implement the USGS funded AmericaView vision.

Principal investigator of hyperspectral and multispectral aerial imaging systems for natural resource management including all aspects of system development, flight acquisition and data processing.

Principal investigator of the Raytheon Synergy program – Inland Northwest Infomart for Natural Resource Applications involving the development of a long-term Landsat image archive for the Inland Northwest.

National Advisory Panel for Implementing Digital Soil Mapping with NRCS.

AmericaView representative to USGS panel on nation-wide LiDAR acquisition planning.

International Working Group on Geomorphometry.

Collaborators & Other Affiliations (past two years):
Michael Briggs (African Predator Conservation Research Organization)
David Brown (Washington State Univ.)
Nicholas Crookston (USDA Forest Service)
Bryan Finegan (CATIE Costa Rica)
Nancy Glenn (Idaho State University)
Peter Gorsevski (Bowling Green Unversity)
Jeffrey Hicke (Univ. of Idaho)
Andrew Hudak (USDA Forest Service)
E. Raymond Hunt (USDA Agricultural Research Service)
Dan Long (USDA Agricultural Research Service)
Paul McDaniel (Univ. of Idaho)
Christopher Schnepf (Univ. of Idaho)
George Seielstad (University of North Dakota)
Steven Sesnie (Northern Arizona University)
Alistair Smith (Univ. of Idaho)
Eva Strand (Univ. of Idaho)
Lee Vierling (Univ. of Idaho)
David Wilkins (Boise State University)

Graduate and Post Doctoral Advisors:
Kevin McSweeney (Univ. of Wisconsin)
Ralph Kiefer (Univ. of Wisconsin)
Thomas Lillesand (Univ. of Wisconsin)
Michael Hutchinson (Australian National University)
Neil McKenzie (CSIRO Australia)
Oliver Chadwick (Univ. of California Santa Barbara)

Thesis Advisor and Postgraduate-Scholar Sponsor (current employer in parentheses):
Russell Beck, M.S., Forest Resources, 2005 (Sentry Dynamics)
James Dickinson, M.S., Forest Resources, 2005 (USDA Forest Service)
Jan Eitel, M.S., Forest Resources, 2008 (PhD student U. Idaho)
Michael Falkowski, M.S., Forest Resources, 2008 (PhD student U. Idaho)
Peter Gorsevski, Ph.D., Natural Resources, 2002 (Bowling Green University)
Qu Haiyan, M.S., Forest Resources, 2007 (ERDAS Inc.)
Natalya Medvedyeva, M.S., Environmental Sciences, 2005 (Turkmenistan Govt.)
Erdensaihkan Naidansuren, M.S. Environmental Sciences, 2002 (Mongolian Govt.)
Amy Pocewicz, M.S., Forest Resources, 2002 (The Nature Conservancy)
Chris Powell, M.S., Forest Resources, 2008

Nancy F. Glenn
Research Associate Professor
Idaho State University

Professional Preparation

B.S. 1994, University of Nevada, Reno Geological Engineering,
M.S. 1996, University of California, Berkeley Geotechnical/Civil Engineering,
PhD, 2000, University of Nevada, Reno, Geo-Engineering

Appointments (academic/professional, beginning w/ most recent)

August 2005 – present: Research Associate Professor, Department of Geosciences, Idaho State University (ISU)
July 2000 – 2005: Research Assistant Professor, Department of Geosciences, ISU
1997 – 2000: Research Assistant, Department of Geological Sciences, Univ. of Nevada, Reno
1997- 1998: Teaching Assistant, Department of Geological Sciences, Univ. of Nevada, Reno
1996-1997: Staff Geotechnical Engineer, GeoEngineers Inc., Redmond, WA

Five Related Publications

Mitchell, J., and Glenn, N.F., Matched filtering subpixel abundance estimates in mixture-tuned matched filtering classifications of leafy spurge (Euphorbia esula L.), International Journal of Remote Sensing, in press

Streutker, D. and Glenn, N., 2006. LiDAR measurement of sagebrush steppe vegetation heights. *Remote Sensing of Environment*, 102, 135-145.

Mundt, J., Streutker, D., Glenn, N., 2006. Mapping sagebrush distribution via fusion of hyperspectral and LiDAR classifications. *Photogrammetric Engineering and Remote Sensing,* 72 (1): 47-54.

Glenn, N.F., Streutker, D., Chadwick, J., Thackray, G., Dorsch, S., 2006. LiDAR derived topographic analyses for studying landslide morphology, material type, and activity. *Geomorphology*, 73 (1-2) 131-148.

Glenn, N.F., Mundt, J.T., Weber, K.T., Prather, T.S., Lass, L.W., Pettingill, J., 2005. Hyperspectral data processing for repeat detection of small infestations of leafy spurge. *Remote Sensing of Environment*, 95: 399–412.

Five Additional Publications

Singh, N., and Glenn, N.F., Multitemporal spectral analysis for cheatgrass (Bromus tectorum) classification, International Journal of Remote Sensing, in press

Mitchell, J., and Glenn, N.F., Leafy Spurge (Euphorbia esula L.) Classification Performance Using Hyperspectral and Multispectral Sensors, Rangeland Ecology & Management, in press

Chadwick, J., Glenn, N., Thackray, G., Dorsch, S., 2005. Landslide Surveillance: New Tools for an Old Problem. *EOS*, 86(11): 109, 114.

Glenn, N.F., J.R. Carr, 2004. Establishing a relationship between soil moisture and RADARSAT-1 SAR data obtained over the Great Basin, Nevada, U.S.A. *Canadian Journal of Remote Sensing* 30/2, pp.1-6.

Glenn, N. F., J.R. Carr, 2004. The effects of soil moisture on SAR delineation of geomorphic surfaces in the Great Basin, Nevada, U.S.A. *Journal of Arid Environments* 56/4, pp. 643-657.

Synergistic Activities Relevant to Proposed Project

(i) Established remote sensing research program at ISU in 2000, leading to development and funding for the ISU Boise Center Aerospace Laboratory for research, teaching, and outreach in remote sensing for the Intermountain West;

(ii) Established the first geospatial outreach specialist coordinator for Idaho focusing on GIS and remote sensing outreach to irrigation and canal companies;

(iii) Established framework and support for pioneering LiDAR processing tools, improving vegetation removal for better bare earth accuracy and novel shrub ecosystem modeling; free download to public (http://bcal.geology.isu.edu/);

(iv) Established tri-campus network for distance learning and visualization for remote sensing research and geospatial technology courses;

(v) Serve as a research mentor to female graduate students and returning female undergraduate students

Collaborators & Other Affiliations

Stuart Hardegree, USDA-ARS
Shuhab Khan, University of Houston
Jim McKean, USFS RMRS
Jim McNamara, Boise State University
Jeffrey Pettingill, Bonneville County, Idaho
Teki Sankey, Idaho State University
Glenn Thackray, Idaho State University

Graduate and Post Doctoral Advisors

Jim Carr, University of Nevada-Reno
Nicholas Sitar, University of California-Berkeley

Thesis Advisor and Postgraduate-Scholar Sponsor

Thesis Advisor (Total of 9 graduate students)
Diane Sprague-Wheeler, Portneuf Environmental, Idaho Falls, ID
Jacob Mundt, Ada County Weed and Pest, Boise, ID
Nagendra Singh, Oak Ridge National Lab, Oak Ridge, TN
Charles Finley, Newmont Mining, Elko, NV
Jill Norton, Blaine County, Hailey, ID.
Jacob Tibbits, Bureau of Land Management, Eureka, NV
Joel Sankey, Idaho State University
Jessica Mitchell, Idaho State University
Sara Ehinger, Idaho State University

Post-doctoral Sponsor (Total of 4 post-doctoral students)
Mohamed Aly, University of California, Riverside
John Chadwick, University of North Carolina-Charlotte
David Streutker, National Geospatial Intelligence Agency
Cheng Wang, Idaho State University

Peter Goodwin

Director, Center for Ecohydraulics Research
Department of Civil Engineering
University of Idaho
Idaho Water Center, 322 East Front Street
Boise, Idaho, 83702

DeVlieg Presidential Professor
Phone:(208) 364-6164

Email: pgoodwin@uidaho.edu
www.uidaho.edu/ecohydraulics

Professional Preparation

B.Sc.,	1978	University of Southampton, United Kingdom	Civil Engineering
M.S.,	1982	University of California, Berkeley	Civil Engineering
Ph.D.,	1986	University of California, Berkeley	Civil Engineering

Appointments

2007-present Vice-President, International Association for Hydraulic Research [www.iahr.org]
2004-present Director, Center for Ecohydraulics Research, University of Idaho
2002-present Professor, Department of Civil Engineering, University of Idaho
2001-present DeVlieg Presidential Professor, University of Idaho
1996-2001 Associate Professor, Department of Civil Engineering, University of Idaho
1998-present Adjunct Professor, Department of Biological and Agricultural Engineering, Univ. of Idaho
1989-96 Technical Director and Principal, Philip Williams and Associates, San Francisco
1987-89 co-Founder, Computational Hydraulics and Environmental Modeling Research Group, University of Bradford, United Kingdom
1986-89 Lecturer in Water Engineering, Department of Civil Engineering, University of Bradford, United Kingdom

Selected Related Publications

Caamaño, D*., **Goodwin, P**., Buffington, J.M., Liou, J.C., Daley-Laursen, S. A unifying criterion for velocity reversal hypothesis in gravel-bed rivers, 2009. Journal of Hydraulic Engineering. ASCE.

Tonina, D.*, C.H. Luce, S.R. Clayton*, S.M. Ali*, J.J. Barry*, B. Rieman, **P. Goodwin**, J.M. Buffington, C.E. Berenbrock*, *2008.*. Hydrological Response to Timber Harvest in Northern Idaho: Implications for Channel Scour and Persistence of Salmonids. Hydrological Processes, 22.

Goodwin, P., K. Jorde, C. Meier and O. Parra, 2006. Minimizing environmental impacts of hydropower development: transferring lessons from past projects to a proposed strategy for Chile. Journal of Hydroinformatics. 8(3). 1-19.

Bernhardt E.S., Palmer, M.A., , J.D. Allan, G. Alexander, K. Barnas, S. Brooks, J. Carr, S. Clayton, C.N. Dahm, J. Follstad Shah, D.L. Galat, S.Gloss, P.Goodwin, D.D. Hart, B. Hassett, R. Jenkinson, S. Katz, G.M. Kondolf, P.S. Lake, R. Lave, J.L. Meyer, T.K. O'Donnell, L. Pagano, B. Powell and E. Sudduth, 2005. Synthesizing U.S. River Restoration Efforts. *Science*, **308**, April 29, 636-637.

Palmer, M.A., E.S. Bernhardt, J.D. Allan, P.S. Lake, G. Alexander, S. Brooks, J. Carr, S. Clayton, C.N. Dahm, J. Follstad Shah, D.L. Galat, S.Gloss, **P.Goodwin**, D.D. Hart, B. Hassett, R. Jenkinson, G.M. Kondolf, R. Lave, J.L. Meyer, T.K. O'Donnell, L. Pagano and E. Sudduth, 2005. Standards for ecological successful river restoration. *Journal of Applied Ecology*, April.

Synergistic Activities

- Science Board, Louisiana Coastal Action Plan (rebuilding the ecosystem and wetlands of coastal Louisiana post-hurricane Katrina). http://el.erdc.usace.army.mil/lcast/ and http://lacoast.gov/
- NSF Steering Committee on the WATERs Network Testbed Initiative.
- NSF CLEANER Science Plan Committee for CLEANER: 2005-06.
- Independent Science Board: CALFED San Francisco Bay-Delta Program (2005-present).
- National River Restoration Synthesis supported by the National Center for Ecological Analysis and Synthesis/National Science Foundation. Additional funding from numerous agencies and Co-PI (NW Node) PIs: Margaret A. Palmer, University of Maryland and J. David Allan, University of Michigan. 2002-present. [www.nceas.ucsb.edu/riverrestoration/]

Collaborators and Other Affiliations

Dr. Dan Ames, Idaho State University
Dr. John Buffington, USFS Rocky Mountain Research Station, Boise
Dr. Nancy Glenn, Idaho State University
Dr. Ric Hauer, Flathead Lake Biological Station, University of Montana
Dr. Jorg Imberger, Center for Water Research, University of Western Australia
Dr. Charlie Luce, USFS Rocky Mountain Research Station, Boise
Dr. Jim McNamara, Boise State University
Dr. Ari Michelson, University of Texas
Dr. Claire Montgomery, Oregon State University
Dr. Marian Muste, IIHR, University of Iowa
Dr. Michael Piasecki, Drexel University
Dr. Geoff Schladow, Tahoe Environmental Research Center, University of California, Davis.
Dr. Steve Wright, Department of Civil Engineering, University of Michigan.

Graduate advisors:

Ph.D. Hugo B. Fisher and Rodney J. Sobey, University of California, Berkeley; Norman H. Brooks, California Institute of Technology
MS. Catherine van Ingen and H.B Fischer, University of California, Berkeley.

PhD Thesis Advisor

Shawkat Ali
Charles Berenbrock
Carter Borden
Tai Bui
Diego Caamano
Christopher Campbell
Steve Clayton
Jack Harrison
Milos Manic
Jasna Muskatirovic
Sharon Parkinson
Shaun Parkinson
Andrew Tranmer
David Tuthill

External Ph.D. Examiner/Adviser:

Daniele Botelho (2006) Univ. W. Australia.
Anthony W. Minns (1998). Technical University of Delft, The Netherlands
Lisa Jane Cluett (2003-04). Univ. W. Australia..
Bishnu Devkota (2003-05). Univ. W. Australia.

Postgraduate Scholars (Past Five Years)

Mark Morehead, Univ. of Idaho
Christopher Cuhaciyan, Univ. of Idaho
Anthony Minns, Delft Hydraulics.
Steven R. Clayton, University of Idaho
Amanda Rosenberger, USFS Rocky Mountain Research Station
Dan Isaak, USFS Rocky Mountain Research Station
Claire McGrath

Harvey L. Hughett
CIO/Executive Director of Information Technology Services
University of Idaho

Professional Preparation

Utah State University	Humanities	BA, 1968
University of Kentucky	Humanities	MA, 1970
Post Master's Work	Computing	None, 1971-77

Appointments

2005 - Present CIO/Executive Director, Information Technology Services, UI
2005 - Present UI representative to Internet2, Northwest Academic Computing Consortium, Northern Tier Network Consortium, Higher Education Information Technology Council, Idaho Postsecondary Education in Technology Council, WESTNET-CIOs, NWMET, & Pacific Northwest GigaPoP
1983 - Present Instructional Technology Advisory Committee, UI
2005 - 2007 President's Commission on Research and Information Technology, UI
2003 - 2005 Computing Policy Task Force, Co-chair, University of Idaho
1998 - 2005 Executive Director, Information Technology Services, UI
1998 - 2001 Educational Outreach Strategic Planning Committee, Co-chair, UI
1986 - 2001 Telecommunications Task Force, UI
1984 - 1998 Director, Educational Technology Services (ETS), UI
1996 - 1998 State Coordinator and Chairperson, Idaho SBOE Telecommunications Council
1996 - 1997 Chair, Access and Priorities Subcommittee for the Idaho Telecommunications Council
1996 - 1997 Chair, Idaho State Board of Education Telecommunications Council
1993 - 1997 Steering Committee, WICHE Western Cooperative for Educational Telecommunications
1987 - 1996 Idaho State Board of Education Telecommunications Council
1986 - 1996 Copyright Planning Committee, UI
1984 - 1996 UI Representative to Idaho State Board of Education Telecommunications Council
1993 - 1994 Chair, Technology and the Classroom Task Force, UI
1987 - 1988 President, Northwest College and University Managers of Educational Technology
1986 - 1987 President, Idaho Association of Teachers of Languages and Culture
1983 - 1984 Manager, Instructional Media Center, UI
1982 - 1984 Director, Idaho Consortium on Computer Assisted Instruction in Languages
1977 - 1983 Supervisor, Learning Laboratories, UI
1971 - 1977 Director, Learning Laboratories, Virginia Tech

Five Related Presentations

"Translating IT Costs to a Sound Funding Model," Northwest Managers of Educational Technology (NWMET), Boise, ID (April, 2004).

"Enterprise Knowledge Portals: What Media Professionals Should Know," Northwest Managers of Educational Technology (NWMET), Boise, ID (April, 2003).

"Funding IT: Making the Case for a Scalable Model," EDUCAUSE, Atlanta, GA. Joint presentation with Dr. Glenn Wilde and Dr. Robert Kuhn (October, 2002)

0919514

"Business Planning and Funding Model Alternatives for Information Technology Services at the University of Idaho," ACUTA Conference, Albuquerque (November, 2001).

"Bridging the Chasm: Multi-institution Faculty Development Program," EDUCAUSE, Long Beach, CA (October, 1999).

Synergistic Activities Relevant to Proposed Project

- Because the University of Idaho is a research intensive university, high-performance connectivity to high-performance computing and collaborators is vital for institutional vitality and success. As CIO for UI, my staff will lead UI in designing and implementing a cost effective connection to high performance, high-bandwidth computing networks not currently available to these remote research centers. As a member of the Idaho Regional Optical Network (IRON) Board of Directors, I am working with IRON to implement a fiber link backbone for the state that currently extends from Moscow to Boise, to Idaho Falls. IRON has a collaborative agreement with Syringa Networks which covers much of Southern Idaho. The IRON/Syringa network does not currently extend to the areas to be covered by this project.
- In addition to high bandwidth, this project will complement my office's current planning for connectivity via the developing GigaPoP planned for Boise, as well as link to the Pacific Northwest GigaPoP, and the Front Range GigaPoP, giving full path redundancy. Plans are underway to further link to the Northern Tier Network Consortium's fiber system (via Idaho Falls to Missoula, MT) within the next five years. All this will open the way for a quantum leap in accessible bandwidth for these rural and isolated research centers. Once connected, access to the IRON network, Internet2, National Lambda Rail, ESNET, and other networks will allow robust connectivity to practically any research lab, university, supercomputing, or related high-bandwidth capability in the world. It also will contribute to planning for the state's broader research networking needs.

Collaborators & Other Affiliations

Front Range GigaPop (FRGP)
Higher Education Information Technology Council (HEITC)
Internet2 (I2)
Northern Tier Network Consortium (NTNC)
Northwest Academic Computing Consortium (NWACC)
Northwest Managers of Educational Technology (NWMET)
Pacific Northwest GigaPoP (PNWGP)
WICHE Western Cooperative for Educational Telecommunications (WCET)

James McNamara
Boise State University

Professional Preparation

B.S	1987	Western Michigan University	Geology
M.S	1991	Syracuse University	Hydrogeology
PhD	1997	University of Alaska Fairbanks	Hydrology

Appointments

Professor, 8/2006-present, Boise State University
Associate Professor, 6/2002-8/2006, Boise State University
Assistant Professor, 9/97- 6/2002, Boise State University

Five Publications Relevant to Proposed Project

Tyler, S.W., Burak, S.A., McNamara, J.P., Lamontagne, A., Dozier, J., and Selker, J., in press. Spatially distributed temperatures at the base of two mountain snowpacks measured with fiber optic sensors. Journal of Glaciology.

Williams, C.J., McNamara, J.P., and Chandler, D.G., 2008. Controls on the spatial and temporal variation of soil moisture in a mountainous landscape: the signatures of snow and complex terrain. Hydrology and Earth System Science Discussion, 5: 1927-1966.

McNamara, J. P., Chandler, D. G., Seyfried, M., and Achet, S. 2005. Soil moisture states, lateral flow, and streamflow generation in a semi-arid, snowmelt-driven catchment. Hydrological Processes, 19, 4023-4038.

Grant, L, Seyfried, M, and McNamara, J. P. 2004. Spatial variation and temporal stability of soil water in a snow-dominated, semi-arid region. Hydrological Processes, 18: 3493-3511.

Miller, C., Routh, P., Brosten, T. and McNamara, J.P, 2008. Application of time-lapse ERT to Watershed Characterization. Geophysics, 73(3): P. G7-G17. DOI 10.1190/1.2907156.

Five Additional Publications

McNamara, J. P., Ziegler, A. D., Wood, S., and Vogler, J.B. 2006. Channel head locations with respect to geomorphologic thresholds derived from a digital elevation model: a case study in northern Thailand. Forest Ecology and Management, 224(1-2): 147-156.

McNamara, J. P., and Borden J. C. 2004. Observations on the movement of coarse gravel using implanted motion-sensing radio transmitters. Hydrological Processes**,** 18(10): 1871-1884.

McNamara, J.P., D.L. Kane, and L.D. Hinzman, 1997. Hydrograph separations in an arctic watershed using mixing model and graphical techniques. Water Resources Research, 33(70): 1707-1720.

McNamara, J.P., Oatley, J.A., Kane, D.L., and Hinzman, L.D., 2008 Case study of a large summer flood on the North Slope of Alaska: bedload transport. Hydrology Research, 39.4: 299-308, doi:10.2166/nh.2008.006.

Taylor, S., Feng, X., Williams, M, and McNamara, J. 2002. How isotopic fractionation of snowmelt affects hydrograph separation. Hydrological Processes, 16(18): 3683-3690.

Synergistic Activities

Member of the Board of Directors for the Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI)

Developed a new degree program in Hydrologic Science at Boise State University.

Collaborators within last 48 months

Shiva Achet, Roosevelt University
Shawn Benner, Boise State University
Dave Benson, Colorado School of Mines
William Bowden, University of Vermont
John Bradford, Boise State University
Troy Brosten, Boise State University
David Chandler, Utah State University
Jeff Dozier, UC Santa Barbara
Michael Gooseff, Utah State University
Molly Gribb, Boise State University
Doug Kane, University of Alaska Fairbanks
George Kling, University of Michigan
Lee Liberty, Boise State University
Danny Marks, U.S. Agricultural Research Service
R.D. Moore, University of British Columbia
Robert Payn, Oregon State University
Partha Routh, Rice University
John Selker, Oregon State University
Mark Seyfried, U.S. Agricultural Research Service
Marc Steiglitz, Georgia Tech
Scott Tyler, University of Nevada Reno
Adam Winstral, US Department of Agriculture
Spence Wood, Boise State University
Daquing Yang, University of Alaska Fairbanks
Jay Zarnetske , Oregon State University
Alan Ziegler, University of Hawaii

Graduate Advisors

Dr. Douglas Kane, University of Alaska Fairbanks
Dr. Donald Siegel, Syracuse University

Postdoctoral Advisees

Dr. Shiva Achet, Roosevelt University
Dr. David Chandler, Kansas State University
Dr. Irina Forkutsa, Boise State University

Graduate Student Advisees (as primary advisor)

Pam Aishlin, Heather Best, Carter Borden, Laura Grant, Bernadette Hoffman, Joel Homan, Patrick Kormos, Daniella Makram-Morgos, Michael Procsal, Brian Ragan, Eric Rothwell, Michael Thoma, Jason Williams, Jennifer Wilson, Melissa Yenko

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Professional Preparation:

Clemson University	Zoology	B.S.	1977
Clemson University	Entomology, Fisheries, and Wildlife	M.S.	1980
University of South Carolina	Biological Oceanography	Ph.D.	1990

Appointments:

2007-present	Director, New Mexico EPSCoR State Program, University of New Mexico
2000-present	Associate Director (LTER Network Office) and Research Professor (Department of Biology), University of New Mexico
1999-2000	Program Director (Ecology and Biocomplexity), National Science Foundation
1993-1999	Associate Scientist and Director of Landscape Ecology Laboratory, J.W. Jones Ecological Research Center
1993-2002	Baruch Associate, Baruch Institute, University of South Carolina
1996-2001	Adjunct Faculty, Department of Zoology, Auburn University
1995-2006	Graduate Faculty, Institute of Ecology, University of Georgia
1993-1995	Adjunct Faculty, Institute of Ecology, University of Georgia
1984-1993	Director, Coastal Geographic Information Systems & Research Database Facility, Baruch Institute, University of South Carolina
1982-1984	Statistician, Baruch Institute, University of South Carolina
1980-1982	Research Associate (Program Manager for Coastal Energy Impact Program), Baruch Institute, University of South Carolina

Publications:

(i) Publications Most Relevant to Proposed Project

National Research Council (Committee on Integrated Observations for Hydrologic and Related Sciences). 2008. *Integrating Multiscale Observations of U.S. Waters.* The National Academies Press, Washington, DC.

