Nevada System of Higher Education
NSF EPSCoR R II

Pre-Proposal Cover Page
2013-2018 Project Period

Name of Project: FROM CLIMATE CHANGE PORTAL TO NEVADA DATA CENTER FOR RESEARCH AND EDUCATION ON THE ENVIRONMENT, WATER, AND ENERGY

This project involves human or vertebrate animal subjects: YES__ NO X

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PROJECT SUMMARY

We propose the creation of advanced capabilities for data acquisition, communication, processing, querying, presentation, management, and curation that can comprehensively serve the needs for multidisciplinary research and education pertaining to the environment, water, and energy in Nevada. The envisioned new centerpiece of the currently under development SENSOR system, the Nevada Center for the Environment, Water, and Energy, will incorporate large volumes of data and information, and will provide a broad range of software tools and services that will cater to the needs of many stakeholders statewide and nationwide. This will be a substantial extension of the existing Nevada SENSOR cyber-infrastructure (CI) and its key "front-end" component, the Nevada Climate Change Portal,

The overarching theme for the proposed work is "*Evolving Nevada's cyberinfrastructure to support research and education on topics that interconnect the environment, water, and energy*." In pursuing this theme, we rely on interdisciplinary ties established and the infrastructure, technical knowledge, and scientific expertise acquired during the ongoing NSF EPSCoR RII program, which made possible the creation of the SENSOR system and its Nevada Climate Change Portal. Further, we have assembled a diverse and complementary team of researchers, educators, and technical staff capable of building upon the work done so far and advancing its scope to address new scientific questions in a new interdisciplinary setting, this time also encompassing (in addition to water and the environment) the important domain of energy, with emphasis on renewable energy.

The project team is organized in four groups (or thrusts): CI, Water and Environment, Energy, and Education and Outreach, and it is composed in equal parts of participants involved in the current NSF EPSCoR RII award, who will ensure knowledge transfer and smooth project transition, and new collaborators, who will pursue new directions of research and development. The main science questions that we will catalyze the project are:

(1) What are the spatial and temporal responses of linked hydrologic, ecologic and human systems to climate and land use change?
(2) How does this response affect long-term availability and management of water for natural systems and water and energy for human use?
(3) How do temporal and spatial coordinates and atmospheric conditions affect the energy usage and production from renewable energy?

To support scientific research efforts on answering these questions, the CI component will focus on: (i) Computational hardware extension; (ii) Monitoring network expansion; (iii) Incorporation of broader environmental, energy, and hydrological research data; (iv) Development and optimization of data management software; (v) Creation of new software tools in support of research and education, in particular for new interactive simulations, intelligent data mining and analysis, and new visualizations that facilitate education; and (vi) Development of dynamic models that utilize SENSOR data systems.

The CI component will also facilitate the integration of research results in Education and Outreach by providing support for this group's planned formal, non-formal, and informal educational and outreach activities.

Intellectual Merit: The proposed multidisciplinary work distinguishes itself through its emphasis on high-quality, verifiable, multidisciplinary CI-enabled research (stemming from high-performance computing resources and high-quality data management processes involved) at the unique confluence of three fields especially important for Nevada: the environment, water, and energy. This integrative effort will charter unfamiliar territories of collaborative work and will provide a model for others to follow. The scientific explorations involved in the project will lead to an increased understanding of the complex, dynamic interplay of water, environment, and energy variables, as well as of the intricate effects of human and climate induced changes on water resources, energy availability, and environmental consequences, for example on the interaction among urban structure, urban energy entrapment, and water demand. The modeling and simulations performed will build specialized multidisciplinary expertise within Nevada, which will bring our project's participants to the forefront of national and international research, and will generate new hypotheses, thus guiding future investigations.

FROM CLIMATE CHANGE PORTAL TO NEVADA DATA CENTER FOR RESEARCH AND EDUCATION ON THE ENVIRONMENT, WATER, AND ENERGY

1 STATUS AND OVERVIEW

Funding received as a part of the ongoing NSF EPSCoR RII award [1] has facilitated the creation of a reusable cyberinfrastructure (CI) for high-quality scientific research: the Spatial Engine for Nevada Scientific Observational Results (SENSOR) system [2][3]. The front end for this system is the Nevada Climate Change Portal (NCCP) (Figure 1), which enables access to SENSOR resources to a broad range of stakeholders, from researchers and educators, to students, policy makers, and the general public. This system facilitates the collection, aggregation, storage, and processing of raw data from various sources (i.e., remote sensors) and provides robust access by interested parties to this data and information generated from it. While the initial infrastructure-building efforts [4] centered on the incorporation of climate research data from transects and the retrieval of data for interested researchers and public entities, the system has been designed for extensibility, allowing it to easily incorporate virtually any data source into its unified, extensible data architecture. As detailed later, this *architectural extensibility* is of paramount importance for the work envisioned in the present project proposal.