Peters, D. P. Groffman, K. Nadelhoffer, N.B. Grimm, S. Collins, W. Michener, M. Huston. 2008. Living in an increasingly connected world: a framework for continental-scale environmental science. *Frontiers in Ecology and the Environment* 5:229-237.

Sundareshwar, P.V., …, W. K. Michener, et al. 2007. Environmental monitoring network for India. *Science* 316:204-205.

Michener, W.K., J.H. Beach, M.B. Jones, B. Ludaescher, D.D. Pennington, R.S. Pereira, A. Rajasekar and M. Schildhauer. 2007. A knowledge environment for the biodiversity and ecological sciences. *Journal of Intelligent Information Systems* 29:111-126.

Porter, J., P. Arzberger, H. Braun, P. Bryant, S. Gage, T. Hansen, P. Hanson, F. Lin, C. Lin, T. Kratz, W. Michener, S. Shapiro, and T. Williams. 2005. Wireless sensor networks for ecology. *BioScience* 55:561-572.

(ii) Five Other Significant Publications

Michener, W.K., T.J. Baerwald, P. Firth, M.A. Palmer, J.L. Rosenberger, E.A. Sandlin, and H. Zimmerman. 2001. Defining and unraveling biocomplexity. *BioScience* 51:1018-1023.

Michener, W.K. and J.W. Brunt. 2000. *Ecological Data: Design, Management and Processing.* Blackwell Science, Oxford, UK. 180 pp.

Houhoulis, P.F. and W.K. Michener. 2000. Detecting wetland change: a rule-based approach using NWI and SPOT-XS data. *Photogrammetric Engineering & Remote Sensing* 66:205-211.

Michener, W.K., E.R. Blood, K.R. Bildstein, M.M. Brinson, and L.R. Gardner. 1997. Climate change, hurricanes and tropical storms, and rising sea level in coastal wetlands. *Ecological Applications* 7:770-801.

Michener, W.K., J.W. Brunt, J. Helly, T.B. Kirchner, and S.G. Stafford. 1997. Non-geospatial metadata for the ecological sciences. *Ecological Applications* 7:330-342.

Synergistic Activities:

- Databases—coordinated development of multiple research, education and administrative databases for the Organization of Biological Field Stations as part of an NSF-funded RCN project
- Software—managed a NSF large-ITR project that created a variety of open source software tools including the Kepler Scientific Workflow System and EarthGrid
- Teaching and broadening participation—organized week-long ecoinformatics training workshops for new faculty (2003-2007) and field station personnel (2002-2006), focusing on under-represented groups
- Recent large grants administration and project management—Director for New Mexico EPSCoR Program (2007-present); Associate Director of the NSF-supported Long Term Ecological Research Network Office (2000-present) at the University of New Mexico; Director of the Ecology and Biocomplexity Programs at the National Science Foundation (1999-2000); Project Science (Management) Training (2002-2006)
- Editorial service—Editor of Ecological Society of America's data journal *Ecological Archives* (2001-present); Board of Editors for *Ecology* (2001-present); Associate Editor for *Journal Ecological Informatics* (2005-present)

Collaborators and Other Affiliations:

Collaborators

D. Agarwal (LBNL)
I. Altintas (SDSC)
D. Baldocchi (Berkeley)
C. Baru (SDSC)
K.K. Baruah (Tezpur U.)
J. Beach (U. Kansas)
F. Berman (SDSC)
K. Bildstein (Hawk Mountain)
E. Blood (NSF--COI)
S. Bowers (UC-Davis)
C. Brewer (U. Montana)
J. Brunt (U. New Mexico)
G.R. Chowdhury (RRL, India)
S. Collins (UNM)
R. Cook (ORNL)
B. Dancik (U. Alberta)
V.K. Dadhwal (Gov't of India)
M. Destro (ESA)
L. Downey (US TSB)
C. Duke (ESA)
C.B.S. Dutt (ISRO, India)
D. Estrin (UCLA)
C. Fox (U. Kentucky)
J. Franklin (U. Washington)
M. Freeman (USGS)
J. Fuentes (U. Virginia)
S. Gage (Michigan State)
S. Gauch (U. Kansas)
J. Goldman (UCLA)
N. Grimm (Arizona State U.)
P. Groffman (IES)
P.K. Gupta (NPL, India)
W.W. Hargrove (USDA-FS)
B. Hayden (U. Virginia)
M. Howard (Texas A&M)
M. Huston (UT)
E. Jager (SDSC)
C.S. Jha (NRSA, India)
M. Jones (NCEAS)
S. Katz (AIBS)
J. Kennedy (Napier University)
L. Krishtalka (U. Kansas)
S. Lal (PRL, India)
H. Lapp (NESCent)
D. Leslie (USGS)
B. Ludaescher (UC-Davis)
J. MacMahon (Utah State)
P. McCartney (NSF)
A. McKee (U. Montana)
D. McClearn (OTS)
A.P. Mitra (NPL, India)
T. Moritz (Getty Res. Inst.)
J.T. Morris (U. South Carolina)
R. Murtugudde (U. Maryland)
R.R. Myneni (Boston U.)
K. Nadelhoffer (U. Michigan)
M. Naja (RIOS, India)
R. Nemani (NASA)
R. Parmenter (Valles Caldera NP)
R. Peet (U. North Carolina)
R. Pereira (U. Kansas)
D. Pennington (U. New Mexico)
D. Peters (NMSU)
T. Peterson (U. Kansas)
J. Porter (U. Virginia)
R. Purvaja (Anna U., India)
S. Raha (Bose Inst., India)
A. Rajasekar (SDSC)
K.J. Ramesh (Government of India)
R. Ramesh (Anna U., India)
J. Reichman (NCEAS)
H. Saarenmaa (GBIF)
S.K. Santhana Vanan (ORNL)
M. Sharma (IIT, India)
A. Subramaniam (Columbia U.)
R. Sukumar (IIS, India)
P.V. Sundareshwar (S. Dakota SMT)
M. Schildhauer (NCEAS)
S. Shapiro (San Diego Cty. Foundation)
S. Singh (Gov't of India)
G. Srinivasan (Gov't of India)
D. Stockwell (SDSC)
M. Stromberg (Berkeley)
R.R. Twilley (LSU)
P. Uhlir (NRC)
K. Vanderbilt (UNM)
S.B. Verma (U. Nebraska)
D. Vieglais (U. Kansas)
F. Villa (U. Vermont)
T. Vision (NESCent)
R. Waide (UNM)
T. Williams (Consultant)
T. Yaters (U. New Mexico)
P.R. Zimmerman (S. Dakota SMT)

Graduate and Postdoctoral Advisors

Thomas.J. Hilbish (USC)
Don Edwards (USC)
Bjorn Kjerve (USC)
David Cowen (USC)
John Vernberg (USC)

Thesis Advisor (5); Postgraduate-Scholars (2)

Roger Birkhead (Auburn Univ.)
Melissa Boglioli (Consultant)
Paula Gagon (TNC)
Jeannine Ott (Auburn Univ.)
Samantha Romanello (AIBS)
Sam Simkin (Cornell)
Jianting Zhang (UC-Davis)

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Professional Preparation

New Mexico State University	Range Science	B.S., 1989
University of Minnesota	Forest Science	Ph.D., 2001

Appointments

2008-present Associate Director, New Mexico EPSCoR State Program, University of New Mexico, Albuquerque, NM
2006-2008 Program Director, NSF TCUP, Southwestern Indian Polytechnic Institute, Albuquerque, NM
2003-2008 Department Chair and Faculty, Natural Resources Program, Southwestern Indian Polytechnic Institute, Albuquerque, NM
2001-2003 Post Doctoral Research Associate, USDA-ARS, Jornada Experiment Station, Las Cruces, New Mexico
1999-2000 Fulbright Research Scholar, Asian Institute of Technology, Bangkok, Thailand

Five Related Publications

Snyder, K.A., K.A. Mitchell and J. Herrick. 2006. Patterns and Controls on Soil Water in the Jornada Basin. In "*Structure and Function of a Chihuahuan Desert Ecosystem: Long-Term Ecological Research in the Jornada Basin, New Mexico*". *Eds. Havstad, K. M., Huenneke, L., and Schlesinger, W. H*. 107-132. New York, NY, Oxford University Press.

Mielnick, P., W.A. Dugas, K. A. Mitchell and K. Havstad. 2004. Long-term measurements of CO_2 flux and evapotranspiration in a Chihuahuan desert grassland. J. Arid Environments, 60:423-436.

Mitchell, K.A., P.V. Bolstad and J.M. Vose. 1999. Interspecific and environmentally-induced variation in foliar respiration among eighteen southeastern deciduous tree species. Tree Physiology,19:861-870.

Bolstad, P.V., K.A. Mitchell and J.M. Vose. 1999. Foliar temperature-respiration response functions for broad-leaved tree species in the southern Appalachians. Tree Physiology, 19:871-878.

Mitchell, K.A. and P.V. Bolstad. Scaling respiration from leaf to landscape: Effects of species, acclimation and topography on forest canopy carbon cycling. *Accepted by Ecological Modeling*

Synergistic Activities Relevant to Proposed Project

Program Director, National Science Foundation Tribal Colleges and Universities Program, *Southwestern Indian Polytechnic Institute (SIPI), Albuquerque, NM.*

Directed a major initiative for improving the delivery of math and science education and expanding the number of academic degree options in the sciences at SIPI, an all Native American institution of higher education. Authored the grant that received NSF funding of $1.5 million over three years.

- Provided leadership on issues of national accreditation and statewide articulation; completed New Mexico Higher Education Dept. statewide core course articulation, established partnerships and negotiated signed articulation agreements with major regional universities.
- Initiated and broadly promoted faculty and student research programs; initiated student research internships on campus, internationally, and with federal agencies, sponsored

faculty professional development, and leveraged existing grants to increase extramural research monies.

Faculty and Academic Program Coordinator, Natural Resources Program, *Southwestern Indian Polytechnic Institute (SIPI), Albuquerque, NM*
Established an undergraduate degree program in Natural Resource Management and incorporated web-based instructional technologies and field programs in addition to conventional classroom learning. Program housed in brand new $10 million Science and Technology building on SIPI campus.

- Assumed primary responsibility for developing a program specifically designed to train a future generation of Native American scientists and managers; led efforts to engage tribal communities and leaders, to secure their support and maintain their commitment, and to deliver an education meeting their needs in forest, range and wildlife management.
- Developed strategies with SIPI Administration for long-term financial stability; secured ongoing funding as a USDA 1994 Land Grant Institution, brought in over $1.3 million in capacity building grants from Department of Energy, Department of Education, U.S. Forest Service and tribal entities.

Ecosystem Ecologist, *Jornada Experimental Range, USDA ARS, Las Cruces, NM.*
Post-doctoral research scientist in arid land ecology and carbon cycling. Conducted research on climate-induced land use change in arid environments of the southwestern US and its effects on carbon storage and flux in grasslands and shrublands.

Fulbright Research Fellow, *Asian Center for Research on Remote Sensing (ACRoRS; renamed Geo-informatics Center, 2005), Asian Institute of Technology, Bangkok, Thailand.*
U.S.I.A. Fulbright Research Grant recipient for research on the assessment of tropical deforestation and land cover change in Southeast Asia using satellite remote sensing.

Key Collaborators & Other Affiliations
Al Kuslikis, American Indian Higher Education Consortium (AIHEC), Washington, DC
Nancy Maynard, NASA Goddard Space Center, Goddard, MD
T. Bull Bennett, North Dakota Association of Tribal Colleges (NDATC), Bismark, ND
Dan Wildcat, Haskell Indian Nations University, Lawrence, KS

Graduate and Post Doctoral Advisors
Paul Bolstad, Department of Forestry, College of Natural Resources, University of Minnesota

Karl Benedict

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Professional Preparation

University of New Mexico	Anthropology	Ph.D., with distinction 2004
University of New Mexico	Anthropology	M.A., with distinction 1996
University of California, Berkeley	Anthropology	B.A. 1986

Appointments

2008-Present	University of New Mexico, Earth Data Analysis Center: Director
2008-Present	University of New Mexico, Department of Geography, Research Assistant Professor
2004-Present	University of New Mexico, Department of Anthropology: Adjunct Professor
2001-2008	University of New Mexico, Earth Data Analysis Center: Research Scientist, Sr. Research Scientist,IT Manager
2006	University of New Mexico, Department of Geography: Part-time Instructor (Geog. 499)
2005	University of New Mexico, Department of Anthropology: Part-time Instructor (Anth. 372/572)
1999-2001	University of New Mexico, Earth Data Analysis Center: Project Assistant
1998-2001	National Park Service, Pecos National Historical Park: Data Analyst
1997-2001	Karl Benedict Data Processing and Analysis: Consultant
1995-2001	INFOTEC Research Inc./Applied Earthworks, Inc.: Data Analyst
2000	University of New Mexico, Office of Evaluation: Project Assistant (Data Analysis)
1998	University of New Mexico, Department of Anthropology: Instructor (Anth. 120)
1997	University of New Mexico, Department of Anthropology: Teaching Assistant (Anth. 372)
1994-1997	University of New Mexico, Department of Anthropology: Graduate Assistant (Computer Lab Manager)
1993-1996	University of New Mexico: Help Desk Liaison
1994-1995	Ebert and Associates, Inc.: Data Processing Specialist
1990-1994	INFOTEC Research Inc.: Data Manager, Field Director
1987-1990	U.S.F.S, Eldorado and Stanislaus National Forests, Archaeologist
1985-1987	Various contract archaeology firms: Field Technician

Publications

Benedict, Karl Kent

2006 'EDAC: Interoperability and multi-application (sic)'. Invited OGC Column for *GIM International.* January 2006, 20(1). p. 17

Watson, Richard, Manfred Ehlers, Thomas K. Budge, and Karl Kent Benedict.

2006 New and Emerging Instruments and Some Emerging Trends for Remote Sensing of Human Settlements. Chapter 12 in *Remote Sensing of Human Settlements. Manual of Remote Sensing,* 3rd ed., Volume 5. Merrill Ridd and James D. Hipple eds. American Society for Photogrammetry and Remote Sensing, Bethesda, Maryland. pp. 713-738

Watson, Richard, Karl Kent Benedict, Theresa R. Watson, Kurt Menke, and Robert R. Parmenter

2006 Satellite Imagery and Internet Mapping Services in Support of Science-Based Adaptive management of Grasslands in the Valles Caldera National Preserve. *Papers of the Applied Geography Conference* (2006). 29:206-213.

Watson, Richard, Louis A. Scuderi, Karl Kent Benedict, and Theresa R. Kuntz.

2004 Data Fusion for Environmental Assessment: Integrating MODIS Imagery and NEXRAD Weather Radar. International Society for Photogrammetry and Remote Sensing, 20th International Congress, Istanbul, June. Archives B-4:906-909

Watson, Richard, Karl Kent Benedict and Theresa R. Kuntz.
2003 Monitoring Weather Hazards on Rural Roads using Remote Sensing and GIS. *Papers of the Applied Geography Conferences*. 26: 266-275, Colorado Springs, CO. November.
Benedict, Karl Kent, and Janet D. Orcutt
2002 Settlement. In, *From Folsom to Fogelson: the Cultural Resources Inventory Survey of Pecos National Historical Park*, Genevieve N. Head, Janet D. Orcutt, Eds., pp 165-219. Anthropology Projects, Cultural Resources Management, Intermountain Region, National Park Service, Dept. of the Interior. Santa Fe, NM.
Huckell, Bruce, Lisa Huckell, and Karl Kent Benedict
2002 Maize Agriculture and the Rise of Mixed Farming-Foraging Economies in Southeastern Arizona During the Second Millennium B.C. In *Traditions, Transitions, and Technologies: Themes in Southwestern Archaeology*, Sarah Schlanger, Editor, pp 136-159. University Press of Colorado.
Powell, Melissa, and Karl Kent Benedict
2002 Ceramic Chronology. In, *From Folsom to Fogelson :the Cultural Resources Inventory Survey of Pecos National Historical Park*, Genevieve N. Head, Janet D. Orcutt, Eds., pp 59-98. Anthropology Projects, Cultural Resources Management, Intermountain Region, National Park Service, Dept. of the Interior. Santa Fe, NM.

Synergistic Activities

- Chair of the Federation of Earth Science Information Partners (ESIP) Federation Information Technology and Interoperability Committee (2004-Present)
- Planned the technical content (workshops and breakout sessions) of the bi-annual ESIP Federation Meeting from 2004-present
- Serves as EDAC's representative to the Open Geospatial Consortium Technical Committee (2005-Present)
- Serves as EDAC's representative on NASA's Earth Science Data Systems Technology Infusion Working Group (2005-Present)

Collaborators & Other Affiliations

Collaborators and Co-Editors

Shirley Baros: University of New Mexico
Salim Bawazir: New Mexico State University
Robert Bowman: New Mexico Tech
David Brookshire: University of New Mexico
Amy Budge: University of New Mexico
Thomas Budge: University of New Mexico
James Cleverly: University of New Mexico
Julie Coonrod: University of New Mexico
Cliff Dahm: University of New Mexico
Mark Dixon: Arizona State University
David Goodrich: Agricultural Research Service, U.S.F.S.
Jan Hendrickx: New Mexico Tech
Michael Inglis: University of New Mexico
Barbara Kimball: New Mexico State EPSCoR Office
Theresa Kuntz: Private Consultant
Marcy Litvak: University of New Mexico
Ricardo Mantilla: New Mexico Tech
Kurt Menke: University of New Mexico
Carol Meyer: Foundation for Earth Science
William Michener: New Mexico State EPSCoR Office
Stan Morain: University of New Mexico
Zohrab Samani: New Mexico State University
Louis Scuderi: University of New Mexico
William Sprigg: University of Arizona
Steven Stewart: University of Arizona
Jennifer Thacher: University of New Mexico
John Van de Castle: University of New Mexico
Enrique Vivoni: New Mexico Tech
Richard Watson: Private Consultant

Graduate Advisors

James Boone: UNM, Department of Anthropology; Bruce Huckell: UNM, Department of Anthropology; Louis Scuderi: UNM, Earth and Planetary Sciences; Wirt (Chip) Wills: UNM, Department of Anthropology

Julia E. Allred Coonrod, Associate Professor
Department of Civil Engineering
The University of New Mexico, Albuquerque, NM 87131
jcoonrod@unm.edu

Professional Preparation

1987 B.E., Civil and Environmental Engineering, Vanderbilt University, Nashville, Tennessee
1991 M.S., Civil Engineering, University of New Mexico, Albuquerque, New Mexico
1998 Ph.D., Civil Engineering (Environmental and Water Resources) Univ. of Texas at Austin

Professional Appointments

1996-present Univ. of New Mexico, Albuquerque, New Mexico. Assistant/Assoc. Professor.
1987-1992 *Scanlon & Associates, Inc.*, Albuquerque & Santa Fe, New Mexico. Project Manager/Engineer promoted to Vice President and Office Manager.

Publications

(5 most relevant, * indicates student)

Cleverly, J.R., C.N. Dahm, J.R. Thibault, D.E. McDonnell*, **J.E.Allred Coonrod**. Riparian ecohydrology: Regulation of water flux from the ground to the atmosphere in the Middle Rio Grande, New Mexico, *Hydrological Processes*, 20, 3207-3225 (2006).

Dahm, C.N., J.R. Cleverly, **J.E. Allred Coonrod**, J.R. Thibault, D.E. McDonnell* and D.J.Gilroy*. Evapotranspiration at the land/water interface in a semi-arid drainage basin. *Freshwater Biology*, special issue on "Riverine Landscapes".(2002) 47, 831-843

Merwade V., A. Cook*, and **J. Coonrod**, GIS techniques for creating river terrain models for hydrodynamic modeling and flood inundation mapping. *Environmental Modelling & Software*, Vol. 23/10-11, 2008; pp 1300-1311.

Stormont, J.C., E. Farfan*, and **J. Coonrod**, in press, Total Soil Water Evaporation in a Riparian Environment: Model Development and Application, ASCE, *Journal of Hydrology*.

Weiss*, J.L., D.S. Gutzler, **J.E. Allred Coonrod**, C.N. Dahm. Seasonal and Interannual Relationships Between Vegetation and Climate in Central New Mexico, USA, *Journal of Arid Environments* JUN 2004; v.57, no.4, p.507-534.

Five Additional Publications

Coonrod, J. Safety Grates in Supercritical Channels, *Journal of Irrigation and Drainage Engineering*, Vol. 120, No. 1, January/February 1994, American Society of Civil Engineers.

Coonrod, J., J. Stormont, L. Van Tassell*, Evaluation of Alternative Cover Systems Using GIS, *Environmental and Engineering Geoscience*, Vol. VII, No. 4, November, 2001. pp.343-355.

Coonrod, J. and McDonnell*, D. *Using Remote Sensing and GIS to Compute Evapotranspiration in the Rio Grande Bosque.* Environmental Systems Research Institute User Conference Proceedings, 21st Annual ESRI International User Conference, July 9-13, 2001. San Diego, California.
http://www.esri.com/library/userconf/proc01/professional/index.html

Etlantus*, A., Vanderbilt, K.L., & Coonrod, J. 2006. *Using GIS to compare methods of estimating riparian evapotranspiration*. Proceedings of AWRA 2006 Spring Specialty Conference: GIS and Water Resources IV, May 8-10, 2006, Houston, TX.

Harp*, D.R., M.M. Reda Taha, J.C. Stormont, E. Farfan, J. Coonrod. An Evaporation Estimation Model Using Optimized Fuzzy Learning From Example Algorithm with an Application to the Riparian Zone of the Middle Rio Grande in New Mexico, U.S.A. *Ecological Modelling*, Volume 208, Issues 2-4,November, 2007.

Synergistic Activities

- American Society of Civil Engineers, Society of Women Engineers Faculty Advisor
- Registered Professional Engineer in the State of New Mexico, #11694
- Reviewer for ASCE's Journal of Irrigation and Drainage, ASCE's Water Resources Management, and Elsevier Journal of Hydrology
- Teaches interdisciplinary graduate level course in GIS in Water Resources
- Planned and organized interdisciplinary Rio Grande Seminar for several years

Collaborators

R. Bowman (Hydrology, NMTech)
J.R. Cleverly (Biology, UNM)
C. N. Dahm (Biology, UNM)
D.S. Gutzler (Earth & Planetary Science, UNM)
B Hurd (Economics, NMSU)
D. Maidment (Civil Engineering, UT-Austin)
V. Merwade (Civil Engineering, Purdue)
G. Meyer (Earth & Planetary Science, UNM)
M. Stone (Desert Research Institute)
J.C. Stormont (Civil Engineering, UNM)
B. M. Thomson (Civil Engineering, UNM)
K. Vanderbilt (Biology, UNM)
T.J. Ward (Civil Engineering, Manhattan College)

Graduate students

12 MS Civil Engineering
Keith Reed (1999), Lisa VanTassell (1999; co-supervised with John Stormont), Zhu Zhongqiang (MSCE, 2001), Carolyn Donnelly (2003), Nathaniel Todea (2003), Christy Jones (2005), Todd Marti (2007), Alandren Etlantus (2007), Clint Moore (2008),), J.T. O'Brien (2008), Kelly Isaacson (anticipated 2009), Anna Caffrey (anticipated 2009), Nelson Bernardo (anticipated 2010).

10 Masters of Water Resources
Mark VanEeckout (2002), Orlando Romero (2002), Cody Stropki (2003), Kerry Bassore (2003), Stephen Kolk (2004), Ann Demint (2005), Pete Martinez (2005), Andrew Funk (2006; co-supervised with Janie Chermak), Alicia Paz (MWR, 2008), Andrew Robertson (MWR, 2008).

3 PhD
Drew Baird (Ph.D. CE, 2004), Dianne McDonnell (Ph.D. Biology 2006; co-supervised with Cliff Dahm), Jungseok Ho (Ph.D. CE, 2006).

Joseph Galewsky
Department of Earth and Planetary Sciences
MSCO3-2040, University of New Mexico
Albuquerque, New Mexico 87131-0001
Email: galewsky@unm.edu, **Phone:** (505) 277-2361, **Fax:** (505) 277-8843

Professional Preparation

Texas A&M University	Geophysics	B.S.	1986-1991
University of California Santa Cruz	Geophysics	Ph.D.	1991-1996

Appointments

2005-Present	Assistant Professor, Earth and Planetary Sciences, University of New Mexico
2002-2005	Postdoctoral Research Scientist, Applied Physics and Applied Mathematics, Columbia University, NY
1996-2002:	Software engineering consultant, San Francisco, CA

Publications

(i) Most closely related to the proposed project:

Galewsky, J., 2008: Rain shadow development during the growth of mountain ranges: An atmospheric dynamics perspective. Jour. Geophys. Res. In press.

Galewsky, J., 2008: Orographic clouds in terrain-blocked flows: An idealized modeling study, Journal of the Atmospheric Sciences, vol. 65, pp. 3460-3478.

Galewsky, J. M. Strong, Z. Sharp 2007: Measurements of water vapor D/H ratios from Mauna Kea, Hawaii, and implications for subtropical humidity dynamics. *Geophysical Research Letters* v. 34, doi:10.1029/2007GL031330,doi:10.1029/2007GL031330.

Galewsky, J. and A.H. Sobel. Moist dynamics and orographic precipitation in Northern California during the New Year's flood of 1997. *Monthly Weather Review,* Vol. 133, No. 6, pp. 1594–1612, 2005.

Galewsky, J., A.H. Sobel, and I. Held, 2005: Diagnosis of subtropical humidity dynamics using tracers of last saturation. Journal of the Atmospheric Sciences, Vol. 62, pp. 3353-3367.

(ii) Other signficant publications:

Galewsky, J., C.P. Stark, S.J. Dadson, C.-C. Wu, A.H. Sobel, and M.-J. Horng, 2006: Tropical cyclone triggering of sediment discharge in Taiwan, *Journal of Geophysical Research,* v. 111, doi:10.1029/2005JF000428.

Abbott, L.D., E.A. Silver, R.S. Anderson, R.B. Smith, J.C. Ingle, S.A. Kling, D. Haig, E. Small, J. Galewsky, and W. Sliter. Measurement of the tectonic uplift rate in a young collisional mountain belt, Finisterre Range, Papua New Guinea. *Nature*, Vol. 385, pp. 501-507, 1997.

Galewsky, J., E. A. Silver, 1997: Tectonic controls on facies transitions in an oblique collision: The western Solomon Sea, Papua New Guinea. Geological Society of America Bulletin: Vol. 109, No. 10, pp. 1266–1278.

Synergistic Activities

- Teaching experience: Taught introductory and advanced environmental science, hydrology, and fluid mechanics courses at UNM
- Computing: Expertise in parallel processing and supercomputing applied to numerical modeling of the atmosphere. Served as lead software engineer for the teams that developed a wide variety of complex software applications. Managed teams of up to 5 engineers using rapid application development techniques.
- Professional Service: Co-organizer of NSF GLD/ATM workshop on climate and geomorphology in 2007; Member of the Terrestrial and Cyberinfrastructure Working Groups for CSDMS (Community Surface Dynamics Modeling System), 2007-present.
- Atmospheric Modeling: Developed new diagnostic techniques for general circulation models; developed new test cases for atmospheric models; expertise in mesoscale atmospheric modeling.

Collaborators

Zach Sharp (UNM), Isaac Held (GFDL/Princeton), Lorenzo Polvani (CU), Richard Scott (CU/NWRA), Adam Sobel (CU), Colin Stark (LDEO), Chun-Chieh Wu (NTU, Taiwan), Simon Dadson (CEH)

Graduate and Postdoctoral Advisors

Eli A. Silver, UC Santa Cruz. Thesis title: Tectonics and depositional processes in the Western Solomon Sea Collision Zone, Papua New Guinea.
Adam H. Sobel, Columbia University

Graduate Students Supervised

John Hurley, University of New Mexico (3rd year PhD student)
Leah Johnson, UNM (1st year PhD student)

Lorie M. Liebrock
New Mexico Institute of Mining and Technology, Socorro, New Mexico
New Mexico Computing Applications Center, Albuquerque, New Mexico
(liebrock@nmt.edu & liebrock@newmexicosupercomputer.com)

Professional Preparation

B.S.	1985	Michigan Technological University, Houghton, M
M.S.	1988	Michigan Technological University, Houghton, MI
M.S.	1992,	Rice University, Houston, TX
Ph. D.	1994	Computer Science, Rice University, Houston, TX

Appointments

2007-Present:	Education Director, New Mexico Computing Applications Center
2007-Present:	Associate Professor and Associate Chair for Undergraduate Affairs, Department of Computer Science, Associate Professor of Information Technology, Adjunct Professor of Management, New Mexico Inst. of Mining and Technology
2002-2007:	Assistant Professor, Department of Computer Science, Assistant Professor of Information Technology, Adjunct Professor of Management, New Mexico Inst. of Mining and Technology
2000-2001:	Assistant Professor, Department of Mathematical Science, University of Alaska, Fairbanks
2000-2001:	Researcher, Arctic Region Supercomputing Center, University of Alaska, Fairbanks
1994-Present:	Researcher, Liebrock-Hicks Research
1989-1994:	Graduate Research Assistant, Computer Science, Rice University
1987-1988:	Assistant to Director, Institute for the Application of Advanced Computing, Michigan Technological University (MTU)
1987, July:	Engineer, Scientific Programming and Advanced Graphics Group, Idaho National Eng. Lab.
1985-1987:	Graduate Research/Teaching Assistant, Department of Computer Science, MTU
1985, July:	Parallel Programmer, Outstanding Student Summer Program, Sandia National Laboratory
1984-1991:	Consultant, Advanced Computing Group and Free Electron Laser Group, KMS Fusion

Five Related Publications:

"Methodology for Modelling SPMD Hybrid Parallel Computation", with S.P. Goudy, *Concurrency and Computation: Practice and Experience*, http://dx.doi.org/10.1002/cpe.1214, 2007.

"Problem Solving with Well Posedness Analysis: Part 1", Applied Mathematics and Computation, Vol 181/2, pp 1671-1682, 2006.

"Scholarship for Service: NMT's Undergraduate Program", Distributed Systems Online, Education Department, Invited by Editor Maria Ganzha, Vol. 8, No. 3, Art. No. 0703-o3002, 2007

"Automatic Data Distribution for Composite Grid Applications", with K. Kennedy, *Scientific Programming*, V6, N1, 95-113, 1997.

"Parallel Algorithms for Computational Continuum Dynamics", with J.F. McGrath and D.L. Hicks, *Applied Mathematics and Computation*, V20, N2, 145-173, 1986.

Other Significant Publications

"A Preliminary Design for Digital Forensics Analysis of Terabyte Size Data Sets", with N. Marrero, D.P. Burton, R. Prine, E. Cornelius, M. Shakamuri, V. Urias, *Proceedings of the 2007 ACM Symposium on Applied Computing*, ACM Press, ISBN: 1-59593-480-4, 2007.

"Performance Analysis of a Hybrid Parallel Linear Algebra Kernel", with Sue Goudy and Steve Schaffer, *Proceedings of the 5th International Conference on Linux Clusters*, Austin, Texas, May 2004.

"Parallelization & Automatic Data Distribution for Nuclear Reactor Simulations", *Proc. of the SIAM Conference on Parallel Processing for Scientific Computing*, 1997.

"Automatic Data Distribution of Small Meshes in Coupled Grid Applications", with K. Kennedy, *Concurrency Practice and Experience*, V 8, 581-615, 1996.

"Parallelization of Linearized Applications in Fortran D", with K. Kennedy, *Proceedings of the International Parallel Processing Symposium*, 51-60, 1994.

Synergistic Activities

- Scholarship for Service Program PI for Information Assurance Research and Education.
- Galaxy Quest Expedition Co-Lead: to develop community cosmology codes. This includes the dissemination of an automatic data distribution system for composite grid applications.

Recent Professional Activities

- Member of Academic Computing Machinery (ACM), Institute of Electrical and Electronics Engineers (IEEE), IEEE Computer Society, Sigma XI
- Editor of the Proceedings of the ACM Symposium on Applied Computing, 2004-2008
- Reviewer: Computing Reviews, International Conference on Supercomputing.

Honors and Awards

- Voted Student Association Teacher of the Year, Presented Spring Graduation Ceremony, NMT, 2005.
- Elected to 9th Edition of *Who's Who Among America's Teachers*®, 2004-2005; July 27th, 2005.
- Patent: "Multiprocessor Parallel Computer Architecture Using a Parallel Machine with Topology-Based Mapping of Composite Grid Applications", US Patent Serial No. 08/423483, 1995
  Selected as a biographical candidate for Strathmore's Who's Who, Who's Who in the Midwest, and Who's Who in Science and Engineering, National Register's Who's Who in Executives and Professionals, Academic Key's Who's Who in Sciences Higher Education, Empire Who's Who Among Executives and Professionals, and Who's Who Among America's Teachers®, 2004-2005 and 2006-2007.

Collaborators and Other Affiliations

Cook, Jeanine (New Mexico State University)
Hicks, Darrell (Liebrock-Hicks Research)
Maccabe, Barney (University of New Mexico)
Schaffer, Steve (Mathematical Science, New Mexico Institute of Mining and Technology)
Sung, Andrew (Computer Science, New Mexico Institute of Mining and Technology)
Teller, Pat (University of Texas, El Paso)

Graduate Advisors: Jack Dongarra & Ken Kennedy, Rice University

M.S. Advisor (NMT):

2003: Stephen K. Hess, Aishwarya Kalyanasundaram, Harley Kozushko, Radhadrishna Reddy Mudhiganti, Sailaja Mummidi

2004: Ramesh Naidu Ande, Yuan Ye, Kalyan Bondili,

2005: Eric Alsheimer, Heather Bitsoi, Nathan Campbell, Calisle House, Steve Sones

2006: Ashley Dearie (Mgt.), Scott Miller, George Schmaltz (Mgt.), Robert Erbes

2007: Unnati Thakore

2008: Paul Ferrell, Barry Gavrich, David Burton, Ron Prine, Mayuri Shakamuri, Moses Schwartz

In progress: Virginia Stoll, Margarita Castillo, Nico Marrero, Jason Mattax, Bill Weiss, Sherry Thomas, Curtis Hash, William Baker, Cynthia Veitch

Ph.D. Advisor (NMT): 2005: Sue Goudy, (co-advisor: Stephen Schaffer).

Timothy L. Thomas
Center for High Performance Computing, MSC 01 1190
University of New Mexico, Albuquerque, NM 87131
505-277-8245 (Office); thomas@phys.unm.edu

Professional Preparation:

Clarkson University	Computer Science	B.S. 1984
Clarkson University	Physics/Mathematics	B.S. 1985
University of Minnesota	Physics	Ph.D. 1995

Appointments:

2006 – present	Research Professor, Physics Department, University of New Mexico.
2004 – present	Deputy Director, Center for High Performance Computing, University of New Mexico.
2004 – 2006	Research Associate Professor, Physics Department, University of New Mexico
1998 – 2004	Research Physicist, Physics Department, University of New Mexico.
1995 – 1998	Post-doctoral Fellow, Physic Department, University of New Mexico

Selected Publications:

A.A. Nepomuceno *et al* (ATLAS collaboration), "The ATLAS experiment at the CERN Large Hadron Collider", to be published in Journal of Instrumentation (JINST), June 2008.

A. Adare *et al* (PHENIX collaboration), "Cold Nuclear Matter Effects on J/Psi as Constrained by Deuteron-Gold Measurements at s(NN)**(1/2) = 200-GeV", Phys. Rev. C77:024912 (2008).

S.S. Adler *et al* (PHENIX collaboration), "Centrality dependence of charged hadron production in deuteron + gold and nucleon + gold collisions at s(NN)**(1/2) = 200-GeV", Phys. Rev. C77:014905 (2008).

A. Adare *et al* (PHENIX collaboration), "Transverse momentum and centrality dependence of dihadron correlations in Au+Au collisions at s(NN) = 200-GeV: Jet-quenching and the response of partonic matter", Phys. Rev. C77:011901 (2008).

S.S. Adler *et al* (PHENIX collaboration), "Measurement of density correlations in pseudorapidity via charged particle multiplicity fluctuations in Au+Au collisions at s(NN)**(1/2) = 200-GeV", Phys. Rev. C76:034903 (2007).

A. Adare *et al* (PHENIX collaboration), "Inclusive cross-section and double helicity asymmetry for pi0 production in p + p collisions at s**(1/2) = 200-GeV: Implications for the polarized gluon distribution in the proton", Phys. Rev. D76:051106 (2007).

S. Afanasiev *et al* (PHENIX collaboration), "Elliptic flow for phi mesons and (anti)deuterons in Au + Au collisions at s(NN)**(1/2) = 200-GeV", Phys. Rev. Lett. 99:052301 (2007).

A. Adare *et al* (PHENIX collaboration), "J / psi production versus transverse momentum and rapidity in p+p collisions at s**(1/2) = 200-GeV", Phys. Rev. Lett. 98:232002 (2007).

A. Adare *et al* (PHENIX collaboration), "Correlated Production of p and anti-p in Au+Au Collisions at s(NN)**(1/2) = 200-GeV", Phys. Lett. B649:359-369 (2007).

A. Adare *et al* (PHENIX collaboration), "Energy Loss and Flow of Heavy Quarks in Au+Au Collisions at s(NN)**(1/2) = 200-GeV", Phys. Rev. Lett. 98:172301 (2007).

A. Adare *et al* (PHENIX collaboration), "System Size and Energy Dependence of Jet-Induced Hadron Pair Correlation Shapes in Cu+Cu and Au+Au Collisions at s(NN)**(1/2) = 200 and 62.4-GeV", Phys. Rev. Lett. 98:232302 (2007).

S.S. Adler *et al* (PHENIX collaboration), "Production of omega mesons at Large Transverse Momenta in p + p and d + Au Collisions at s**(1/2)(NN) = 200-GeV", Phys. Rev. C75:051902 (2007).

Synergistic Activities:

- While I am a research professor in UNM's department of Physics and Astronomy, my interests are highly inter-disciplinary, which has led to my current position as CHPC Deputy Director, where my roles include: liaison to Students, Professors, Directors, Deans, CIOs, VPs, State Legislators and vendors; proposal writing, lecturing, facility tours to diverse audiences, including faculty new-hire candidates, artists, high-school and UNM students and administrators; participation in CHPC strategic and budget planning processes; research user - as well as administrator - of CHPC and NMCAC systems; UNM Gallas building (CHPC+ARTS Lab) facilities coordinator.
- Recent talk: 'Stereo & Computational Photography for Cultural Preservation: the Maxwell Museum / NM State-wide Digital Archive project concept', given to a meeting at the Santa Fe Complex, March 2008.
- Vice President, UNM Chapter, Sigma Xi – The Scientific Research Society, and multi- and inter-disciplinary organization.
- Lecturer (since 1998) and supporting REU co-PI (since 2004) of the Los Alamos Summer School (LASS).
- Continuing service on NSF Teragrid Allocations Committees (Large and Medium.)
- Initiator, co-coordinator and speaker, March 2008 New Mexico CI-days Conference.
- Lecturer and administrator, LCI Workshops; panel organizer, 2007 LCI Conference.
- Member, NM CAC (Computing Applications Center) business formation committee. NMCAC presently operates the largest open/academic research supercomputing system in the nation, the third system on the November 2007 Top-500 List.
- Involvement with more than 18 UNM students: supervised nine undergraduates and co-supervised nine graduate students, the latter including Kalyaya Banda (MS, computer science), Dr. Alex Brandl (physics), Gavin Conant (MS, computational biology), Dr. Scott Eilerts (physics), Dr. Paul Kingsberry (physics), Dr. Eric Moore (physics), Dr. Benn Tannenbaum (physics), Dr. Steve Klinkseik (physics), Takeshi Hakamata (computer science; currently sitting on Ph.D. committee.)

Collaborators:

Particle physics: PHENIX and ATLAS experimental collaborations (total, ~2500 co-authors); local collaborators, UNM Department of Physics and Astronomy include (PHENIX:) Doug Fields and Bernd Bassalleck, (ATLAS:) Igor Gorlov and Sally Seidel (also NSF/REU co-PI for LASS); very recent are (AUGER:) Bernie Becker and Michael Gold. **Non-physics**: NM Digital Archive and Analysis facility project (NSF/MRI pending): Catherine Baudoin, UNM Maxwell Museum & Lakshman Prasad, Los Alamos National Laboratory; GridJam project: Jack Ox, UNM College of Fine Arts and UNM ARTS Lab; Maya Skies project (NSF-funded; I am not a co-PI): David Beining, UNM ARTS Lab, formerly of UNM Lodestar.

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Nevada System of Higher Education

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	0.00	0.00	0.00	$ **0**	$
2. **Faculty Associate - Materials Development**	1.00	0.00	0.00	**8,500**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	0.00	**8,500**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	1.20	0.00	0.00	**8,150**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**16,650**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**4,407**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**21,057**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) **See Justification** $ **135,045**					
TOTAL EQUIPMENT				**135,045**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**25,463**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**1,430**	
3. CONSULTANT SERVICES				**20,000**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**431,776**	
6. OTHER				**20,281**	
TOTAL OTHER DIRECT COSTS				**475,987**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**657,552**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 5.5000, Base: 165731)**					
TOTAL INDIRECT COSTS (F&A)				**9,115**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,667**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,667**	$

M. COST SHARING PROPOSED LEVEL $ **315,090** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Nevada System of Higher Education

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	0.00	0.00	0.00	$ **0**	$
2. **Faculty Associate - Materials Development**	1.00	0.00	0.00	**8,500**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	0.00	**8,500**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	1.20	0.00	0.00	**8,150**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**16,650**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**4,407**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**21,057**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) **See Justification** $ **123,406**					
TOTAL EQUIPMENT				**123,406**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**41,863**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**1,430**	
3. CONSULTANT SERVICES				**20,000**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**395,661**	
6. OTHER				**53,054**	
TOTAL OTHER DIRECT COSTS				**472,645**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**658,971**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 5.5000, Base: 139904)**					
TOTAL INDIRECT COSTS (F&A)				**7,695**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,666**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,666**	$

M. COST SHARING PROPOSED LEVEL $ **369,823** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Nevada System of Higher Education

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	0.00	0.00	0.00	$ **0**	$
2. **Faculty Associate - Materials Development**	1.00	0.00	0.00	**8,500**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	0.00	**8,500**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**8,500**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**2,125**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**10,625**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) **See Justification** $ **124,478**					
TOTAL EQUIPMENT				**124,478**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**25,463**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**1,430**	
3. CONSULTANT SERVICES				**20,000**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**417,307**	
6. OTHER				**58,354**	
TOTAL OTHER DIRECT COSTS				**499,591**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**660,157**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 5.5000, Base: 118371)**					
TOTAL INDIRECT COSTS (F&A)				**6,510**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,667**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,667**	$

M. COST SHARING PROPOSED LEVEL $ **315,089** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Nevada System of Higher Education

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	0.00	0.00	0.00	$ **0**	$
2. **Faculty Associate - Materials Development**	3.00	0.00	0.00	**25,500**	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	3.00	0.00	0.00	**25,500**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**6**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	2.40	0.00	0.00	**16,300**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**41,800**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**10,939**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**52,739**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) **$ 382,929**					
TOTAL EQUIPMENT				**382,929**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**92,789**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**7,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**4,290**	
3. CONSULTANT SERVICES				**60,000**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**1,244,744**	
6. OTHER				**131,689**	
TOTAL OTHER DIRECT COSTS				**1,448,223**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**1,976,680**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**23,320**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**2,000,000**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **2,000,000**	$

M. COST SHARING PROPOSED LEVEL $ **1,000,002** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget Justification – NSHE

A. Senior Personnel - All positions for the life of the project.

Consortium Lead PI and Nevada Lead PI, Gayle Dana; has oversight of entire project (see description DRI budget justification) (management & evaluation)

Faculty Associate, TBD, will be identified through a statewide competition to develop learning materials @ 1.0 summer month @ $8,500 per year. (cyberlearning)

B. Other Personnel: B2. Other Professionals

Project Administrator, Lori Brazfield will work with the PD to oversee the administration of the entire NSF CI award; budgeted at 0.05 FTE $4,150 in year 1 & 2 and contributed time of 0.20 FTE $16,600 in year 1 & 2 and 0.25 FTE contributed time in year 3. (management & evaluation)

Research Administrator, Alice Ward will work directly with the PI and team leads to assist with education and outreach; budgeted at 0.05 FTE $4,000 per year and contributed time of 0.15 FTE $11,181. (management & evaluation)

Communications Specialist , Lisa Contreras will administer the statewide media needs, public relations with campuses, web content and disseminate program materials; budgeted at 0.15 FTE contributed time of $8,250. (management & evaluation)

C. Fringe Benefits

Fringe benefits for senior personnel are calculated at 25% each year; other professional personnel is calculated at 28% each year for all years of the project. (management & evaluation), (cyberlearning)

D. Equipment

Upgrade of Networking:
Upgrade Northern Commodity/Research Internet Connection to 10 Gbps (from 2 Gbps)

1. Grant Cost of $60,000 for hardware in year 1.

NevadaNet is contributing the connection fee for the 10 Gbps connection. This connection will be approximately $330,000 per year. (connectivity)

MPLS Switches (in Reno and Las Vegas) –

1. Multi-protocol layer switching which allows for logical routing layering of many QoS dependent applications i.e. VOIP, video, etc over one network.
2. Grant Cost of $8,751 in year 1, $1,600 in year 2 and $30,449 in year 3 for hardware for switches at both ends of the state . (connectivity)

Change Management Inventory Control, Phase I

1. The Change Management/Inventory Control equipment is designed to provide system change control and inventory management in line with industry best practices.
2. Grant Cost of $63,600 for equipment in year 2. (connectivity)

Change Management Inventory Control, Phase II

1. Phase II would consist of providing additional storage/archiving capability and enhanced reporting/analysis functionality.
2. Grant Cost of $45,229 for equipment in year 3. (connectivity)

Network IP Management System

1. Provide tools to effectively document and manage network IP address space allocated to NSHE by outside IP address governing bodies
2. Grant Cost of $10,300 for equipment in year 3. (connectivity)

Cross Connect Cards

1. Upgrade the networking optical add/drop capabilities in the Elko Hub
2. Grant Cost of $8,500 for equipment in year 3. (connectivity)

Optical Transport Cards

1. Upgrade the Network on the I-80 Corridor from Reno to Elko
2. Grant Cost $30,000 for equipment in year 3. (connectivity)

Upgrade of video conferencing capabilities:
Video Conferencing Bridging Unit Expansion #1 (MCU) 40 port w/ISDN

1. This will enhance the capabilities for video of Nevada Net by allowing more connections to near HD or full HD quality were practical.
2. Grant Cost of $66,293 for hardware in year 1. (connectivity)

Video Conferencing Bridging Unit Expansion #2 (MCU) 40 port

1. Grant Cost of $58,206 for equipment in year 2. (connectivity)

E. Travel: E1. Domestic Travel

In-state Administration for two trips per year @ $1,000 for NSHE EPSCoR staff, and State and Office Directors. Calculated as average day trip; airfare @ $360; ground transportation @ $75; GSA M & I @ $65. (management & evaluation)

Out-of-State for two trips per year @ $3,000 for NSHE EPSCoR staff, and State and Office Directors to attend CI, NSF or other needed national meetings. Calculated as average 3 day trip; airfare @ $650; ground transportation @ $100; GSA lodging and M & I @ $225 per day = $675. (management & evaluation)

Individual travel for NSHE faculty per year @ $10,000 to attend the annual Tri-State CI conference held in conjunction with the tri-EPSCoR state Regional Climate Change Conference (ID or NM). Calculated as average 3 day trip; airfare @ $650; ground transportation @ $105; GSA M & I @ $165 per day = $495; per trip $1,250. (management & evaluation)

Site Visits will be paid for by NM in year 1 and ID in Year 3. $14,400 is requested for the External Cyberinfrastructure Advisory Committee for 8 members for one site visit in Year 2 @ $1,800 per person; they will provide advice, guidance and suggestions to the RII project. (management & evaluation)

Post Doc travel in year 2 to NM Faculty Leadership Program is for 4 days of coursework and 2 travel days (before and after workshop). Calculated as average 6 day trip; airfare @ $650; ground transportation @ $50, registration at $300; per trip $1,000 = $2,000. (housing and food are paid for by NM EPSCoR). (management & evaluation)

Faculty, Post Doc, and graduate student travel grants to attend CI training will be awarded through a statewide competition; travel to LCI facility (NM), NCAR (CO), or HIS workshop (ID) @ $11,463 per year to as many students/faculty within this budget. (cyberlearning)

G. Other Direct Costs

G1. Materials and Supplies:

Estimated from previous year EPSCoR program budgets @ $2,500 per year for needed program materials. (management & evaluation)

G2. Publications

Printed training materials, web production costs and publications costs @ $1,430 year 1 and 2 and $1,429 in year 3. (management & evaluation)

G3. Consultant Services
Rose Shaw, METRICA, serves as evaluator for the tri-state consortium in meeting its goals and milestones and prepares a written annual and final evaluation report @ $20,000 per year to be equally divided among the three states; ($60,000 for Nevada). (management & evaluation)

G5. Subaward - Component funding to NSHE institutions - See subaward budget justification.