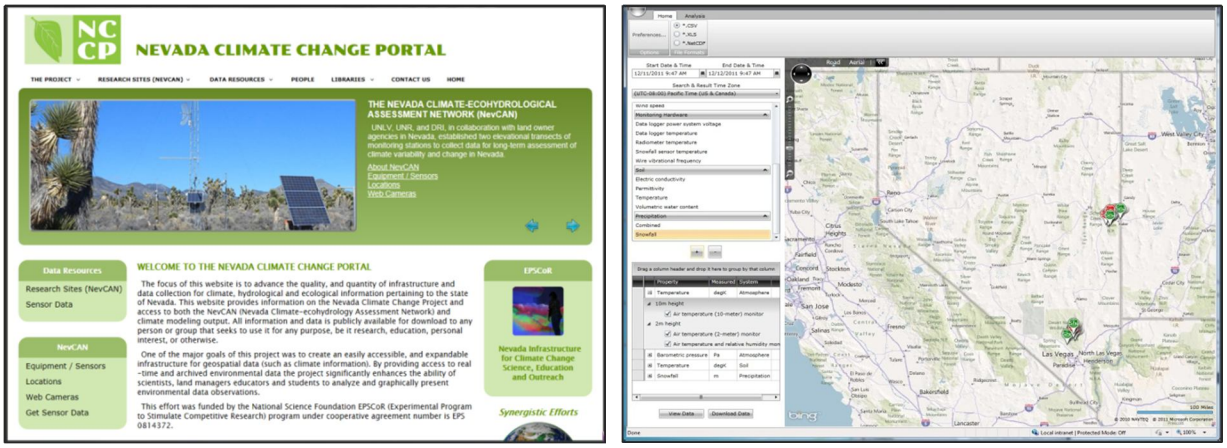

Fig.1 The Nevada Climate Change Portal, the Front End of the SENSOR System: Home Page on the left, Sensor Data Selection Page on the right

The SENSOR system, whose high level data-focused activities are shown in Figure 2, is revolutionary in comparison to existing research data systems, extending the role of CI and data management activities from the initial point of data acquisition (i.e., data loggers or data aggregators) to the data repository itself (i.e., the portal's file system and database [5]). This architectural difference allows the SENSOR system to provide many features that are critical to long-term multidisciplinary research needs, including: time synchronization and data correlation, error-free data collection and storage, asset management, data curation, unit conversions, metadata exchange and generation, complete data verification and tracing, centralized quality assurance (QA) and quality control (QC) data assessments, robust data selection and search features, multiple data formats, and multiple data access mechanisms (i.e. web pages, web services, and files). The implemented system frees researchers from all intermediate data activities, allowing them to focus on designing the data collection system and using the collected data.

In contrast to other scientific research data systems, SENSOR collects and provides *verifiable, traceable data* to interested entities. Acknowledging the fact that environmental sciences are fields that involve a great deal of non-repeatable data collection for trend analysis, SENSOR has been designed and implemented to eliminate the introduction of errors from the data collection process. In large part, this is

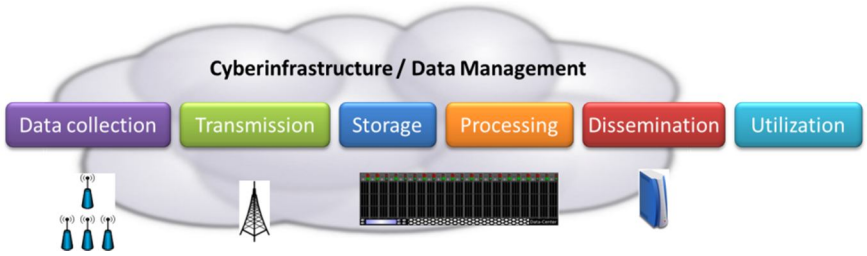

Fig.2 From Climate Change Data to Information in the SENSOR System

achieved by utilizing monitoring hardware and network infrastructure components that transmit data without loss (specifically, using TCP/IP networking), as opposed to the error-inducing transmission mechanisms that are commonly used in monitoring deployments for communication (e.g., one-way satellite communication/GOES). The use of specialized software to automate the acquisition and management of this data further eliminates the potential for error by removing the possibility of common researcher-introduced errors such as data modification, data filtering, data loss due to misplacing of data files, and manual conversion errors. Further, SENSOR defines a set of *data and infrastructure maintenance policies* that require all changes to infrastructure and all corrections applied to data be completely documented by the involved personnel; these policies are reinforced by SENSOR software that detects such changes and requires appropriate documentation. This unique combination of hardware, software, and policies provide a high degree of verifiability to all data collected in the system, allowing researchers and other stakeholders to closely examine data and corroborate its accuracy.