Sub Award	Year 1	Year 2	Year 3	Total
DRI	133,781	105,147	133,781	**372,710**
UNLV	108,892	104,572	104,572	**318,035**
UNR	189,103	185,943	178,954	**554,000**
TOTAL	**431,776**	**395,661**	**417,307**	**1,244,744**

G6. Other
Annual CI conference costs in year 2 for hosting institution calculated as 60 people @ $67.00 for meeting room, food, beverages, plus funds for AV, poster display, printed materials, and other miscellaneous. (management & evaluation)

Adobe Connect Pro would provide online meetings and information exchange among NV, NM, and ID @ $1,400 per year. (management & evaluation)

External Cyberinfrastructure Advisory Committee for 8 members in year 2 & year 3; each receive $1,000 honorarium. Commitment letters have been received from each member. (management & evaluation)

Tech support for programming services and web page maintenance is being contributed @ $1,000 for each year of the project. (management & evaluation)

Maintenance: Northern Commodity/Research Internet Connection maintenance at $8,000 per year in all years; MPLS Switches maintenance at $5,000 in year 3; Change Management Inventory Control, Phase I maintenance at $15,900 per year in years 2 & 3; Change Management Inventory Control, Phase II maintenance at $10,500 in year 3; Video Conferencing Bridging Unit Expansion #1 maintenance at $7,877 per year for all years of the project; Video Conferencing Bridging Unit Expansion #2 maintenance at $7,877 per year in years 2 and 3. (connectivity)

Other costs affiliated with outputs, parts and maintenance for the connectivity equipment @ $3,004 in year 1, $7,657 in year 2 and $1,700 in year 3. (connectivity)

I. Indirect Costs: NSHE Nevada EPSCoR office rate is 5.5% MTDC, DHHS 11/21/06

M. Cost Share
Project cost share at 50% contribution is described above and supported by NSHE (see letters of commitment)

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Desert Research Institute

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	2.00	0.00	0.00	$ **23,646**	$
2. **Darko Koracin - Team Leader**	1.50	0.00	0.00	**17,490**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	3.50	0.00	0.00	**41,136**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	3.00	0.00	0.00	**13,496**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**54,632**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**24,507**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**79,139**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**5,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**0**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**84,139**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 59.0000, Base: 84139)**					
TOTAL INDIRECT COSTS (F&A)				**49,642**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**133,781**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **133,781**	$

M. COST SHARING PROPOSED LEVEL $ **42,266** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Desert Research Institute

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	1.00	0.00	0.00	$ **11,823**	$
2. **Darko Koracin - Team Leader**	1.50	0.00	0.00	**17,490**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	2.50	0.00	0.00	**29,313**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	3.00	0.00	0.00	**13,496**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**42,809**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**19,364**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**62,173**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**3,957**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**0**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**66,130**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 59.0000, Base: 66130)**					
TOTAL INDIRECT COSTS (F&A)				**39,017**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**105,147**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **105,147**	$

M. COST SHARING PROPOSED LEVEL $ **97,000** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Desert Research Institute

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	2.00	0.00	0.00	$ **23,646**	$
2. **Darko Koracin - Team Leader**	1.50	0.00	0.00	**17,490**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	3.50	0.00	0.00	**41,136**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	3.00	0.00	0.00	**13,496**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**54,632**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**24,507**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**79,139**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**5,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**0**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**84,139**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 59.0000, Base: 84139)**					
TOTAL INDIRECT COSTS (F&A)				**49,642**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**133,781**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **133,781**	$

M. COST SHARING PROPOSED LEVEL $ **42,266** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Desert Research Institute

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gayle L Dana

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gayle L Dana - PI**	5.00	0.00	0.00	$ **59,115**	$
2. **Darko Koracin - Team Leader**	4.50	0.00	0.00	**52,470**	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	9.50	0.00	0.00	**111,585**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	9.00	0.00	0.00	**40,488**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**152,073**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**68,378**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**220,451**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**13,957**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**0**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**234,408**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**138,301**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**372,709**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **372,709**	$

M. COST SHARING PROPOSED LEVEL $ **181,532** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gayle L Dana

ORG. REP. NAME*
William Schulze

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C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget Justification – DRI

A. Senior Personnel - All positions for the life of the project.

Consortium Lead and Nevada Lead PI, Gayle Dana is budgeted for 2.0 calendar months per year @ a base rate of $11,823/month. In Year 2, 1.0 month is contributed time and 1.0 by NSF. NV NSF PI is responsible for supervising all components of the CI project. (management & evaluation)

Team Lead of Cyberlearning CI Training, Darko Koracin is budgeted for 1.5 calendar months @ a base rate of $11,660/month. Koracin will provide technical and project management functions and conduct workshop "Development of Custom Training for Computational Climate Modeling and Hydrological Information Systems. (cyberlearning)

B. Other Personnel: B2. Other Professionals

CI Program Coordinator, TBD will assist the PI in program administration and coordination for the entire NSF CI award; budgeted at 0.25 FTE @ $13,496 per year. (management & evaluation)

C. Fringe Benefits

Fringe benefits for senior personnel is calculated at 43.5% and other personnel is calculated at 49% for all years of the project. (management & evaluation), (cyber-learning)

E. Travel: E1. Domestic Travel

Consortium Lead/NV PI travel for multiple in-state and out-of-state travel to ID/NM for leadership and management of the RII project, and work at state EPSCoR Office (DRI) @ $5,000 per year. In year 2, $1,043 is contributed toward total cost. (management & evaluation)

In-state and/or out-of-state travel to ID/NM for program coordination for the CI Program Coordinator is contributed @ $5,000 per year. (management & evaluation)

Faculty, post doc and graduate student travel grants are being contributed by DRI to attend CI training and will be awarded through a statewide competition; travel to LCI facility (NM), NCAR (CO) or HIS workshop (ID) at $8,537 in year 1 and 3, and $23,537 in year 2; to as many students/faculty within this budget. (cyber-learning)

Out-of-state travel for D. Koracin for conducting workshop "Development of Custom Training for Computational Climate Modeling and Hydrological Information Systems" in NM and ID is contributed each year @ $1,750 per trip ; 4 days for two students per year. (cyber-learning)

G. Other Direct Costs: G1. Materials and Supplies

Estimated from previous year budgets @ $745 per year for program materials. (management & evaluation)

Estimated from previous budgets is contributed @ $1,470 total for program materials. (cyber-learning)

I. Indirect Costs

Desert Research Institute is 72.0% MTDC, but only 59.0% for NSF awards is being requested, 13% will be used as unrecovered F & A for cost share; DHHS February 8, 2008; for the entire project.

M. Cost Share

Project cost share at 50% contribution is described above and supported by NSHE (see letters of commitment)

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Las Vegas

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Kent J Crippen

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kent J Crippen - Team Leader**	0.00	0.00	2.00	$ **17,941**	$
2. **Faculty Associate - Course Development**	1.00	0.00	0.00	**8,500**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	2.00	**26,441**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**1**) GRADUATE STUDENTS				**10,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**36,441**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**6,095**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**42,536**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**7,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **15,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**3**) TOTAL PARTICIPANT COSTS				**15,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**5,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**12,060**	
TOTAL OTHER DIRECT COSTS				**17,060**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**81,596**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 44.0000, Base: 62036)**					
TOTAL INDIRECT COSTS (F&A)				**27,296**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**108,892**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **108,892**	$

M. COST SHARING PROPOSED LEVEL $ **47,394** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Kent J Crippen

ORG. REP. NAME*
William Schulze

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Las Vegas

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Kent J Crippen

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kent J Crippen - Team Leader**	0.00	0.00	2.00	$ **17,941**	$
2. **Faculty Associate - Course Development**	1.00	0.00	0.00	**8,500**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	2.00	**26,441**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**1**) GRADUATE STUDENTS				**10,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**36,441**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**6,095**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**42,536**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**7,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **15,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**3**) TOTAL PARTICIPANT COSTS				**15,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**5,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**9,060**	
TOTAL OTHER DIRECT COSTS				**14,060**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**78,596**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 44.0000, Base: 59036)**					
TOTAL INDIRECT COSTS (F&A)				**25,976**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**104,572**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **104,572**	$

M. COST SHARING PROPOSED LEVEL $ **47,392** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Kent J Crippen

ORG. REP. NAME*
William Schulze

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Las Vegas

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Kent J Crippen

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kent J Crippen - Team Leader**	0.00	0.00	2.00	$ **17,941**	$
2. **Faculty Associate - Course Development**	1.00	0.00	0.00	**8,500**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	2.00	**26,441**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**1**) GRADUATE STUDENTS				**10,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**36,441**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**6,095**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**42,536**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**7,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **15,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**3**) TOTAL PARTICIPANT COSTS				**15,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**5,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**9,060**	
TOTAL OTHER DIRECT COSTS				**14,060**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**78,596**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 44.0000, Base: 59036)**					
TOTAL INDIRECT COSTS (F&A)				**25,976**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**104,572**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **104,572**	$

M. COST SHARING PROPOSED LEVEL $ **47,392** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Kent J Crippen

ORG. REP. NAME*
William Schulze

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **University of Nevada Las Vegas**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Kent J Crippen**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kent J Crippen - Team Leader**	0.00	0.00	6.00	$ **53,823**	$
2. **Faculty Associate - Course Development**	3.00	0.00	0.00	**25,500**	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	3.00	0.00	6.00	**79,323**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**3**) GRADUATE STUDENTS				**30,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**109,323**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**18,285**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**127,608**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**21,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **45,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**9**) TOTAL PARTICIPANT COSTS				**45,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**15,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**30,180**	
TOTAL OTHER DIRECT COSTS				**45,180**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**238,788**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**79,248**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**318,036**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **318,036**	$

M. COST SHARING PROPOSED LEVEL $ **142,178** AGREED LEVEL IF DIFFERENT $

PI/PD NAME: **Kent J Crippen**

ORG. REP. NAME*: **William Schulze**

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Date Checked	Date Of Rate Sheet	Initials - ORG

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget Justification – UNLV

A. Senior Personnel - All positions for the life of the project.
State Team Leader Cyberlearning, Kent Crippen is budgeted for 2.0 summer months and contributed 1.8 calendar months @ a base rate of $8,970/month. Will establish the project virtual workspace/resource portal, administer the consortium's competition; cyberlearning activities; project activity reports, and work with faculty from the annual competitions to ensure completion of annual learning materials projects. (cyberlearning)

B. Other Personnel
B2. Other Professionals
Course Development, faculty member (TBD) will collaborate on the production and delivery of graduate courses @ 1.0 summer month per year @ a rate of $8,500/year. (cyberlearning)
B3. Graduate Student
Graduate Research Assistant, will be hired to coordinate the activities of the learning activities, assist in the development materials, and coordinate the educational outreach efforts @ $20,000 per year; half of the salary is being contributed by UNLV. (cyberlearning)

C. Fringe Benefits
Fringe benefits for senior personnel is calculated at Faculty (summer salary) 17%, Faculty (academic) 32%, and other personnel is calculated at Graduate Assistants 16% for all years of the project. (cyberlearning)

E. Travel: E1. Domestic Travel
Out-of state travel, for the Team Leader, faculty, GRA, and three high school teachers to attend tri-state CI conference (present results & collaborate with climate scientists). Team Leader will travel to two educational research conferences in years two and three to disseminate the project results. Total costs is @ $7,000 per year. (cyberlearning)

F. Participant Support: F1. Stipends
Teacher Stipends: Three identified K12 teachers serving as research and development team members will receive a $5,000 stipend = $15,000 per year. (cyberlearning)

G. Other Direct Costs
G1. Materials and Supplies
Estimated from previous budgets @ $5,000 per year for program materials. (cyberlearning)
G6. Other
Graduate student tuition and fees: Graduate student tuition remission is considered part of Graduate Research Assistant compensation and is estimated as follows per semester: 7+ credits @ $227/ct, $237 misc. fees; $100 international fee; $4,560 per year. (cyberlearning)

Course Development Materials: Includes office supplies, computer supplies/application software, and replacement parts. Estimates are based on experience with projects similar to the one proposed. $2,500 in year 1 and $4,500 in year 2 & 3. (cyberlearning)

Virtual workspace/resource portal: Includes a server @ $5,000 in year 1 and supporting supplies/application software, and replacement parts. Estimates are based on experience with projects similar to the one proposed. (cyberlearning)

I. Indirect Costs
University of Nevada, Las Vegas is 43.5% MTDC; DHHS May 1, 2008; for the entire project.

M. Cost Share
Project cost share at 50% contribution is described above and supported by NSHE (see letters of commitment)

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Reno

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Sergiu Dascalu

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Sergiu Dascalu - Team Leader**	0.00	0.00	1.00	$ **14,000**	$
2. **Frederick C Harris - Team Leader**	0.00	0.00	1.00	**16,000**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	2.00	**30,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**1**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**40,000**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**2**) GRADUATE STUDENTS				**30,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**100,000**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**16,500**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**116,500**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**7,500**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**6,750**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**5,400**	
TOTAL OTHER DIRECT COSTS				**12,150**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**136,150**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 40.5000, Base: 130750)**					
TOTAL INDIRECT COSTS (F&A)				**52,954**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**189,104**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **189,104**	$

M. COST SHARING PROPOSED LEVEL $ **92,385** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Sergiu Dascalu

ORG. REP. NAME*
William Schulze

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Reno

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Sergiu Dascalu

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Sergiu Dascalu - Team Leader**	0.00	0.00	1.00	$ **14,000**	$
2. **Frederick C Harris - Team Leader**	0.00	0.00	1.00	**16,000**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	2.00	**30,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**1**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**40,000**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**2**) GRADUATE STUDENTS				**30,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**100,000**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**16,500**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**116,500**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**7,500**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**4,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**5,400**	
TOTAL OTHER DIRECT COSTS				**9,900**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**133,900**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 40.5000, Base: 128500)**					
TOTAL INDIRECT COSTS (F&A)				**52,043**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**185,943**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **185,943**	$

M. COST SHARING PROPOSED LEVEL $ **92,385** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Sergiu Dascalu

ORG. REP. NAME*
William Schulze

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Nevada Reno

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Sergiu Dascalu

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Sergiu Dascalu - Team Leader**	0.00	0.00	1.00	$ **14,000**	$
2. **Frederick C Harris - Team Leader**	0.00	0.00	1.00	**16,000**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	2.00	**30,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**1**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**40,000**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**2**) GRADUATE STUDENTS				**30,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**100,000**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**16,500**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**116,500**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**6,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,026**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**5,400**	
TOTAL OTHER DIRECT COSTS				**6,426**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**128,926**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **F&A (Rate: 40.5000, Base: 123526)**					
TOTAL INDIRECT COSTS (F&A)				**50,028**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**178,954**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **178,954**	$

M. COST SHARING PROPOSED LEVEL $ **92,385** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Sergiu Dascalu

ORG. REP. NAME*
William Schulze

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **University of Nevada Reno**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Sergiu Dascalu**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Sergiu Dascalu - Team Leader**	0.00	0.00	3.00	$ **42,000**	$
2. **Frederick C Harris - Team Leader**	0.00	0.00	3.00	**48,000**	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	6.00	**90,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**3**) POST DOCTORAL SCHOLARS	36.00	0.00	0.00	**120,000**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**6**) GRADUATE STUDENTS				**90,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**300,000**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**49,500**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**349,500**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**21,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**12,276**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**16,200**	
TOTAL OTHER DIRECT COSTS				**28,476**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**398,976**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**155,025**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**554,001**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **554,001**	$

M. COST SHARING PROPOSED LEVEL $ **277,155** AGREED LEVEL IF DIFFERENT $

PI/PD NAME: **Sergiu Dascalu**

ORG. REP. NAME*: **William Schulze**

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C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget Justification – UNR

A. Senior Personnel - All positions for the life of the project.

Consortium Connectivity Team Leader and Connectivity and Interoperability Team Member, Fred Harris is budgeted for 1.0 summer month and contributed 1.6 calendar months @ a base rate of $16,000/month, per year; will focus primarily on data exchange and data archives, and will also work on model interoperability. He will supervise all Connectivity and Interoperability activities of the group and will coordinate with ID and NM partners. (interoperability)

State Team Leader - Interoperability, Sergiu Dascalu is budgeted for 1.0 summer month and contributed 1.6 calendar months @ a base rate of $14,000/month, per year; will focus on model interoperability and software frameworks, including software engineering and human-computer interaction aspects. He will also work on the data archive component and will supervise the activities of the post-doctoral associate, software engineer, and one RA. Dascalu will also coordinate activities with ID and NM partners. (interoperability)

B. Other Personnel

B1. Post Doctoral Associate

Post Doctoral Associate (TBD), @ a base rate of $40,000 per year; will work on both model & data interoperability component and data archive component of the project. He or she will help supervise and coordinate the two graduate RAs. (interoperability)

B3. Graduate Student

Graduate Research Assistants, one will work primarily on model and data interoperability and applications; the second RA will be involved primarily on data archive activities @ a base rate of $20,000 each, per year; $10,000 per year will be contributed by the Computer Science and Engineering Department at UNR. (interoperability)

C. Fringe Benefits

Fringe benefits for senior personnel is calculated at Faculty (summer salary) 4%, Faculty (academic) 27%, and other personnel is calculated at Post Doctoral Associate 27%, and Graduate Assistants 15% for all years of the project. (interoperability)

E. Travel: E1. Domestic Travel

In-state and out-of state travel, for the Model/Data Interoperability Group, two faculty, the graduate research assistants for trips as needed or to attend conferences/training. Total costs of travel is based on $7,500 in year 1 & 2 and $6,000 in year 3. (interoperability)

G. Other Direct Costs

G1. Materials and Supplies

Estimated from previous year EPSCoR program budgets @ $6,750 in year 1 for three laptops for the post-doc and the two RAs; $4,500 in year 2 and $1,026 in year 3 for specialized software and printing and publishing. (interoperability)

G6. Other

Graduate student tuition and fees: Graduate student tuition remission is considered part of Graduate Research Assistant compensation and is estimated as follows: $2,700 per student per year, composed of 18 credits x $150 per credit. (interoperability)

I. Indirect Costs

University of Nevada, Reno is 40.5% MTDC; DHHS July 7, 2004; for the entire project.

M. Cost Share

Project cost share at 50% contribution is described above and supported by NSHE (see letters of commitment)

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Idaho

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gregory A Bohach

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gregory A Bohach - none**	0.00	0.00	0.00	$ **0**	$
2. **TBD Cyberlearning**	0.00	0.00	0.50	**4,000**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.50	**4,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**4**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	15.60	0.00	0.00	**85,707**	
3. (**1**) GRADUATE STUDENTS				**11,500**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**101,207**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**32,382**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**133,589**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
Printer $ **11,500**					
TOTAL EQUIPMENT				**11,500**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**27,100**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **5,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**1**) TOTAL PARTICIPANT COSTS				**5,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**4,316**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**44,109**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**237,131**	
6. OTHER				**63,783**	
TOTAL OTHER DIRECT COSTS				**349,339**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**526,528**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
Indirect (Rate: 43.4000, Base: 322898)					
TOTAL INDIRECT COSTS (F&A)				**140,138**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,666**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,666**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gregory A Bohach

ORG. REP. NAME*

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Idaho

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gregory A Bohach

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gregory A Bohach - none**	0.00	0.00	0.00	$ **0**	$
2. **TBD Cyberlearning**	0.00	0.00	0.50	**4,160**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.50	**4,160**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**4**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	15.60	0.00	0.00	**89,135**	
3. (**1**) GRADUATE STUDENTS				**11,960**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**105,255**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**33,678**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**138,933**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**29,020**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **5,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**1**) TOTAL PARTICIPANT COSTS				**5,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**3,562**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**20,000**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**219,552**	
6. OTHER				**116,793**	
TOTAL OTHER DIRECT COSTS				**359,907**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**532,860**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 43.4000, Base: 308308)**					
TOTAL INDIRECT COSTS (F&A)				**133,806**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,666**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,666**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gregory A Bohach

ORG. REP. NAME*

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Idaho

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gregory A Bohach

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gregory A Bohach - none**	0.00	0.00	0.00	$ **0**	$
2. **TBD Cyberlearning**	0.00	0.00	0.50	**4,326**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.50	**4,326**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**4**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	15.60	0.00	0.00	**92,700**	
3. (**1**) GRADUATE STUDENTS				**12,438**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**109,464**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**35,025**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**144,489**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**25,760**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **5,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**1**) TOTAL PARTICIPANT COSTS				**5,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**621**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**20,000**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**201,727**	
6. OTHER				**129,868**	
TOTAL OTHER DIRECT COSTS				**352,216**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**527,465**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 43.4000, Base: 320739)**					
TOTAL INDIRECT COSTS (F&A)				**139,201**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,666**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,666**	$
M. COST SHARING PROPOSED LEVEL $ **0**	AGREED LEVEL IF DIFFERENT $				

PI/PD NAME
Gregory A Bohach

ORG. REP. NAME*

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INDIRECT COST RATE VERIFICATION		
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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of Idaho

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Gregory A Bohach

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Gregory A Bohach - none**	0.00	0.00	0.00	$ **0**	$
2. **TBD Cyberlearning**	0.00	0.00	1.50	**12,486**	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.50	**12,486**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**12**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	46.80	0.00	0.00	**267,542**	
3. (**3**) GRADUATE STUDENTS				**35,898**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**315,926**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**101,085**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**417,011**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) $ **11,500**					
TOTAL EQUIPMENT				**11,500**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**81,880**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **15,000**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**3**) TOTAL PARTICIPANT COSTS				**15,000**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**8,499**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**84,109**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**658,410**	
6. OTHER				**310,444**	
TOTAL OTHER DIRECT COSTS				**1,061,462**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**1,586,853**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**413,145**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**1,999,998**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **1,999,998**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Gregory A Bohach

ORG. REP. NAME*

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Revised Budget Justification
University of Idaho

A. Senior Personnel

Salary calculated with a 4% increase each year, beginning in Year 2.

One-half month of summer salary is requested ($4,000) per year for faculty who will be involved in development of cyber-learning learning materials teams.

B. Other Personnel

Salary calculated with a 4% increase each year, beginning in Year 2.

B.2 Other Professionals

Salary is requested for a ½ FTE Idaho EPSCoR CI Coordinator to work closely with the EPSCoR Directors, faculty and staff within the consortium, 10% EPSCoR Project Administrator, and 20% EPSCoR Program Coordinator for all years of the project.

Salary is requested at 50% of a 1 FTE Data Manager (base salary $75,000/yr).

B.3 Graduate students

Salary is requested for 1/2 RA stipend per year for students participating cyber-learning materials development teams as described in the proposal.

C. Fringe benefits

Fringe benefits are calculated at 22% Faculty, 37% Track 2 Coordinator, 35% for Project Administrator and Data Manger; 41% Program Coordinator; and 3% Graduate Student.

D. Equipment

Funds are requested for a high-end printer (e.g., HP Designjet 4000PS) for providing data products and output to the university community and consortium members and stakeholders.

E. Travel:

Trips are based on $1250 per trip, most calculated as 3-day trips unless noted; airfare @ $640 round trip, ground transportation $100, federal GSA lodging and M&I estimated at $170 per day.

Funds are budgeted for project coordination with from NV and NM (seven person trips in year 1 and 2, four trips in year 3), as well as trips to attend the annual tri-state CI meeting (seven person trips in each of yrs 1 and 2, four person trips in yr 3).

Funds are requested for participation in workshops and training described in the proposal, including postdoctoral training. These are assumed to be 4-day trips on average, and include $500 registration, for a total of $1,920 each. Multiple person trips are budgeted during the three year project (5 in yr 1, 6 in yr 2, and 3 in year 3).

Eight person trips are included in yr 3 for external Project Advisory Board members to visit Idaho for site review ($10,000).

F. Participant costs:
Funds are requested to support middle or high school teacher stipend for participation in CI Learning materials development teams ($5,000 per year).

G. Other Direct Costs

G.1 Materials and supplies:
Funds are requested for materials and supplies to support project administration and to help with production of consortium communication materials ($2,316 in yr 1, $1,869 in yr and 2 and $621 in yr 3).

Operating supplies are requested for the data manager toward interoperability and HIS development ($2,000 in yr 1 and $1,693 in yr 2)

G.3. Consultant Services:
$24,109 in yr 1 are budgeted to enable UI to work with IRON to develop a connectivity strategy/implementation plan for utilizing IRON to access UI facilities in Southern Idaho.

NSF funds will also support a contract for services with the external project evaluator ($20,000 in each yrs 1, 2, and 3)

G.5. Subawards
Boise State University, yrs 1-3 ($72,173, $97,671, $101,366)
Idaho State University, yrs 1-3 ($164,958, $121,881, $100,361)

G.6. Other:
Internet connectivity fees for services via IRON in yrs 2 ($100,000) and three ($117,276) to facilitate high-speed connections first to Kimberly R&E Center, then to UI research facility in Hagerman.

Funds are budgeted for teleconference charges in yrs 1-3 $2,400, $1,800 and $1,200 (@ $200/mo, $150/mo, and $100/mo respectively).

In yrs 1-3 we request student fees and health insurance for the cyber-learning ½ RA graduate student per semester ($1,433 + $382 health insurance per semester). This includes an anticipated 10% increase in student fees and health insurance each year.

Two high-end workstations at $8,753 in year 1 for data management center at Idaho Water Center in collaboration with IDWR.

Software for secure data hosting from Water Center @ $3,000 per year.

The addition of a POP in Twin Falls associated with IRON in yr 1 is requested at ($30,000) as well as Kimberley R&E Center LAN upgrades ($16,000 total) in yr 1. Hagerman LAN upgrades ($8,000 total) are requested in year 2

$4,000 for expenses to host day long Tri-State CI meeting in Idaho in year 3.

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Boise State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
James McNamara

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **James McNamara**	0.00	0.00	0.00	$ **0**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.00	**0**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	6.00	0.00	0.00	**22,500**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**22,500**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**9,000**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**31,500**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**1,250**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**8,436**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**10,000**	
TOTAL OTHER DIRECT COSTS				**18,436**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**51,186**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 41.0000, Base: 51187)**					
TOTAL INDIRECT COSTS (F&A)				**20,987**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**72,173**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **72,173**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
James McNamara

ORG. REP. NAME*

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Boise State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
James McNamara

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **James McNamara**	0.00	0.00	0.00	$ **0**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.00	**0**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	12.00	0.00	0.00	**46,800**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**46,800**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**18,720**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**65,520**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**1,250**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**2,500**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**69,270**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 41.0000, Base: 69270)**					
TOTAL INDIRECT COSTS (F&A)				**28,401**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**97,671**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **97,671**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
James McNamara

ORG. REP. NAME*

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Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Boise State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
James McNamara

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **James McNamara**	0.00	0.00	0.00	$ **0**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.00	**0**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	12.00	0.00	0.00	**48,672**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**48,672**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**19,469**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**68,141**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**1,250**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**2,500**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**71,891**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 41.0000, Base: 71891)**					
TOTAL INDIRECT COSTS (F&A)				**29,475**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**101,366**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **101,366**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
James McNamara

ORG. REP. NAME*

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INDIRECT COST RATE VERIFICATION		
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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Boise State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
James McNamara

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **James McNamara**	0.00	0.00	0.00	$ **0**	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.00	**0**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	30.00	0.00	0.00	**117,972**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**117,972**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**47,189**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**165,161**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**3,750**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**13,436**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**10,000**	
TOTAL OTHER DIRECT COSTS				**23,436**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**192,347**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**78,863**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**271,210**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **271,210**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
James McNamara

ORG. REP. NAME*

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Revised Budget Justification:
Boise State University

A. Senior Personnel
No funds are requested for Senior Personnel.

B. Other Personnel
Salary increases are calculated at 4% beginning in Year 2.

B.2. Other Personnel
Salary is requested for postdoctoral fellow (1/2 FTE in Year 1 and 1 FTE in years 2 and 3) as technical liaison for field data collection and ingestion into the database at the Idaho Water Center. This will facilitate collaborations with personnel at Idaho's universities, Idaho Department of Water Resources, ARS Reynolds Creek Experimental Watershed, and NV and NM.

C. Fringe benefits:
Fringe benefits are calculated at 40% for this salary.

D. Equipment

E. Travel:
Travel is budgeted for senior personnel to attend the annual tri-state CI meeting. $1250 per trip, calculated as 3-day trip; airfare @ $640 round trip, ground transportation $100, federal GSA lodging and M&I at $170 per day. The budget includes one person trip each year.

G. Other Direct Costs

G.1 Materials and Supplies: Funds are requested for materials and supplies for data capture and ingestion to be used by the postdoctoral fellow ($8,436 in year 1, and $2,500 in each subsequent year of the award).

G.6. Other Local Area Network (LAN) upgrades for engineering (MEC) building ($10,000) in year 1. This will help provide high-speed connectivity to off campus sites via IRON for climate research faculty, including Dr. Venkataramana Sridhar.

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Idaho State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Nancy Glenn

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Nancy Glenn**	0.00	0.00	0.50	$ **4,502**	$
2. **Daniel Ames**	0.00	0.00	1.00	**6,751**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.50	**11,253**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**1**) POST DOCTORAL SCHOLARS	9.00	0.00	0.00	**33,750**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**45,003**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**16,624**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**61,627**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,500**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**77,180**	
TOTAL OTHER DIRECT COSTS				**79,680**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**143,807**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 47.0000, Base: 45003)**					
TOTAL INDIRECT COSTS (F&A)				**21,151**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**164,958**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **164,958**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Nancy Glenn

ORG. REP. NAME*

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Idaho State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Nancy Glenn

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Nancy Glenn**	0.00	0.00	0.50	$ **4,727**	$
2. **Daniel Ames**	0.00	0.00	1.00	**7,021**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.50	**11,748**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**1**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**46,800**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**58,548**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**22,815**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**81,363**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,500**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**8,000**	
TOTAL OTHER DIRECT COSTS				**10,500**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**94,363**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 47.0000, Base: 58548)**					
TOTAL INDIRECT COSTS (F&A)				**27,518**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**121,881**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **121,881**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Nancy Glenn

ORG. REP. NAME*

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Idaho State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Nancy Glenn

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Nancy Glenn**	0.00	0.00	0.50	$ **4,964**	$
2. **Daniel Ames**	0.00	0.00	1.00	**7,301**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.50	**12,265**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**1**) POST DOCTORAL SCHOLARS	9.00	0.00	0.00	**36,504**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**48,769**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**18,921**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**67,690**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,500**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,250**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**6,000**	
TOTAL OTHER DIRECT COSTS				**7,250**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**77,440**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Indirect (Rate: 47.0000, Base: 48769)**					
TOTAL INDIRECT COSTS (F&A)				**22,921**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**100,361**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **100,361**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Nancy Glenn

ORG. REP. NAME*

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
Idaho State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Nancy Glenn

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Nancy Glenn**	0.00	0.00	1.50	$ **14,193**	$
2. **Daniel Ames**	0.00	0.00	3.00	**21,073**	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	4.50	**35,266**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**3**) POST DOCTORAL SCHOLARS	30.00	0.00	0.00	**117,054**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	**0**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**152,320**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**58,360**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**210,680**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**7,500**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**6,250**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**91,180**	
TOTAL OTHER DIRECT COSTS				**97,430**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**315,610**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**71,590**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**387,200**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **387,200**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Nancy Glenn

ORG. REP. NAME*

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INDIRECT COST RATE VERIFICATION		
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C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Revised Budget Justification
Idaho State University

B. Senior Personnel:

Salary increases are calculated at 3% above FY08 in Yr1 and 4% beginning in Year 2 for Dr. Ames and 5% for Dr. Glenn.

ISU requests funds for 0.5 month salary for Dr. Glenn for each year of the project to coordinate interoperability and cyber-learning materials development.

1 month summer salary for Dr. Ames in all three years is requested for his coordination of Idaho Environmental Observatory data and HIS-related activities.

C. Other Personnel

Salary increases are calculated at 3% above FY08 in Yr1 and 4% beginning in Year 2.

B.1. Other Personnel

Salary is requested for a postdoctoral fellow to facilitate interoperability and HIS database development and use and to collaborate with personnel from the UI, BSU, Idaho Department of Water Resources, ARS Reynolds Creek Experimental Watershed, and collaborators in NV and NM. This request is for .75 FTE in year 1, 1 FTE in year 2, and .75 FTE in year 3.

D. Fringe benefits:

Fringe benefits are 21% of salary for faculty and staff; additional health insurance is calculated separately for the postdoctoral fellow at a rate of $797/mo in Yr 1 with 10% increase in each subsequent year.

E. Equipment

E. Travel:

Travel is budgeted for personnel to attend the annual tri-state CI meeting and project coordination. $1,250 per trip, calculated as 3-day trip; airfare @ $640 round trip, ground transportation $100, federal GSA lodging and M&I at $170 per day. Funds are requested for two person trips per year.

G. Other Direct Costs

G.1 Materials and Supplies

$2,500 is requested for development and implementation of training materials for HIS workshop that will be provided to participants from all three states is requested in years 1 and 2; $1,250 in year 3

G.6. Other

$6,000 per year is requested to provide upgraded connectivity service for ISU GIS laboratory in Boise.

$19,180 for LAN improvements to four buildings (4 Cisco WS-C3560G-24TS-S * $4,795 ea.) in year 1.

$2,000 per year to provide increased throughput at the desktop from 10Mbps to 100Mbps for 20 researchers ($100 per port) in year 1 and year 2.

$50,000 in year 1 toward network backbone improvements for 1Gb uplinks to key research buildings (including Cisco SFP 24-Port Cards for WS-C6509-E switches).

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **University of New Mexico**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **William K Michener**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **William K Michener - none**	0.00	0.00	0.00	$ **0**	$
2. **Karl Benedict - EDAC**	1.00	0.00	0.00	**10,850**	
3. **Katherine Mitchell - none**	0.00	0.00	0.00	**0**	
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**3**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	0.00	**10,850**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**2**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**90,000**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	6.00	0.00	0.00	**36,631**	
3. (**1**) GRADUATE STUDENTS				**22,500**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**5,256**	
TOTAL SALARIES AND WAGES (A + B)				**165,237**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**44,090**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**209,327**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**28,400**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **23,750**					
3. SUBSISTENCE **13,790**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**14**) TOTAL PARTICIPANT COSTS				**37,540**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,745**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**1,655**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**222,159**	
6. OTHER				**23,600**	
TOTAL OTHER DIRECT COSTS				**249,159**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**524,426**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Modified Total Direct Cost (Rate: 50.0000, Base: 259471) (Cont. on Comments Page)**					
TOTAL INDIRECT COSTS (F&A)				**142,236**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,662**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,662**	$

M. COST SHARING PROPOSED LEVEL $ **1,000,000** AGREED LEVEL IF DIFFERENT $

PI/PD NAME: **William K Michener**

ORG. REP. NAME*: **Lydia Salas**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET COMMENTS - Year 1

**** I- Indirect Costs**
SUBAWARD (Rate: 50.0000, Base 25000)

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of New Mexico

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
William K Michener

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **William K Michener - none**	0.00	0.00	0.00	$ **0**	$
2. **Karl Benedict - EDAC**	1.00	0.00	0.00	**11,393**	
3. **Katherine Mitchell - none**	0.00	0.00	0.00	**0**	
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**3**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	0.00	**11,393**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**2**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**94,500**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	6.00	0.00	0.00	**38,463**	
3. (**1**) GRADUATE STUDENTS				**23,625**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**5,500**	
TOTAL SALARIES AND WAGES (A + B)				**173,481**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**51,622**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**225,103**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**25,220**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **8,000**					
2. TRAVEL **12,015**					
3. SUBSISTENCE **10,370**					
4. OTHER **4,500**					
TOTAL NUMBER OF PARTICIPANTS (**14**) TOTAL PARTICIPANT COSTS				**34,885**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**745**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**500**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**221,780**	
6. OTHER				**23,600**	
TOTAL OTHER DIRECT COSTS				**246,625**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**531,833**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Modified Total Direct Cost (Rate: 50.0000, Base: 269667)**					
TOTAL INDIRECT COSTS (F&A)				**134,834**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,667**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,667**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
William K Michener

ORG. REP. NAME*
Lydia Salas

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of New Mexico

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
William K Michener

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **William K Michener - none**	0.00	0.00	0.00	$ **0**	$
2. **Karl Benedict - EDAC**	1.00	0.00	0.00	**11,962**	
3. **Katherine Mitchell - none**	0.00	0.00	0.00	**0**	
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**3**) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	0.00	0.00	**11,962**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**2**) POST DOCTORAL SCHOLARS	12.00	0.00	0.00	**99,225**	
2. (**3**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	6.00	0.00	0.00	**40,386**	
3. (**1**) GRADUATE STUDENTS				**24,806**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**5,750**	
TOTAL SALARIES AND WAGES (A + B)				**182,129**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**59,274**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**241,403**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**25,220**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **6,750**					
3. SUBSISTENCE **3,525**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**14**) TOTAL PARTICIPANT COSTS				**10,275**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**680**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**500**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**222,160**	
6. OTHER				**23,600**	
TOTAL OTHER DIRECT COSTS				**246,940**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**523,838**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Modified Total Direct Cost (Rate: 50.0000, Base: 285653)**					
TOTAL INDIRECT COSTS (F&A)				**142,827**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,665**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,665**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
William K Michener

ORG. REP. NAME*
Lydia Salas

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Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
University of New Mexico

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
William K Michener

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **William K Michener - none**	0.00	0.00	0.00	$ **0**	$
2. **Karl Benedict - EDAC**	3.00	0.00	0.00	**34,205**	
3. **Katherine Mitchell - none**	0.00	0.00	0.00	**0**	
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**3**) TOTAL SENIOR PERSONNEL (1 - 6)	3.00	0.00	0.00	**34,205**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**6**) POST DOCTORAL SCHOLARS	36.00	0.00	0.00	**283,725**	
2. (**9**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	18.00	0.00	0.00	**115,480**	
3. (**3**) GRADUATE STUDENTS				**70,931**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**16,506**	
TOTAL SALARIES AND WAGES (A + B)				**520,847**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**154,986**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**675,833**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**78,840**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **8,000**					
2. TRAVEL **42,515**					
3. SUBSISTENCE **27,685**					
4. OTHER **4,500**					
TOTAL NUMBER OF PARTICIPANTS (**42**) TOTAL PARTICIPANT COSTS				**82,700**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**3,170**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**2,655**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**666,099**	
6. OTHER				**70,800**	
TOTAL OTHER DIRECT COSTS				**742,724**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**1,580,097**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**419,897**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**1,999,994**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **1,999,994**	$

M. COST SHARING PROPOSED LEVEL $ **1,000,000** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
William K Michener

ORG. REP. NAME*
Lydia Salas

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C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

A. Senior Personnel
Salary calculated with a 5% COLA beginning in Year Two.

Karl Benedict, EDAC Director, is budgeted for 1.2 calendar months per year. EDAC Director is responsible for supervising data archive portal development and model interoperability research. Position for the life of the project.

B. Other Personnel
Salary calculated with a 5% COLA beginning in Year Two.

B2. Other Professionals
Two post-doctoral researchers in the Department of Earth and Planetary Science for hydro-climatological modeling using High Performance Computing are budgeted at $45,000 per year salary. EDAC personnel for data archive, software/model interoperability and portal development are 0.25 FTE service interface developer, 0.25 FTE database developer, and 0.05 FTE project user support. All positions for the life of the project.

B3. Graduate Students
One graduate student in the Department of Civil Engineering to develop and integrate hydrologic data sources (CUAHSI HIS – hydrologic information system) is budgeted at $22,500.00 stipend. Position is for the life of the project.

B6. Tuition
Tuition for one graduate student at $5256.00 for all tuition and fees. Annual increase approximated at 5%.

C. Fringe Benefits
Fringe benefits for senior and other professional personnel is calculated at 36% for year 1, 40% for year 2, and 44% for year 3. Post-doctoral associate fringe is calculated at 28% for year 1, 31% for year 2, and 34% for year 3. Fringe for graduate students is calculated at 1%. Grad student health insurance is calculated at UNM standard policy rates of $1572 for year 1, $1650 for year 2, and $1733 for year 3. All are in accordance with UNM policy standards.

D. Equipment
Cost share purchases of equipment for computing Gateways at Tribal Colleges and regional Hispanic Serving Institutions

E. Travel
E1. Domestic Travel

Travel for senior professional staff is budgeted to include travel to the annual CI meeting and travel among EPSCoR states for research and management purposes. Professional staff include: EDAC staff, Earth& Planetary Science faculty, EPSCoR Director and EPSCoR Associate Director. 10 trips total per year @ $1250 per trip cost.
Travel for UNM graduate students and post docs is budgeted to include travel to the annual CI meeting. Five trips per year in Year 1 and 4 trips per year in Years 2 and 3 @ 1250.00 per trip. Graduate students and post docs also have travel for CI workshop training and professional development (eg. NCAR). Five trips per year in Year 1, 4 trips in Years 2 and 3 @ $1930.00 per trip (includes registration or tuition fees for workshop).

Note: trip cost calculation
Individual trip cost = $1250.00. Calculated as average 3 day trip; airfare @ $650.00 rt; ground transportation @ $100.00; federal GSA lodging and M&I @ $165.00 per day = $495.00.
Individual trip cost = $1930.00. Calculated as airfare @ $650.00 rt; ground transportation @ $100.00; Federal GSA lodging and M&I average of $170 per day for 4 days of training = $680.00. Registration or tuition fee @ $500.00

F. Participant Support

F1. Stipends

External Advisory Committee of 8 members each receive $1000.00 honorarium.

F2. Travel and F3. Subsistence

External Advisory Committee is budgeted at 8 members for one trip in Year 2 @ $1250.00 per trip.

Travel for participants in education and workforce development activities as follows:

National Travel for grad students, post docs, other:
Travel for graduate student, post doc and others (State government, educators, invited guests) attendance at annual CI conference for the out-of-state conferences is budgeted at 10 trips for Year 1 and 4 trips for Year 3 @ $1250.00 per trip.
Travel for graduate student & post doc CI workshop training and professional development at national training workshops are budgeted as 13 individual trips for Year 1, 4 trips for Year 2 and 3 trips for Year 3 @ $1930.00 per trip.

In-State Travel for grad students, post docs, other:
Graduate student & post docs, and other participants, for in-state CI conference in Year 2 are budgeted as 7 individual trips @ $655.00 per trip.

Note: trip cost calculation
Individual trip cost = $1250.00. Calculated as average 3 day trip; airfare @ $650.00 rt; ground transportation @ $100.00; federal GSA lodging and M&I @ $165.00 per day = $495.00.
Individual trip cost = $1930.00. Calculated as airfare @ $650.00 rt; ground transportation @ $100.00; Federal GSA lodging and M&I average of $170 per day for 4 days of training = $680.00. Registration or tuition fee @ $500.00.
Individual trip cost = $655.00. Calculated as ravel @ $145.00 for 450 miles @ 0.32 per mile. Federal GSA lodging and M&I for Albuquerque @ $170.00 per day for 3 days = $510.00

F4. Other

Annual CI conference costs for hosting institution calculated as 60 people @ $60.00 for meeting room, food, beverages, plus funds for AV, poster display, printed materials, other miscellaneous

G. Other Direct Costs

G1. Materials and Supplies:

Estimated from previous year EPSCoR budgets

G2. Publications

Printed training materials; publications costs; taken from previous EPSCoR actual costs

G5. Subaward

NMCAC Education Directorate for cyberlearning activities and workforce development as per NMCAC annual budgets. See subaward budget justification.

G6. Other

Telephone costs @ $300.00 per month for conference calls.

Rose Shaw, METRICA, serves as evaluator for the tri-state consortium; contract through Nevada EPSCoR office @ $60,000 per year to be equally divided among the three states.

SUMMARY PROPOSAL BUDGET

YEAR 1

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PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
New Mexico Computer Application Center

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Lorie Liebrock

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Lorie Liebrock - NMCAC Education Director**	2.00	0.00	0.00	$ **20,083**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	2.00	0.00	0.00	**20,083**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**5**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	8.00	0.00	0.00	**55,333**	
3. (**2**) GRADUATE STUDENTS				**8,000**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**83,416**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**0**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**83,416**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**17,315**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,178**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**40,500**	
TOTAL OTHER DIRECT COSTS				**41,678**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**142,409**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Total Direct Costs (Rate: 56.0000, Base: 142409)**					
TOTAL INDIRECT COSTS (F&A)				**79,749**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**222,158**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **222,158**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Lorie Liebrock

ORG. REP. NAME*
Lydia Salas

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
New Mexico Computer Application Center

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Lorie Liebrock

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Lorie Liebrock - NMCAC Education Director**	2.00	0.00	0.00	$ **21,088**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	2.00	0.00	0.00	**21,088**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**5**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	8.00	0.00	0.00	**58,100**	
3. (**2**) GRADUATE STUDENTS				**8,400**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**87,588**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**0**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**87,588**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**13,295**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**284**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**41,000**	
TOTAL OTHER DIRECT COSTS				**41,284**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**142,167**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Total Direct Costs (Rate: 56.0000, Base: 142167)**					
TOTAL INDIRECT COSTS (F&A)				**79,614**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**221,781**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **221,781**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Lorie Liebrock

ORG. REP. NAME*
Lydia Salas

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
New Mexico Computer Application Center

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Lorie Liebrock

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Lorie Liebrock - NMCAC Education Director**	2.00	0.00	0.00	$ **22,142**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	2.00	0.00	0.00	**22,142**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**5**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	8.00	0.00	0.00	**55,493**	
3. (**2**) GRADUATE STUDENTS				**8,820**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**86,455**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**0**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**86,455**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**13,295**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,136**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**41,525**	
TOTAL OTHER DIRECT COSTS				**42,661**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**142,411**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Total Direct Costs (Rate: 56.0000, Base: 142411)**					
TOTAL INDIRECT COSTS (F&A)				**79,750**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**222,161**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **222,161**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Lorie Liebrock

ORG. REP. NAME*
Lydia Salas

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION
New Mexico Computer Application Center

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Lorie Liebrock

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Lorie Liebrock - NMCAC Education Director**	6.00	0.00	0.00	$ **63,313**	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	6.00	0.00	0.00	**63,313**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL SCHOLARS	0.00	0.00	0.00	**0**	
2. (**15**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	24.00	0.00	0.00	**168,926**	
3. (**6**) GRADUATE STUDENTS				**25,220**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**257,459**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**0**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**257,459**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**43,905**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,598**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**123,025**	
TOTAL OTHER DIRECT COSTS				**125,623**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**426,987**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**239,113**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**666,100**	
K. RESIDUAL FUNDS				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **666,100**	$

M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $

PI/PD NAME
Lorie Liebrock

ORG. REP. NAME*
Lydia Salas

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C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

A. Senior Personnel
Lorie M. Liebrock, NMCAC Education Director, is budgeted for 1 calendar month per year for the life of the project. The Education Director will set priorities for educational, workforce, and awareness material development; determine the most appropriate NMCAC gateways for which to develop educational materials; recruit faculty and teachers; recruit and match consulting experts as needed; and ultimately be responsible for oversight of all NMCAC activities. Salary calculated with a 5% COLA beginning in Year Two.

B. Other Personnel

B2. Other Professionals
The NMCAC Education Outreach Coordinator will work with the Education Director to recruit faculty and teachers and to facilitate and coordinate the development of all educational, workforce, and awareness materials. Two calendar months at an annual rate of $80,000 are included for this coordination.

The NMCAC Gateway Support staff will be responsible for support for the gateway equipment at the gateway sites. This person will provide technical training and support for the gateway equipment for all sites. One calendar month at an annual rate of $192,000 is included for support of the gateway sites involved in the education/outreach/workforce training material development and delivery.

The NMCAC Workforce / Awareness Educator will be responsible for specialization and/or development of materials for workforce and community awareness. These materials will be coordinated with educational materials developed by other personnel. One calendar month at an annual rate of $60,000 is included for this material development except in the second year, where two months are scheduled.

STEM Content Faculty will provide content assistance with mathematics, computer science, and climate change science for development of educational materials. This assistance will be provided for educators, particularly the Middle and High School Teachers and the Master of Science Teaching Graduate Students. The assistance time will be provided at a joint appointment rate that will provide at least two weeks of consultation spread across teachers during the year.

CI and Distance Education Faculty position will provide support for a faculty member to integrate distance delivery into a new cyberinfrastructure course or split across two faculty to integrate distance delivery into two existing cyberinfrastructure courses. The courses will be selected by the Education Director in coordination with other states to advance the full set of distance courses provided to the consortium.

All components are for the life of the project. All salary calculated with a 5% COLA beginning in Year 2.

B3. Graduate Students
Two graduate students in the Masters of Science Teaching (MST) program are budgeted to receive support. These students will be teachers in the state of New Mexico that are working toward degrees in related areas of study. The students will develop new teaching materials / approaches as part of their graduate program. Two students will be supported for the life of the project.

B6. Tuition

C. Fringe Benefits
NMCAC positions are supported as joint appointments with home institutions. Fringe rates are included within the line item salaries.

D. Equipment

E. Travel
E1. Domestic Travel
Travel for management staff is budgeted as travel to the annual National CI meeting, travel among EPSCoR states for research and management purposes and travel to the New Mexico

CI meeting. Management staff include: Education Director, Education Outreach Coordinator, other as needed, to = 6 trips total per year.

Travel for other personnel, is budgeted as 6 trips total per year to the in-state New Mexico CI meeting. Personnel who will attend this meeting are the listed Workforce/Awareness Educator, Faculty, Middle and High School Teachers, and the two Masters of Science Teaching Graduate Students.

Out of state individual trip cost = $1320.00. Calculated as average 3 day trip; airfare @ $650.00 rt; ground transportation $110.00; lodging $130 and meals/incidentals $30.00 per day; registration $50.

In-state New Mexico CI meeting trip cost = $655; ground transportation $145; lodging $130 and meals/incidentals $30.00 per day. Each trip is an average of 3.5 days.

Gateway travel for visiting the gateways for training users as well as initial meetings to coordinate development of education/workforce/outreach materials. In the first year, there are two trips scheduled to each gateway for the Education Outreach Coordinator and the Workforce / Awareness Educator and one for the Gateway Support personnel. In subsequent years, there is one trip scheduled to each gateway.

Per gateway meeting trip cost = $335; ground transportation $145; lodging $130 and meals/incidentals $30.00 per day. Each trip is scheduled for two days.

F. Participant Support

G. Other Direct Costs

G1. Materials and Supplies

In addition to standard materials and supplies for all collaborators, in the final year, print and digital copies of materials developed will be distributed to schools (at appropriate levels) across the state of New Mexico.

G2. Publications

Poster and other printed materials; publications costs; estimated based on previous year similar programs actual costs.

G3. Consultant Services

G5. Subaward

G6. Other

Middle and High School Teachers will be supported to integrate distance delivery into a cyberinfrastructure course. This course may be new or the instructor may be making substantial improvements to an existing course. This funding is to provide a broad set of distance delivery courses of exemplary quality to the consortium.

GUTS (Growing Up Thinking Scientifically) will add three new schools to the set of schools where they deliver the GUTS program. This will include training for the local teachers, supporting a facilitator for each location, and development and integration of materials and simulations based on those developed for the middle school program. Budget amount of $5000 per school was taken from per school costs currently in use by the GUTS program.

Supercomputing challenge will add three new schools to the set of schools where they deliver the Supercomputing Challenge program. This will include support for the students and teachers at the new sites, travel to the Supercomputing Challenge Kick-Off meeting, and a $1000 fee for the sponsor teacher at each location. Budget amount of $5000 per school was taken from per school costs currently in use by the Supercomputing challenge program

Current and Pending Support: Gayle Dana, Nevada

Support: Current
Project/Proposal Title: Research Infrastructure for Nevada's Growth - Targeting Research with Uniqueness and Excellence
Source of Support: NSF
Total Award Amount: $9,000,000
Total Award Period Covered: 8/01/2005 – 1/31/2009
Location of Project: Desert Research Institute, NSHE
Person-Months per Year Committed to the Project: Cal: 6.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Nevada Infrastructure for Climate Change Science, Education, and Outreach
Source of Support: NSF
Total Award Amount: $15,000,000
Total Award Period Covered: 9/01/2008 – 8/31/2013
Location of Project: Desert Research Institute, NSHE
Person-Months per Year Committed to the Project: Cal: 6.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Boca Reservoir Evaporation Measurements for the Truckee River Operating Agreement (TROA)
Source of Support: U.S. District Court Water Master
Total Award Amount: $104,543
Total Award Period Covered: 05/01/2008 – 08/31/2009
Location of Project: Desert Research Institute
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support:
Total Award Amount: $2,000,000
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Desert Research Institute, NSHE
Person-Months per Year Committed to the Project: Cal: 2.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support: Kent Crippen, Nevada

Support: Current
Project/Proposal Title: Project MIST (Mathematics Integrated with Science using Technology)
Source of Support: US Dept. of Education - MSP
Total Award Amount: $860,000
Total Award Period Covered: 2008-2011
Location of Project: UNLV, Las Vegas Nevada
Person-Months per Year Committed to the Project: Cal: 1.5 Acad: 1.0 Sumr: 0.5

Support: Pending
Project/Proposal Title: Haptic Interface for Data Graphics in STEM Education for Students with Disabilities
Source of Support: US Dept of Education, Office of Special Education Programs (Stepping Stones of Technology)
Total Award Amount: $399,173
Total Award Period Covered: 9/1/2009 – 8/31/2010
Location of Project: UNLV, Las Vegas, Nevada
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 1.0

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 1.8 Sumr: 2.0

Current and Pending Support: Sergiu Dascalu, Nevada

Support: Current
Project/Proposal Title: Nevada Infrastructure for Climate Change Science, Education, and Outreach
Source of Support: NSF
Total Award Amount: $15,000,000
Total Award Period Covered: 09/01/2008 – 08/31/2013
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Current
Project/Proposal Title: Exploring Planetary Surfaces: Earth, Moon and Mars
Source of Support: NASA
Total Award Amount: $1,500,000
Total Award Period Covered: 09/01/2007 – 08/31/2010
Location of Project: University of Nevada, Reno
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.75

Support: Pending
Project/Proposal Title: Development of Space Radiation Capabilities to Support NASA and Commercialization of Space
Source of Support: NASA
Total Award Amount: $1,050,000
Total Award Period Covered: 07/01/2009 – 06/30/20012
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 1.6 Sumr: 1.0

Current and Pending Support: Frederick C. Harris, Jr., Nevada

Support: Current
Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education, and Outreach.**
Source of Support: NSF
Total Award Amount: $15,000,000
Total Award Period Covered: 09/01/2008- 08/31/2013
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.5

Support: Current
Project/Proposal Title: **Exploring Planetary Surfaces: Earth, Moon and Mars**
Source of Support: NASA
Total Award Amount: $1,500,000
Total Award Period Covered: 09/01/2007 – 08/31/2010
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.75

Support: Current
Project/Proposal Title: **Cortical Microcircuit Dynamics**
Source of Support: ONR
Total Award Amount: $877,000
Total Award Period Covered: 10/01/2006 - 9/30/2009
Location of Project: UNR
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 1.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 1.6 Sumr: 1.0

Current and Pending Support: Darko Koracin, Nevada

Support: Current
Project/Proposal Title: ARO Initiative Continuation Phase III
Source of Support: DoD/ARO
Total Award Amount: $2,814,000
Total Award Period Covered: 01/06-12/08
Location of Project: Reno, NV
Person-Months per Year Committed to the Project: Cal: 1.0

Support: Current
Project/Proposal Title: Evaluation of Regional Scale Receptor Models (D. Lowenthal, PI)
Source of Support: EPA
Total Award Amount: $436,687
Total Award Period Covered: 01/05-12/08
Location of Project: Reno, NV
Person-Months per Year Committed to the Project: Cal: 1.0

Support: Current
Project/Proposal Title: Integrated Desert Terrain Forecasting for Military Operations (E. McDonald, PI)
Source of Support: DoD-Army
Total Award Amount: $10,215,808
Total Award Period Covered: 07/03-06/12
Location of Project: Desert Southwest and Israel
Person-Months per Year Committed to the Project: Cal: 1.5

Support: Current
Project/Proposal Title: NV Infrastructure for Climate Change Science, Education and Outreach (G. Dana, PI)
Source of Support: NSF
Total Award Amount: $465,613
Total Award Period Covered: 09/08-08/09
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 2.0

Support: Current
Project/Proposal Title: Data Analysis and Modeling to Support Nowcast and Forecast Activities as Fallon Naval Air Station
Source of Support: DoD-ONR
Total Award Amount: $387,891
Total Award Period Covered: 02/08-12/09
Location of Project: Fallon NAS, NV
Person-Months per Year Committed to the Project: Cal: 1.5

Support: Pending
Project/Proposal Title: Wind Energy Assessment for Wind Farm Deployment in Southern and Eastern Nevada
Source of Support: Dept of Energy NREL
Total Award Amount: $882,442
Total Award Period Covered: 12/08-05/10
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 2.5

Support: Pending
Project/Proposal Title: Air Quality in the Lake Tahoe Basin: Impacts of Pollution, Fires, and Abatement Strategies (W. Goliff, PI)
Source of Support: USDA Forest Service
Total Award Amount: $299,038
Total Award Period Covered: 07/08-06/09
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 2.4

Support: Pending
Project/Proposal Title: Quantifying Contribution to Local Air Quality Impacts from Airport-related Emissions
Source of Support: Transportation Research Board
Total Award Amount: $599,377
Total Award Period Covered: 04/08-03/10
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 3.7

Support: Pending
Project/Proposal Title: Developing Urban Air Quality Measurement Programs in Central America: Phase 1 (J. Watson, PI)
Source of Support: EPA
Total Award Amount: $349,994
Total Award Period Covered: 03/08-03/10
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 0.3

Support: Pending
Project/Proposal Title: Adriatic High-resolution Coupled Air-sea Modeling: A prerequisite for Efficient Ocean Forecasts (AHRAM)
Source of Support: Croatian Ministry of Science, Education, and Sport
Total Award Amount: $15,608
Total Award Period Covered: 07/08-06/10
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 0.3

Support: Pending
Project/Proposal Title: Nyquist-Limited Infrared Detectors (NIRD)
Source of Support: Teledyne Scientific and Imaging, LLC
Total Award Amount: $74,052
Total Award Period Covered: 01/09-12/09
Location of Project: NV
Person-Months per Year Committed to the Project: Cal: 0.87

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Nevada
Person-Months per Year Committed to the Project: Cal: 1.5 Acad: 0.0 Sumr: 0.0

Current and Pending Support: Gregory A. Bohach, Idaho

Support: Current
Project/Proposal Title: Regional Center of Excellence (Biodefense): Novel Biodefense Vaccine Development
Total Award Amount: $1,748,000
Source of Support: NIH:NIAID
Total Award Period Covered: 9/1/2003-8/31/2008
Location of Project: University of Idaho, Moscow, Idaho
Person-Months Per Year Committed to Project: 2 Cal

Support: Current
Project/Proposal Title: Molecular and cellular basis of host-pathogen interactions
Total Award Amount: $10,600,000
Source of Support: NIH:NCRR
Total Award Period Covered: 6/01/05-5/31/10
Location of Project: University of Idaho, Moscow, Idaho
Person-Months Per Year Committed to Project: 3 Cal

Support: Current
Project/Proposal Title: EPSCoR Idaho RII VI: Infrastructure for Water Resources Research in a Changing Climate
Source of Support: NSF
Total Award Amount: $15M
Total Award Period Covered: 2008-2013
Location of Project: UI/ISU/BSU
Person-Months Per Year Committed to the Project: 3.2 cal

Support: Current
Project/Proposal Title: Inflammatory and immunoregulatory roles of microbial superantigens in bovine mastitis
Source of Support: USDA:NRI
Total Award Period Covered: 6/20/08-6/19/11
Location of Project: University of Idaho, Moscow, Idaho
Person-Months Per Year Committed to Project: Cal: 1.2

Support: Current
Project/Proposal Title: Regional Center of Excellence (Biodefense): Competitive Renewal
Total Award Amount: $1,674,927
Source of Support: NIH:NIAID
Total Award Period Covered: 3/1/09-2/28/14
Location of Project: University of Idaho, Moscow, Idaho
Person-Months Per Year Committed to Project: 0.5 Cal

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.4

Current and Pending Support: Daniel P. Ames, Idaho

Support: Current
Project/Proposal Title: FossilPlot: Data-Driven Web-Based Software and Teaching Modules for Undergraduate Education On the History of Life
Source of Support: : National Science Foundation
Total Award Amount: $150,000
Total Award Period Covered: 5/15/08-5/14/2010
Location of Project: Idaho Falls, Idaho
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Current
Project/Proposal Title: USGS Surface Water Software Support
Source of Support: : USGS
Total Award Amount: 232,157
Total Award Period Covered: : 05-01-07 to 04-30-12
Location of Project: Idaho Falls, Idaho
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Current
Project/Proposal Title: Technical Support for BASINS and the Water Quality Monitoring Program
Source of Support: Environmental Protection Agency
Total Award Amount: $380,000
Total Award Period Covered: : 04-01-06 to 03-31-11
Location of Project: Idaho Falls, Idaho
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 2.0

Support: Current
Project/Proposal Title: INRA ICEWATER Project
Source of Support: Department of Energy
Total Award Amount: $91,000
Total Award Period Covered: September 1, 2008 – December 31, 2011
Location of Project: Idaho Falls, Idaho
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.5

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 2.1 Acad: 0.0 Sumr: 0.0

Current and Pending Support: Paul Gessler, Idaho

Support: Current
Project/Proposal Title: Developing geospatial site type classification systems for forest nutrition management.
Source of Support: American Forest & Paper Association: Agenda 2020
Total Award Amount: $150,000
Total Award Period Covered: 2008-2011
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Statewide Habitat change assessment and monitoring.
Source of Support: Idaho Dept of Fish and Game
Total Award Amount: $35,000/yr
Total Award Period Covered: 2008-2010
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: IdahoView: a proposal for Full Membership to the AmericaView Consortium by the State of Idaho.
Source of Support: : USDI – Geological Survey
Total Award Amount: $81,000/year.
Total Award Period Covered: 2007-Indefinite
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Cropping systems and precision land management in dryland Pacific Northwest.
Source of Support: Collaboration with the USDA ARS Columbia Plateau Cons. Research Center
Total Award Amount: $90,000
Total Award Period Covered: 2006-2009.
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: EPSCoR Idaho RII VI: Infrastructure for Water Resources Research in a Changing Climate
Source of Support: NSF
Total Award Amount: $15M
Total Award Period Covered: 2008-2013
Location of Project: UI/ISU/BSU
Person-Months Per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support: Nancy Glenn, Idaho

Support: Current
Project/Proposal Title: Development of a Geospatial Outreach Program – Boise Center Aerospace Laboratory
Source of Support: NOAA
Total Award Amount: $475,900
Total Award Period Covered: October 2005 – September 2009
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Implementation of Remote Sensing Techniques for Invasive Species Management
Source of Support: USDA NRCS
Total Award Amount: $43,459
Total Award Period Covered: August 2006-July 2008
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.25 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Hyperspectral and LiDAR landscape modeling
Source of Support: NOAA
Total Award Amount: $462,120
Total Award Period Covered: October 2006-September 2009
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Fusion of remotely sensed data sources for modeling eolian soil transport in heterogeneous terrain
Source of Support: DoD
Total Award Amount: $360,515
Total Award Period Covered: October 2007 – September 2010
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 2.5 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Water Resources in a Changing Climate
Source of Support: NSF
Total Award Amount: $15,000,000
Total Award Period Covered: September 2008 – August 2013
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: .25 Acad: 0.0 Sumr: 0.0

Support: Pending

Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Current and Pending Support: Peter Goodwin, Idaho

Support: Current
Project/Proposal Title: Simulation and real-time monitoring of fish response to reservoir operations
Source of Support: USBR
Total Award Amount: $868,000
Total Award Period Covered: 9/1/07-8/31/10
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Instrumentation of the Stream Laboratory at the Center for Ecohydraulics Research
Source of Support: Murdock Trust
Total Award Amount: $470,000
Total Award Period Covered: Sept 2007-May 2009
Location of Project: Boise, Idaho
Person-Months per Year Committed to the Project: Cal: 0.2 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Sustainability of pools in gravel bed rivers
Source of Support: USGS and DeVlieg Foundation
Total Award Amount: $25,000/yr
Total Award Period Covered: 08/01/07-07/31/08 [renewed annually]
Location of Project: Idaho, U.S. and Chile, South America
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Alternative fuel and fire management
Source of Support: USDA Forest Service
Total Award Amount: $127,000
Total Award Period Covered:05/03/07-06/15/10
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Effects of fire on fuel
Source of Support: USDA Forest Service
Total Award Amount: $51,000
Total Award Period Covered:08/17/07-01/01/09
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.25 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: Riskpoint – Assessing the risks posed by point source contamination
Source of Support: Danish Research Grant through DHI Water and Environment and the Technical University of Denmark
Total Award Amount: $10,000 (Idaho)
Total Award Period Covered:08/17/08-01/01/10
Location of Project: Sites in the US and Europe
Person-Months per Year Committed to the Project: Cal: 0.25 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: WATERS Testbed: an international observatory node for the BioBio Basin, Chile
Source of Support: NSF
Total Award Amount: $150,000
Total Award Period Covered: June 2008 – May 2010
Location of Project: Idaho, U.S. and Chile, South America
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: Restoration Strategy for Silver Creek, Idaho
Source of Support: The Nature Conservancy
Total Award Amount: $50,000 (Phase 1)
Total Award Period Covered: March 2009 – January 2010
Location of Project: Idaho, U.S.
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Current and Pending Support: Harvey L. Hughett, Idaho

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Current and Pending Support: James McNamara, Idaho

Support: Current
Project/Proposal Title: Improved snowmelt modeling in semi-arid catchments
Agency: National Weather Service
Amount: $89,000
Total Award Period Covered:: June 1, 2008 – May 31, 2009
Location of Project: Idaho
Committed Time for McNamara: 1 month

Support: Pending
Project/Proposal Title: Collaborative Research: A WATERS testbed to investigate the impacts of changing snow conditions on hydrologic processes in the western United States
Agency: National Science Foundation
Amount: $252,036
Total Award Period Covered:: July 1, 2009 – June 30, 2012
Location of Project: Idaho
Committed time for McNamara: 1 month for 2 years

Support: Pending
Project/Proposal Title: **Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico** (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: Idaho
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 1.0 Sumr: 0.0

Current and Pending Support

Investigator: William Michener

Support: Current
Project/Proposal Title: Network Office of the US LTER
Source of Support: NSF
Total Award Amount: $ 9,011,235
Total Award Period Covered: 3/1/2003 – 2/28/2009
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: New Mexico EPSCoR RII (Climate Change Impacts on New Mexico's Mountain Sources of Water)
Source of Support: NSF
Total Award Amount: $15,000,000
Total Award Period Covered: 07/01/2008 – 06/30/2013
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 6.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: National Biological Information Infrastructure (NBII) & University of New Mexico Metadata Standardization Project
Source of Support: USGS
Total Award Amount: $148,000
Total Award Period Covered: 12/1/2006 – 11/30/2008
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 0.05 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: INTEROP: Creation of an International Virtual Data Center for the Biodiversity, Ecological and Environmental Sciences
Source of Support: NSF
Total Award Amount: $749,931
Total Award Period Covered: 1/1/2008 – 12/31/2010
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: Long Term Ecological Research Network Office FY 09-15
Source of Support: NSF
Total Award Amount: $15,662,179
Total Award Period Covered: 03/01/2009 – 02/28/2015
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 6.0 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: DataNet Full Proposal: DataNetONE (Observation Network for Earth)
Source of Support: NSF

Total Award Amount: $19,999,742
Total Award Period Covered: 10/01/2008 – 09/30/2013
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 1.5 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support

Investigator: Katherine A. Mitchell

Support: Current
Project/Proposal Title: Introduction to Climate Change Science course series for Tribal Colleges and Universities
Source of Support: NSF Geoscience Directorate
Total Award Amount: $150,000.00
Total Award Period Covered: 9/1/08 – 8/31/10
Location of Project: AIHEC, Washington DC
Person-Months per Year Committed to the Project: Cal: 0.5 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support

Investigator: Karl Benedict

Support: Current
Project/Proposal Title: NASA-EPHTN
Source of Support: NASA
Total Award Amount: $959,990
Total Award Period Covered: 3/28/08-3/27/11
Location of Project: University of New Mexico, PI: Stan Morain
Person Months per Year Committed to Project: 2.64

Support: Current
Project/Proposal Title: Multi-Hazard Mitigation Plan
Source of Support: FEMA
Total Award Amount: $67,719
Total Award Period Covered: 9/17/07-9/16/10
Location of Project: University of New Mexico, PI: Tim Ward
Person Months per Year Committed to Project: 0.6

Support: Current
Project/Proposal Title: New Mexico EPSCoR RII 3
Source of Support: NSF
Total Award Amount to EDAC: $268,587 (yr. 1)
Total Award Period Covered: 8/08-7/13
Location of Project: University of New Mexico, PI: William Michener
Person Months per Year Committed to Project: 0.84

Support: Current
Project/Proposal Title: NM Environmental Public Health Tracking Implementation
Source of Support: NM Department of Health
Total Award Amount: $220,000
Total Award Period Covered: 7/08-6/09
Location of Project: University of New Mexico, PI: Mike Inglis
Person Months per Year Committed to Project: 2.4

Support: Current
Project/Proposal Title: Development of a Flexible Pavement Database for Local Calibration of MEPDG
Source of Support: NM Department of Transportation
Total Award Amount: $439,787
Total Award Period Covered: 7/08-6/11
Location of Project: University of New Mexico, PI: Rafi Tarefder
Person Months per Year Committed to Project: 2

Support: Pending
Project/Proposal Title: MMMS
Source of Support: FEMA
Total Award Amount: $60,000
Total Award Period Covered: 8/08-7/09

Location of Project: University of New Mexico, PI: Shirley Baros
Person Months per Year Committed to Project: 0.6

Support: Pending
Project/Proposal Title: Improved Range Management Decision Support Through Quantitative Modeling of Forage from a Combination of High Frequency Remote Sensing Vegetation Measurements and Biotic Community Scale Ground Calibration
Source of Support: NASA
Total Award Amount to EDAC: $1,190,136.69
Total Award Period Covered: 2/09-1/13
Location of Project: University of New Mexico, PI: Karl Benedict
Person Months per Year Committed to Project: 4.776 (Yr. 1)

Support: Pending
Project/Proposal Title: Feasibility of Development and Deployment into Public Health Decision Support systems of a Multi-resolution Nested Dust Forecast System Enabled by Open Standards Based Model and Data Interoperability
Source of Support: NASA
Total Award Amount to EDAC: $ 109,576
Total Award Period Covered: 10/2/08-3/31/10
Location of Project: University of New Mexico, PI: Karl Benedict
Person Months Committed to Project: 1.2 (over 18 months)

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: 0.8

Current and Pending Support

Investigator: Julia Coonrod

Support: Current
Project/Proposal Title: Open Channel Modeling
Source of Support: Albuquerque Metropolitan Arroyo Flood Control Authority
Total Award Amount: $50,000
Total Award Period Covered: 07/01/08-06/30/09
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Current
Project/Proposal Title: Urban Flood Reduction and Channel Restoration Demonstration Program
Source of Support: U.S. Army Corps of Engineers
Total Award Amount: $570,000,
Total Award Period Covered: 07/01/08-9/30/09
Location of Project: Rio Grande in Albuquerque
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 2.0

Support: Pending
Project/Proposal Title: Engineered Systems and Ecosystem Response in the Middle Rio Grande
Source of Support: NSF 07-598 – Dynamics of Coupled Natural and Human Systems
Total Award Amount: $1,477,482
Total Award Period Covered: 08/15/09-08/15/11
Location of Project: Rio Grande in central New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support

Investigator: Joseph Galewsky

Support: Current

Project/Proposal Title: Diagnosis of subtropical humidity dynamics using tracers of last saturation
Source of Support: NSF
Total Award Amount: $184,842
Total Award Period Covered: 2/06-2/10
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 2.0 Acad: 0.0 Sumr: 2.0

Project/Proposal Title: Collaborative Research: Intercomparison of atmospheric water vapor isotope measurements from Mauna Loa, Hawaii and implications for characterizing subtropical humidity
Source of Support: NSF
Total Award Amount: $65,000
Total Award Period Covered: 9/08-9/09
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Project/Proposal Title: New Mexico EPSCoR RII (Climate Change Impacts on New Mexico's Mountain Sources of Water)
Source of Support: NSF
Total Award Amount: $15,000,000
Total Award Period Covered: 7/1/2008 – 6/30/2013
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0

Support: Pending

Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support

Investigator: Lorie M. Liebrock

Support: Current
Project/Proposal Title: CRI: ENSL: Experimental Network of Sensors Lab for Advancing Research in Sensed-data Collection, Integration, Management, and Analysis
Source of Support: NSF
Total Award Amount: 160,000
Total Award Period Covered: 7/1/2007 - 06/30/2010
Location of Project: Socorro, NM
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Support: Current
Project/Proposal Title: CITADEL: Coordinated Information Technology and Assurance Development and Education Laboratory (SFS)
Source of Support:
Total Award Amount: 1,025,329
Total Award Period Covered: 07/01/06 – 06/30/10
Location of Project: Socorro, NM
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 1.0
[Note that this is a renew of the grant below and does not increase the level of commitment as it adds on in time; the grant below was extended for student support.]

Support: Current
Project/Proposal Title: CITADEL: Coordinated Information Technology and Assurance Development and Education Laboratory (SFS)
Source of Support: NSF
Total Award Amount: 2,147,777
Total Award Period Covered: 07/01/03 - 06/30/09
Location of Project: Socorro, NM
Person-Months per Year Committed to the Project: Cal: 1.0 Acad: 0.0 Sumr: 1.0

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Current and Pending Support

Investigator: Timothy Thomas

Support: Current
Project/Proposal Title: Research Experience for Undergraduates: The Los Alamos Summer School
Source of Support: National Science Foundation
Total Award Amount: $217,085.00
Total Award Period Covered: 02/15/05 - 01/31/09
Location of Project: University of New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Support: Pending
Project/Proposal Title: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico (this proposal)
Source of Support: NSF
Total Award Amount: $2.0M
Total Award Period Covered: 05/01/2009 – 04/30/2012
Location of Project: New Mexico
Person-Months per Year Committed to the Project: Cal: 0.0 Acad: 0.0 Sumr: 0.0

Facilities, Equipment, and Other Resources

Nevada's Facilities, Equipment, and Other Resources related to cyberinfrastructure and the climate change theme are described below. These facilities support research, computer modeling, and information technology related to the project activities.

Computer – UNR

UNR Research Grid 1,500 ft^2. University computer cluster that facilitates computational research for all groups on the UNR campus. Consists of Sun 4100 and 4600 servers as compute nodes, a Sun 4600 computer as the head-node, and Sun 4500's as a disk array (48 TBytes total storage in network attached devices).

Software Engineering Laboratory (S. Dascalu) 400 ft^2. Research and design of large software systems, software frameworks, software processes, and interactive systems.

Evolutionary Computing Systems Lab (S. Louis) 500 ft^2. Development of computer processing methods that evolve without human intervention.

High Performance Computation and Visualization Lab (F. Harris) 400 ft^2. High performance parallel processing (200 cores with infinband), 8 multicore, multi-gpu, multi-head, visualization stations, 10 ft stereo virtual reality wall with optical tracking. Research in advanced visualizations, virtual reality applications, distributing computing, bioinformatics, and simulation environments.

DataWorks Analysis and Visualization Lab 14 Dell Precision Workstations with dual 2.8 GHz XEON processors, Network Attached Storage (NAS) provide a 4TB distributed file system, and large format printing facilities.

The Keck Center GIS\Visualization Lab a state-of-the-art GIS and scientific visualization facility that includes seven (7) advanced multiprocessor Dell workstations.

Center for Regional Studies employs six (6) employees. Facilitating organization for outreach, collaboration with Northern Nevada stakeholders (Track 1 project). Citrix MetaFrame Cluster servers. Software: ArcView 3.3, ArcInfo 9.1, ArcMap 9, ArcGIS 9, IDL, ENVI, GeoLytics Census CD 2000, Maple6, Mathematica 5, Mathcad, QSR NUD*IST, SAS & SPSS. R+, Stata, and Stella modeling software.

Robotics Research Lab (M. Nicolescu) 500 ft^2. Development of autonomous, adaptive, interactive robotic systems.

Software Engineering Laboratory 4 touch-screen displays, & two (2) Sony cameras and lightning equipment for video-recording of demos and presentations.

Spatial Analysis and GIS Teaching Laboratories 30 seats with the necessary software to teach integrative modeling procedures. Mass storage device (24Tbytes) for supporting mass data retrieval in an instructional environment.

Computer – UNLV

National Supercomputing Center for Energy and the Environment (**NSCEE**) Full-service supercomputing facility; national network accessibility. Advanced high performance computing systems available to educational and research centers, state and federal government agencies, and Nevada private sector (e.g., Sun Fire E6900, Sun Enterprise 5500), advanced computing clusters (e.g., RackSaver RS-1100 cluster, Lakemead Itanium cluster), and high capacity storage units (e.g., StorageTek PowderHorn automated cartridge system, Sun StorEdge T4 disk array).

Hydrologic Computing Laboratory Networked Sun server (1 GB memory, >10 GB storage space), 3 high-performance workstations, numerous personal computers. C/C++, Fortran, and Java compilers, image tools, visualization software, Arc/info geographic information system, and remote sensing analysis software.

Geographic Information Systems and Remote Sensing Core Laboratory (W. Smith, Jr) Faculty, graduate student research and outreach. Office space, computer banks, work tables, plotter, color printer, poster laminator, four (4) global positioning systems, sophisticated GIS and remote sensing software, mobile printing capabilities. Server and networking support provided by NSCEE staff and facilities.

Solutions Room (Piechota and Smith) ~1,200 ft^2. work/office space dedicated to the Track 1 NSF EPSCoR project. High definition monitors, 20 computers, servers, network supported by NSCEE. White boards, projector and teleconferencing.

Geoscience Computing Laboratory SUN server (including Ultra Workstations) and Linux cluster and personal computers. ARC-INFO GIS, USGS Land Analysis System, Advanced Visualization System, SURFER, and their own developed softwares.

Bennett Professional Development Center Four MacOSX servers and personal computers. Educational computing laboratory with 15 eMAC Macintosh computers. Three mobile laptop carts with a total of 45 Macbook and Macbook Pro computers. Full compliment of educational software. Three large smart classrooms outfitted to support cyberlearning.

Computer – DRI

CAVCaM – Center for Advanced Visualization, Computation, and Modeling (Harris) Computer graphics research, visualization renderings, immersive virtual reality environments, advanced simulations. 4-side Computer Automatic Virtual Environment (CAVE) for immersive virtual reality applications. 4-year old shared memory computer with 40 SGI Altix CPUs. 6-side CAVE in construction. Visbox immersive stereoscopic display, FLEX/CAVE system. Fall 2008: Computational Research and Visualization Building (CRUB).

Advanced Computing in Environmental Science State-of-the-art facility funded NSF EPSCoR (2003). SGI Altix 3700 computer; SGI Origin 2000 computer (16 processors, 2 Gb RAM); LINUX PC cluster (13 nodes-26 2.66 GHz processors-26 Gb of RAM). VisLab –Scientific visualization facility: wall-to-wall tiled 18 ft by 6 ft back projection, passive 3D stereo front projection screen and 3DLP projectors driven by high-performance computer cluster.

Numerical Modeling CRAY XD1 (Koracin Lab) 12 processors (AMD Opteron 2.6 GHz) and 18 GB of RAM. Its theoretical peak performance is 60 GFLOPS. It also features 6 Xilinx Virtex-4 FPGAs (NSF EPSCoR funded-2005). Also, 5-node Alpha cluster and two 24-node Beowulf clusters. Cluster of 40 1.3Ghz Itanium 2 CPUs Instructional Computer Laboratory. 17 seat facility for the teaching of complex computer models.

Other – DRI, UNR, UNLV

Video conferencing facilities available to facilitate project meetings. Additionally, video conferencing facility that also allows file sharing and display of software presentations simultaneously between parties remotely located.

Major Equipment- Nevada System of Higher Education

Connectivity for the educational and research institutions in Nevada is handled through a Nevada System of Higher Education (NSHE) sponsored organization called NevadaNet – a robust statewide backbone network that provides data connectivity and IP based video conferencing services to approximately 200 predominately rural Nevada locations. Campuses

provide the endpoint hardware. These sites include NSHE college campuses, K-12 schools, hospitals, Native American communities, and some state and federal government entities. There are several Connectivity Rooms used for Access Grid Node (AGN) and distance education connections, some of which were funded through a previous NSF EPSCoR grant (2002-2004).

The NevadaNet network consists of a backbone connecting four major hub sites – Las Vegas, Elko, Reno, and Carson City. From these major hub sites, radial spurs consisting of primarily full or fractional T1 leased circuits extend to the individual rural site locations. The major part of the network is based out of two metro rings. One ring is in the north (Reno), and the other in the south (Las Vegas). These two metro rings are connected by a 1Gbps leased fiber link with 2 OC3 circuits through Salt Lake City as backup. Connectivity to Commodity Internet is available from the south ring via a 1 Gbps line. Connectivity to Commodity Internet as well as Internet 2 and NLR is available through a 2 Gbps link from the north ring over the I-80 corridor to CENIC in Sacramento. UNR, UNLV, and DRI each have 10 Gbps networks on campus between buildings with 1 Gbps to desktops (10 Gbps can be provided where needed).

Facilities, Equipment, and Other Resources

Idaho's Facilities, Equipment, and Other Resources related to cyberinfrastructure and the climate change theme are described below. These facilities support research, computer modeling, and information technology related to the project activities.

Laboratory and Field Facilities

Idaho Experimental Watershed Network (IEWN)

The IEWN was developed during Idaho's most recent RII award. The Dry Creek, Mica Creek, and the Portneuf River watersheds have been instrumented. Instrumentation includes telemetry equipment for data transmission, in situ water quality sensors, weather stations, soil moisture sensors, stream gages, and two eddy flux towers. These sites are currently linked through the idahowaters.net, which is compatible with the WATERS Network. Idaho is working toward a fully integrated data warehouse and web services system with the ability to store and retrieve all observational data sets, not only stream flow, and to display these as text or graphs and to be able to access them directly through web-services.

Kimberly Research and Extension Center, University of Idaho

The UI Kimberly research center is co-located with the USDA-ARS Northwest Irrigation and Soils Research Lab (NWISRL). Facilities in support of climate change and hydrologic research include the UI Evapotranspiration Remote Sensing Computer Laboratory that houses six image processing work stations for applying the METRIC surface energy balance algorithms. There is also an electronic lab and machine shop for supporting field instrumentation. Existing field instrumentation includes two eddy covariance systems for sensible heat flux measurement, Bowen ratio system, thermal and solar radiometers, and a number of surface weather stations. The NWISRL lab has a state-of-the-art soil and water chemistry analysis facility. There are also on-going local watershed water balance studies that will provide datasets from which to compare with the regional water balance analyses. In addition, the primary meteorological system that monitors the Snake Plain is the Agrimet system of the USBR. This system provides short and long-term weather data from 12 continuously operating hourly weather stations on or near the Plain and nearly 30 RAWS hourly meteorological stations in the upper Snake and Salmon River systems. The Agrimet systems and data are routinely quality controlled.

Center for Ecohydraulics Research (CER), University of Idaho, Boise

High speed connections in the Water Center will allow researchers in other areas to participate in real-time flume experiments. The fiber-optic cable and ability to exchange large experimental data quickly was one of the factors of the NSF National Center for Earth Dynamics (University of Minnesota) to include this facility under their umbrella. The Memorandum of Understanding has been signed with the University of Idaho, and the first phase of specific research activities will be finalized during the summer of 2008.

A dedicated server running MicroSoft's Server 2003 operating system plus MS SQL Server, IIS, .NET framework, Visual Studio, and ODM Tools have been installed at the Center for Ecohydraulics Research (CER) at the Boise Water Center. Due to the network security settings and the need to permit individuals outside of the U of Idaho network to have access to the server (for data submission purposes), the server configuration includes an external server (submission server) that in turn communicates with the behind-the-firewall servers. A lease and software agreement has been set up with a commercial provider and the system is being tested. The publishing of the WaterOneFlow web-services have effectively added the IdahoWaters node to the WATERs network.

The CER Hydroinformatics Lab contains a mapping workshop, computer maintenance workbench, mobile classroom, and GIS & computer modeling workstations. The CER field equipment includes Survey Equipment, monitoring equipment, vehicles, and watercraft.

Facilities for Cyberinfrastructure

Visualization

The Center for Advanced Energy Studies (CAES) Building in Idaho Falls plans to implement a 12' x 6' powerwall or large high-resolution, tiled display wall to be used for projecting large computer generated images. A powerwall implementation differs from that of a typical large projection display system due to the tiling and composition of the image from several smaller high resolution images creating a high fidelity display.

The CAES Building plans to implement a 10’ X 10’ X 9’ Cave Automatic Virtual Environment (CAVE) or an immersive virtual reality environment where projectors are directed to three walls and the floor. Users go inside of the CAVE wearing special tracked stereo glasses so that their movements are tracked with sensors and the video adjusts accordingly to produce a verisimilitude environment.

The ISU Idaho Virtualization Laboratory (IVL) is a central technology laboratory located within the Center for Archaeology, Materials, and Applied Spectroscopy (CAMAS); the IVL houses technology for the development of virtual files containing three-dimensional data for selected objects. The data are generated using surface scanners. The IVL houses three laser surface scanners for small and medium-sized objects. These scanners can scan objects with a resolution of 0.06 mm -0.25 mm. Extensive 3D modeling software allows the accurate rendering of a range of object sizes and even small landscape areas.

Beowulf Cluster Laboratory, Boise State University

The Beowulf Cluster Lab in the College Of Engineering at Boise State University houses two clusters: a 61 node Beowulf cluster with 122 2.4 GHz Xeon processors and a 3-node developmental cluster with six 2.4 GHz Xeon processors. The lab is sponsored by a National Science Foundation Major Research Instrumentation Award No. 0321233. Use of this facility is possible based on user fees.

Computing Facilities in Geography Department, University of Idaho

The UI Geography Department has four high-performance Linux computing nodes with dual AMD processors on each node. The combined disk storage space of these systems is 6.5 Terabytes.

Remote Sensing and GIS Facilities

Remote Sensing and GIS Research & Teaching Laboratory, University of Idaho

The research and teaching facility was refurbished in 2007 and hosts a dual wireless smart board and high resolution projector system to enable simultaneous presentation of geospatial imagery to 24 students. Available software includes GIS, remote sensing, and programming software. Three file servers provide approximately 10 TB of file storage space with regional LiDAR and Landsat datasets and time-series of imagery and value-added products. The lab also owns several high resolution digital cameras, two Trimble Pro XRS GPS receivers, a Top-con wireless total station, and 4 laser rangefinders for use in conjunction with the GPS receivers. Two Li-Cor LAI-2000 Plant Canopy Analyzers and one Tracing Radiation and Architecture of Canopies (TRAC) sensor are available to quantify light interception and LAI across a range of vegetation types. Two field spectroradiometers (ASD and GER-1500) are also

available. The lab also contains a full suite of stereoscopes, zoom transfer scopes and airphoto interpretation equipment.

GIS Training and Research Center (TReC), Idaho State University

The TReC is a university-wide facility serving ISU and the Idaho GIS community. TReC offers a range of GIS courses and workshops such as, core GIS, spatial data analysis, programming, and other closely related geotechnologies (e.g., IT for GIS, Remote Sensing, and GPS). The TReC is equipped with an Enterprise GIS Server constellation with RAID-5 hot-swappable SCSI hard drives with more than 7 TB. The constellation consists of the following servers: ArcIMS, ArcSDE & IBM DB2, GIS Web, Spatial Librar, GIS Web Mirror, Archive, GPS, and Research and Development servers. There are also 25 student and research workstations and a cartographic workstation (including wide-format printer and scanner). The TReC also has 11 GPS receivers and a community base station phase corrected receiver. Extensive GIS, remote sensing, GPS, and database software are available. Gigabit Ethernet is deployed in the center with dark fiber network from the TReC to the ISU backbone.

Boise Center Aerospace Lab, Idaho State University - Boise

The Boise Center Aerospace Lab (BCAL) in the Department of Geosciences at Idaho State University is a remote sensing research, teaching, and outreach laboratory located in the Idaho Water Center in Boise, Idaho. BCAL provides image processing expertise in optical (hyperspectral), laser altimetry (LiDAR), and radar. BCAL has developed free LiDAR tools written in the Interactive Data Language (IDL), which include analysis of raw point data. These tools are the only LiDAR analysis tools specifically designed for analyzing semiarid ecosystems. BCAL also provides 12 state-of-the-art workstations, large format plotter, a server, and supporting hardware and software (remote sensing, GIS, GPS). BCAL has a compressed video IP-based system and a Sympodium interactive pen displays for collaborative meetings and student sharing across the U.S.

Geospatial Software Laboratory, Idaho State University, Idaho Falls

The ISU Geospatial Software Lab in Idaho Falls is located in the Center for Advanced Energy Studies with Idaho National Laboratory, University of Idaho, and Boise State University. This facility has 20 workstations, wide format plotter, scanners, GPS equipment, and three servers. Additionally, existing software licenses for GIS, remote sensing, programming, and web-development are available. The ISU Geospatial Software Lab develops and maintains the open-source GIS software MapWindow (http://www.mapwindow.org/).

FACILITIES, EQUIPMENT & OTHER RESOURCES

New Mexico's Facilities, Equipment, and Other Resources related to cyberinfrastructure and the climate change theme are described below. These facilities support research, computer modeling, and information technology related to the project activities.

Computer – New Mexico

The Earth Data Analysis Center (EDAC) on the **UNM campus** will serve as the central host site for the Data and Model Interoperability activities in the proposal. **EDAC** is an Earth science and analysis laboratory for geoscience applications. Technical resources are in computing capacity and data analysis. The computing system has Internet connectivity via UNM's standard Internet, Internet 2, and National Lambda Rail. Hardware consists of 22 production servers, 24 workstations, and 5 laptop computers. Nineteen servers support e-mail, web, ftp, and mapping services. The remaining three servers support intranet applications. Additional hardware includes input and output devices (flatbed scanners, and a large-format digitizing tablet). Databackups include a9.6TB tape library and a free-standing LTO tape backup drive. Server configurations include 17 dual-processor application servers and 5 dual- processor data servers hosting 21 TB of available disk space. All servers are running hardware RAID disk subsystems, are interconnected using either a standard or load-balancing Gb switch, and are located in a climate controlled, secure, dedicated server room. All servers and workstations are connected to the UNM Campus backbone through a 1 Gb firewall.

Software includes workstation and server applications running under Windows 2000, Windows XP, Macintosh OS X, and Linux. Externally available servers are running Windows Server 2003, or Linux. One Windows 2003 server provides web and ftp services via Microsoft Internet Information Server (IIS) and Macromedia ColdFusion. Microsoft SQL Server 2003 and ESRI's Spatial Database Engine (ArcSDE) provide database support for some web services and Internet mapping. Windows 2003 Internet mapping applications are provided via ESRI's Internet Mapping Service (ArcIMS) or ArcGIS Server. Externally available Linux servers (running RedHat Enterprise Linux Advanced Server, and Debian) provide email, web, ftp, database, GIS, and Internet mapping applications. Applications use open-source Apache, wu-ftp, sendmail, PostgreSQL/PostGIS, Minnesota Map Server, GRASS, R, perl, PHP, and python scripting languages.

NMCAC Encanto Supercomputer in Albuquerque and housed at an Intel facility, with exemplar sites at **UNM, NMSU**, and **NMT** available for use by the project, including running coupled climate/hydrological models and training graduate students in HPC. Encanto is a 172 Teraflops (peak theoretical speed) Altix ICE 8200 cluster (132 Teraflops sustained operation measured using standard Linpack tests). It consists of 1792 nodes (14,336 cores) of quad Xeon 3.0 GHz processors housed in 28 racks; 28.7 TeraByte of local memory (2 GB/core); 20 TeraByte NSF storage system. It has a172 TeraByte parallel file system with 12 GigaByte/sec bandwidth GigE connectivity to Lambda Rail (available up to 10 Gigabits/s).

The three exemplar systems (2.1 Tflops peak speed) are installed at the three major research universities: UNM, NMSU, and NMT. Their configuration is: 22 nodes (176 cores) in a single rack; 352 GigaByte memory (2 GB/core) and 16 TeraByte raw NSF storage system

Center for High Performance Computing Center at UNM. At UNM's High Performance Computing Center, 7 parallel processing systems for development of the WRF coupling software. The Center houses 7 computational clusters, ranging from 15 to 95 nodes, and a maximum of 11 TeraByte raw NSF storge ystem. HPC@UNM also offers training, workshops and assistance in HPC for graduate students and faculty.

Department of Earth and Planetary Sciences has a Linux cluster for model applications development and testing, plus a full suite of software packages such as MATLAB for analyzing and visualizing model output.

Office – UNM, NMT

Office space is available to support faculty, graduate students, and postdoctoral associates. Principal Investigators have private offices. Graduate students share office space. As of January 2009 the NM

State EPSCoR Program has expanded offices and conferences rooms available to accommodate personnel and meetings. Private office is available for Program Manager for Education and Outreach, Associate Director, and accounting and administration staff. All offices contain Sun workstations/servers and/or networked personal computers.

Other – UNM, NMSU, NMT + TCUs and HSIs

After installation of Gateways systems, all three major research institutions will be linked to the two Tribal Colleges and four regional Hispanic Serving Institutions by video conferencing and facilities that also allows file sharing and display of software presentations simultaneously between parties remotely located.

Supplementary Documents for Nevada NSF EPSCoR

Institutional Commitment Letters:

1. Nevada System of Higher Education	Ed Anderson, Director of Network Services/NevadaNet
2. Desert Research Institute	John J. Warwick, Interim Executive Vice President for Research
3. University of Nevada, Las Vegas	Sandra J. Odell, Professor and Chair, Department of Curriculum & Instruction
4. METRICA	A. Rose Shaw, External Evaluator

External Advisory Committee Letters:

5. Francine Berman	University of California, San Diego
6. Kelvin K. Droegemeier	The University of Oklahoma
7. Janice D. Gobert	Worcester Polytechnic Institute
8. Alan R. Hevner	University of South Florida
9. Henry Neeman	The University of Oklahoma
10. Jordan Powers	National Center for Atmospheric Research
11. Robert D. Sherwood	Indiana University
12. David Tarboton	Utah State University

Nevada System of Higher Education
SYSTEM COMPUTING SERVICES

System Computing Services
4505 Maryland Parkway
Box 454016
Las Vegas, Nevada 89154-4016
Tel: (702) 895-4500
FAX: (775) 895-3791

System Computing Services
Computing Center Building/270
Reno, Nevada 89557-0023
Tel: (775) 789-1200
FAX: (775) 789-3700

January 5, 2009

Dr. Gayle Dana
Nevada NSF EPSCoR Director
Desert Research Institute
2215 Raggio Parkway, Reno, NV 89512

Dear Dr. Dana,

I am writing this letter in support of the NSF EPSCoR Track II proposal, "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada and New Mexico". As the Director of Network Services for the Nevada System of Higher Education (NSHE), I have been happy to assist in the proposal planning for cyberinfrastructure enhancements for the state of Nevada.

NSHE System Computing Services (SCS)/NevadaNet's commitment and support of this proposal will be shown in the following areas:

- First, SCS will operate the networking and video equipment which will be purchased under this proposal, including the upgrade of NevadaNet's CENIC connection from 2 Gbps to 10 Gbps.
- Second, SCS will pay for the NevadaNet CENIC Connection at the 10 Gbps data bandwidth. The quote from CENIC currently lists this price at approximately $330,000 per year which you can use as match for this proposal. SCS also expects to continue funding this connection after the award is finished.

In summary, I look forward to working with you on the Track 2 project in upgrading the cyberinfrastructure for the state. If I can be of any further assistance, please do not hesitate to contact me.

Sincerely,

Ed Anderson
Director of Network Services/NevadaNet
Nevada System-Higher Education
2601 Enterprise Road
Reno, NV 89512-1666
EANDRSN@NEVADA.EDU
(775) 789-3710

0919123

Desert Research Institute

Office of the Vice President for Research

2215 Raggio Parkway
Reno, NV 89512-1095

Date: January 8, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
System Sponsored Programs and EPSCoR Office
755 E. Flamingo Road
Las Vegas, NV 89119

Subject: NSF-EPSCoR TrackII Matching Commitment

Dear Dr. Dana:

The Desert Research Institute (DRI) commits to providing $87,825 in state Applied Research Initiative Funds to the project entitled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico" during the award term.

Sincerely,

John J. Warwick. Ph.D., P.E., D.WRE
Interim Executive Vice President for Research

0919123

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

Dr. Gayla Dana
Nevada System of Higher Education
System Sponsored Programs and EPSCoR Office
755 E. Flamingo Road
Las Vegas, NV 89119

Tuesday, January 6, 2009

Dr. Dana

The UNLV Department of Curriculum & Instruction is committing support to Dr. Crippen and the NSF Cyber award by providing a Graduate Research Assistant during the award term.

Sincerely,

Sandra J. Odell
Professor and Chair

Department of Curriculum & Instruction
4505 Maryland Parkway • Box 453005 • Las Vegas, Nevada 89154-3005
(702) 895-3241 • FAX (702) 895-4898

METRICA

1703 36th Avenue Court - Greeley, CO 80634-2807

January 2, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR
Division of Hydrologic Sciences
Desert Research Institute
2215 Raggio Parkway
Reno, NV 89512

Dear Dr. Dana:

It is my intent to serve as the External Evaluator of the Idaho, Nevada, and New Mexico Consortium's proposed three-year National Science Foundation Research Infrastructure Improvement (RII) Track II project, *Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico.* I do not have any obligations, contracts, or restrictions that will prevent me from carrying out the duties of the external evaluator in a timely and professional manner. Since I worked with you and your team on the development of the evaluation and assessment plan I understand the proposed plan and support it fully.

My responsibilities include collecting quantitative and qualitative data that will be used to provide quarterly reported summaries and suggestions for refining and improving project implementation at both the state and consortium levels; measure the progress of the project in successfully meeting its goals, objectives and annual metrics; assess the impact of the project in developing strong inter-jurisdiction collaborations that address regionally relevant and nationally important climate change science and education; and assess the project's impact on enhancing discovery, learning, and economic development through the use of cyberinfrastructure. I will participate in the Advisory Committee meetings. Each of the three years I will prepare an annual external evaluation report in which progress toward anticipated outcomes and long-term sustainability of all aspects of the project including inter-jurisdictional collaboration, cyberinfrastructure development, and outreach and diversity.

Sincerely yours,

A. Rose Shaw, Ph.D.

UNIVERSITY OF CALIFORNIA, SAN DIEGO UCSD

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9500 GILMAN DRIVE, BLDG 109
A JOLLA, CALIFORNIA 92093-0505

PROFESSOR AND HPC ENDOWED CHAIR
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
U.C. SAN DIEGO

January 6, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway
Reno NV 89512

Dear Dr. Dana,

I am pleased to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled “Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico." I believe the proposal addresses key issues and has great potential to support Cyberinfrastructure in this region.

I understand that External Advisory Committee members will be asked to travel to one state in the three-state Consortium once a year over three years to advise and evaluate the project. I also understand that I will be reimbursed by the Western Consortium for all travel expenses and will receive a $1000 stipend for each visit.

I wish you and the team a successful award for this important project.

Sincerely,

Francine Berman

Dr. Francine Berman
Professor and High Performance Computing Endowed Chair, UC San Diego
Director, San Diego Supercomputer Center

The University of Oklahoma
SCHOOL OF METEOROLOGY

3 January 2009

Dr. Gayle Dana, Director
Nevada EPSCoR Program

RE: Letter of Commitment for Serving on External Advisory Committee

Dear Dr. Dana,

I am pleased to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico". I understand that, as part of this commitment, I will be expected to travel to one state in the three-state Consortium once a year over three years to advise and evaluate the project. As a member of the National Science Board, I cannot accept the stipend offered though I can accept reimbursement for travel expenses.

Please note that I have committed to serve on the EAC for another Track-2 proposal and thus, if both it and yours are funded, NSF will have to determine whether I can serve on both without a conflict of interest.

I wish you the very best in the review process and look forward to hearing the outcome of the competition!

Sincerely,

Kelvin K. Droegemeier
Associate Vice President for Research
Regents' Professor of Meteorology
and Weathernews Chair

120 David L. Boren Boulevard, Suite 5900 Norman, Oklahoma 73072-7307 USA Ph: (405) 325-6561 FAX: (405) 325-7689

Social Sciences & Policy Studies
and
Computer Science

103 Atwater-Kent Labs
e-mail: jgobert@wpi.edu
phone: 508-831-5619

Janice D. Gobert, Ph.D.
Associate Professor of Learning Sciences

January 7, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway
Reno NV 89512

Dear Dr. Dana,

I am pleased to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico". I understand that, as part of this commitment, I will be expected to travel to one state in the three-state Consortium once a year over three years to advise and evaluate the project. I also understand that I will be reimbursed by the Western Consortium for all travel expenses and will receive a $1000 stipend for each visit.

I am enthusiastic about the opportunity to work with you on this important project. Good luck with your proposal.

Sincerely,

Janice D. Gobert

Janice D. Gobert, Ph.D.

January 7, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway
Reno NV 89512

Dear Dr. Dana,

I am pleased to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled “Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico". I understand that as part of this commitment I will be expected to travel to one state in the three-state Consortium once a year over three years to advise and evaluate the project. I also understand that I will be reimbursed by the Western Consortium for all travel expenses and will receive a $1000 stipend for each visit.

I look forward to participating on the External Advisory Committee for this exciting project. If you need additional information from me, please let me know.

Sincerely,

Alan R. Hevner

Alan R. Hevner, Citigroup/Hidden River Chair of Distributed Technology
Information Systems and Decision Sciences, College of Business
University of South Florida, 4202 East Fowler Ave., CIS1040, Tampa, FL 33620
(813) 974-6753, ahevner@coba.usf.edu

The University of Oklahoma
STEPHENSON RESEARCH AND TECHNOLOGY CENTER

January 6, 2009

From: Dr. Henry Neeman
Director, OU Supercomputing Center for Education & Research (OSCER)
Adjunct Assistant Professor, School of Computer Science
University of Oklahoma
Stephenson Research & Technology Center, 101 David L. Boren Blvd., Norman OK 73019
405-325-5386, 405-325-3442 (fax), hneeman@ou.edu

To: Dr. Gayle L. Dana, Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway, Reno NV 89512

Re: Participation in External Advisory Committee for National Science Foundation EPSCoR Research Infrastructure Improvement Track 2 Proposal "Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada and New Mexico"

As Director of the OU Supercomputing Center for Education & Research (OSCER) at the University of Oklahoma (OU), I am pleased to accept your invitation to serve on the External Advisory Committee for your National Science Foundation (NSF) EPSCoR Research Infrastructure Improvement (RII) Track 2 proposal, titled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada and New Mexico."

I understand that, as part of this commitment, I will be expected to travel, once each year for the three year project duration, to one of the three participating Consortium states, to advise and evaluate the project. I also understand that I will be reimbursed by the Western Consortium for all travel expenses and will receive a $1000 stipend for each visit.

Please note that I am participating in Oklahoma's NSF EPSCoR RII Track 2 proposal and that therefore, if both Oklahoma's and yours are funded, the NSF will have to determine whether I can serve on both without a conflict of interest.

Sincerely,

Dr. Henry Neeman
Director, OU Supercomputing Center for Education & Research (OSCER)
University of Oklahoma

NCAR

National Center for Atmospheric Research
Earth and Sun Systems Laboratory (ESSL)
Mesoscale and Microscale Meteorology Division (MMM)

P. O. Box 3000, Boulder, CO 80307-3000
Phone (303) 497-8937 HYacinth7-8937
Fax (303) 497-8171

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway
Reno NV 89512

January 6, 2009

Dear Dr. Dana:
I am happy to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico". I understand that, as part of this commitment, I will be expected to travel to one state in the three-state Western Consortium once a year over three years to advise and evaluate the project. I also understand that I will be reimbursed by the Western Corsortium for all travel expenses and will receive a $1000 stipend for each visit.

Your proposed project appears innovative and shows promise to advance the aims of NSF's EPSCoR program. I look forward to serving on the advisory committee.

Very truly yours,

Dr. Jordan G. Powers

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INDIANA UNIVERSITY
SCHOOL OF EDUCATION
Office of Research and Development

January 6, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway
Reno NV 89512

Dear Dr. Dana,

I am pleased to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico". I understand that, as part of this commitment, I will be expected to travel to one state in the three-state Consortium once a year over three years to advise and evaluate the project. I also understand that I will be reimbursed by the Western Consortium for all travel expenses and will receive a $1000 stipend for each visit.

Regards,

Robert D. Sherwood, Ph.D.
Associate Dean for Research
Professor of Science Education

W. W. Wright Education Building 2070 201 N. Rose Avenue Bloomington, IN 47405 (812) 856-8004 http://education.indiana.edu/research

UtahState UNIVERSITY
UTAH WATER RESEARCH LABORATORY
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
4110 Old Main Hill
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David G. Tarboton, Sc.D., P.E.
Professor
Telephone: 435 797-3172
Email: david.tarboton@usu.edu
http://www.engineering.usu.edu/dtarb/

January 6, 2009

Dr. Gayle L. Dana
Nevada NSF EPSCoR Project Director
Desert Research Institute
2215 Raggio Parkway
Reno NV 89512

Dear Dr. Dana:

External Advisory Committee

I am pleased to accept your invitation to serve on the External Advisory Committee for your EPSCoR RII Track-2 proposal entitled "Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico". I trust that my experience with the Consortium of Universities for the Advancement of Hydrologic Science, Inc. Hydrologic Information System will be of value in this service. I understand that, as part of this commitment, I will be expected to travel to one state in the three-state Consortium once a year over three years to advise and evaluate the project. I also understand that I will be reimbursed by the Western Consortium for all travel expenses and will receive a $1000 stipend for each visit.

Sincerely,

David Tarboton
Professor

State of Idaho
DEPARTMENT OF WATER RESOURCES
322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098
Phone: (208) 287-4800 • Fax: (208) 287-6700 • Web Site: www.idwr.idaho.gov

C. L. "BUTCH" OTTER
Governor
DAVID R. TUTHILL, JR.
Director

January 6, 2009

Gregory Bohach, Ph.D.
Idaho EPSCoR Program
University of Idaho
McClure Hall 329
Moscow, ID 83844-3029

Re: EPSCoR Research Infrastructure Improvement Program: Track 2

Dear Dr. Bohach:

The Idaho Department of Water Resources (IDWR) is pleased to support the collaborative proposal between the states of Idaho, Nevada and New Mexico. This proposal will help establish an Idaho Environmental Observatory data management center that will build on the existing collaboration between IDWR and the academic community. Current activities include the METRIC model (satellite based energy balance for evapotranspiration estimates) with Dr. Rick Allen (UI) who is also a primary liaison between IDWR and the NSF EPSCoR Track 1 Grant, the ground water modeling and monitoring of the Snake River aquifer with Dr. Gary Johnson (UI), floodplain modeling using green LiDAR data with Dr. Peter Goodwin, and the development of a statewide LiDAR database with Dr. Nancy Glenn (ISU), Dr. Paul Gessler (UI) and Dr. Jim McNamara (BSU). To help achieve this distributed data management system, IDWR will contribute $100,000 per year for three years of match through our ongoing eligible activities.

Our on-going eligible activities are related to water-related data and providing public access to water-related data. These activities include:

1. Data creation, editing and maintenance (for example, the IDWR work with the National Hydrological Data Set, water rights, watersheds, wells, flood-plain data);
2. Creation and maintenance of public access to water-related data and Internet GIS applications built on ArcIMS and ArcServer applications;
3. Public access to the input data, and
4. Results of hydrologic modeling and water-rights accounting that can be integrated with the Track 1 Climate Change proposal and other research activities that support the mission of IDWR.

It is our understanding that this match will be leveraged by co-locating servers with IDWR in the Idaho Water Center in Boise, mirroring and archiving activities with INSIDE Idaho and the ISU GIS Training and Research Center, and in-kind modeling expertise and model data processing.

Sincerely,

David R. Tuthill, Jr., Ph.D., P.E.
Director

0919514

University of Idaho

University Research Office
Morrill Hall 109
PO Box 443010
Moscow ID 83844-3010
Phone: 208-885-4989
Fax: 208-885-5752
Email: vpresearch@uidaho.edu
Web: www.uro.uidaho.edu

January 8, 2009

Dr. Denise Barnes
Program Director
National Science Foundation
4201 Wilson Blvd.
Arlington, VA 22230

Dear Dr. Barnes:

As Vice-President for Research for the University of Idaho (UI), I am pleased to convey Idaho's commitment to the implementation of the collaborative proposal "Cyberinfrastructure (CI) Development for the Western Consortium of Idaho, Nevada, and New Mexico."

The proposed project has grown from the efforts of the newly established Western Consortium of Idaho, Nevada, and New Mexico. All three states have current EPSCoR RII awards that share the overarching theme and scientific objectives related to climate change. The Consortium proposes three high priority objectives that will enhance CI, enable community science, and promote knowledge transfer to scientists, educators, students, and citizens within and beyond the Consortium. Each of these is also a priority for Idaho and specifically Idaho's public universities involved in this project. Idaho's needs and commitments have been identified and agreed upon based on discussions and cooperation among faculty and administrators at the UI, Idaho State University (ISU), Boise State University (BSU), and the Idaho Department of Water Resources (IDWR) (see additional letter of commitment). Idaho has developed its 50% cost share strategy and will meet this commitment during the award period.

The UI will provide funding (~$495,842) for the external evaluator, honoraria for the Project Advisory Board; funds for the integration and implementation of cyberlearning materials; 50% of the new data manager position during the award to support interoperability goals, and servers and storage area networks at the Idaho Water Center in Boise. Both ISU and BSU will also provide support (~$119,156 and ~$85,000, respectively) for salary of participating faculty and staff working on this collaborative project. The IDWR has also committed funds (~$300,000) for software maintenance and personnel. A key outcome of the Track 2 investments will be the creation of an Idaho Environmental Data Center to better service the needs of the university community and key stakeholders within the Consortium.

The CI and associated benefits of these EPSCoR investments will be sustained well beyond the life of the grant through partnerships including IDWR and Idaho's universities. The UI will continue to support the data manager beyond the award period.

Addition of this new infrastructure will support the Consortium's efforts to achieve community science, research, and education goals, and also add significant value to Idaho's existing CI. Collaborative relationships forged within our State and the Consortium during the Track 2 project period will be a lasting outcome of this EPSCoR project.

Sincerely,

John K. McIver
Vice President for Research

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State of New Mexico

Office of the Governor

November 26, 2008

Dr. William Michener, Director
New Mexico EPSCoR Program
University of New Mexico
MSC05 3180
1 University of New Mexico
Albuquerque, NM 87131-0001

Dear Dr. Michener,

I am pleased to write this letter of support for your EPSCoR Track 2 Research Infrastructure Improvement proposal to the National Science Foundation. Congratulations on the previous successes in developing the EPSCoR program in New Mexico and enhancing the research capacity at our universities and colleges.

I understand that the new Track 2 proposal has been developed as part of a western consortium of states including Idaho, Nevada, and New Mexico and, furthermore, that the states have focused their infrastructure development activities on: (1) increasing high speed connectivity to our regional universities and colleges; (2) building computer literacy in public and higher education institutions across the region; (3) developing the workforce necessary to support high performance computing needs; and (4) creating the data and modeling framework that will allow us to make more-informed decisions about energy, water, and the environment—the underpinnings of the New Mexico economy.

Importantly, the Track 2 project will enable New Mexico to develop education and workforce development programs, as well as the data and modeling framework that further expands the capacity of the recently-created New Mexico Computing Applications Center (NMCAC) in which New Mexico has already invested $18.7M. I am especially pleased that you and your EPSCoR team have been working closely with the NMCAC directors to identify and address statewide computing and

connectivity challenges. The NMCAC houses one of the world's fastest computers (172 Teraflops) and provides connections to the R&D staff at Los Alamos and Sandia National Laboratories and professors and students at our universities and colleges. The NMCAC will be provide both the administrative and physical infrastructure that will bring our research labs and universities into a coordinated network to serve technology-based economic development, education and workforce development, and community assistance. Because of the strong synergies and the significance of the outcomes to our citizens, the State of New Mexico is committing more than $1,000,000 during 2009-2011 as our NSF EPSCoR Track 2 cost-share to establish gateways with sufficient high-speed connectivity to provide high definition videoconferencing and 3-D stereo visualization capabilities on the campuses of our regional universities and colleges. Our focus for the NSF effort will be to establish gateways at our Hispanic serving and Native American campuses at Eastern New Mexico University, New Mexico Highlands University, Northern New Mexico College, Western New Mexico University, Navajo Technical College, and Southwestern Indian Polytechnic Institute. Based on estimates of the cost of equipment for the gateways, we expect to spend $180-$200K per campus, thus resulting in a total expenditure by the State of $1.08-1.2M in support of the EPSCoR Track 2 program. In addition to providing gateways to under-represented student institutions, I note that these institutions are participants in our larger EPSCoR-funded program. These capabilities will provide an effective means for the colleges and universities to collaborate in the education and workforce development efforts highlighted in the Track 2 proposal as well as the research and education activities included in the recently funded Track 1 Research Infrastructure Improvement proposal that is focused on climate change science.

I look forward to continuing EPSCoR successes over the next several years. I am very appreciative of the role that the National Science Foundation and Congress are playing in supporting research and education in the EPSCoR states and am especially enthusiastic about potential for the tri-state western EPSCoR partnership.

Yours truly,

Thomas Bowles, Ph.D.
Science Advisor to New Mexico Governor Bill Richardson
NM Governor's Representative on the New Mexico EPSCoR Board

INSTAAR, University of Colorado — Boulder
Campus Box 545
Boulder, Colorado, 80309-0545
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Email: james.syvitski@colorado.edu
http://csdms.colorado.edu/

Jan. 5, 2009

Professor Joseph Galewsky
Earth and Planetary Sciences
Northrop Hall Room 222
MSC 03 2040
1 University of New Mexico
Albuquerque, NM 87131-0001
phone: 505-277-2361; fax: 505-277-8843
email: galewsky@unm.edu

RE: CSDMS Letter of Confirmation/Support

Dear Professor Galewsky:

I am pleased to acknowledge your personal efforts within the CSDMS Terrestrial Working Group and also your general support of our CSDMS goal of integrating community-contributed, freely available software models and modules that reflect and predict earth surface dynamics processes over a broad range of time and space scales. We value and support your proposed efforts in developing a cyberinfrastructure for a Western Consortium of Idaho, Nevada, and New Mexico, through the enclosed EPSCoR Track 2 pathway at NSF. We note your interest in developing a model and data interoperability framework that should allow users to specify, maintain and update, through a central user interface and a common methodology, a collection of software tools, as well as the interconnections between tools, needed to accomplish climate research tasks. We acknowledge your desire to coordinate your EPSCoR efforts with CSDMS, particularly using the CSDMS protocols to couple your surface process and hydrologic models with WRF. We would be pleased to have your personnel visit the CSDMS Integration Facility and work with our software engineers. We acknowledge your promise of coordinating your software development activities with CSDMS, and in contributing your software, once tested and verified, to our CSDMS program.

Sincerely,

James Syvitski, Ph.D.
Professor of Geological Sciences
CSDMS Executive Director
University of Colorado – Boulder
Boulder, CO, 80309-0545, USA