The SENSOR system largely automates and simplifies the management of *metadata* [6][7]related to the data collected by the system. To achieve this, SENSOR incorporates an *asset management system* that records all relevant information related to the collection of data, including: sensor and infrastructure hardware deployed and maintenance records, infrastructure configuration parameters and changes, and geospatial locations. Combined with the additional project information present in the system, SENSOR contains a full complement of metadata that can be used for data curation, verification, management, synchronization, and exchange activities. By embedding this information within the system itself, the need for researcher or maintenance personnel interrogation related to data and system parameters is minimized, yet accurately and centrally captured.

As shown in Figure 3, which depicts the research, education and outreach activities facilitated by the SENSOR system and its NCCP centerpiece, the primary interface to this system is the NCCP web portal, which hosts, among other things, information regarding the SENSOR system itself, the projects that utilize its services, and search interfaces to the data. The portal hosts access to the collected data via web-based *search interfaces* that facilitate navigation and selection of sensor data in various ways, as well as to *web services* (i.e., SOAP and REST) that provide efficient software-based access to the data for advanced computational systems (e.g. climate modeling, trend analysis, current site conditions, etc.). In addition, the portal provides a number of interfaces and displays to aide in the maintenance of equipment and infrastructure by project personnel, simplifying maintenance operations and diagnostics while documenting the metadata necessary to ensure long-term data viability, validity, and verifiability.

At the present, the SENSOR system is the primary repository for collected climate data and information from the previous NSF EPSCoR RII ("Track I") award, providing researchers with the long-term data they require for their analyses via generalized cross-discipline interfaces. Vegetation and meteorological data collected by Campbell Scientific data loggers [8] have been automatically imported into the SENSOR database and made available to all interested parties. Live camera streams from all deployed sites are available for public viewing on the web portal, while periodic web camera images are being captured and stored for maintenance and later analysis. Additionally, SENSOR is successfully participating in data and metadata exchange with NSF EPSCoR ("Track II") [9] partners in Idaho and New Mexico. These efforts will add redundancy to the data collected by SENSOR while at the same time increasing the availability of the data by exposing it on these external data repositories.

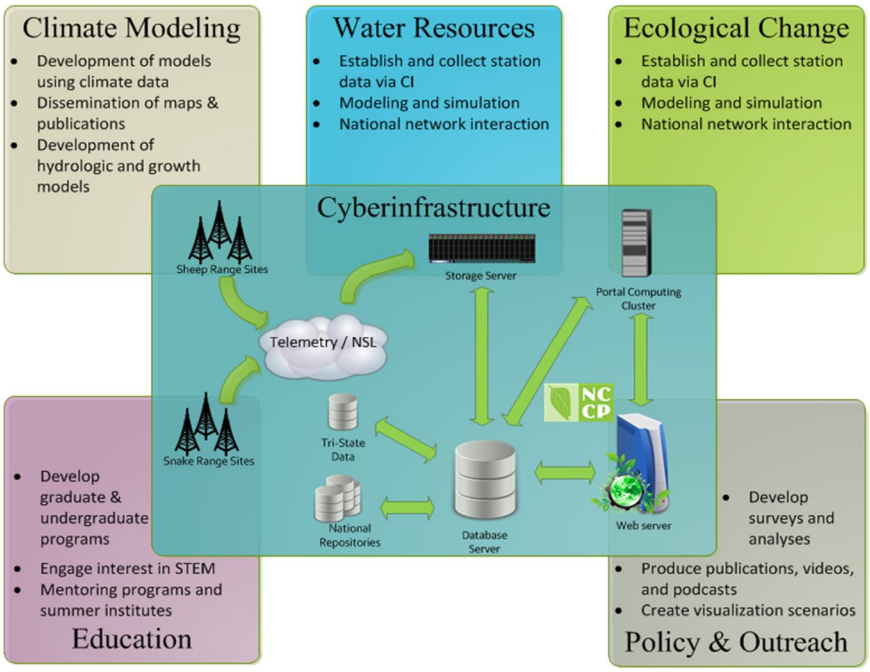

Fig.3 Research, Education, and Outreach Facilitated by the SENSOR System and its NCCP Centerpiece

The NCCP, while still under development, is establishing itself as the CI hub for the research, education, and outreach activities envisioned in the ongoing NSF EPSCoR RII Track I project. In addition to the capabilities previously described, the NCCP provides functions and features that benefit all six current project components, from Climate Modeling, Water Resources, and Ecological Change, to Education, Policy, Decision Making & Outreach, and CI itself. The portal serves (or will serve) for the dissemination of various types of project results, including model outputs, maps, publications, videos, course materials, and educational games, and will provide access to a growing set of new software tools.

An example of such software tool is the *Demeter* [10][11] software framework for data processing and model interconnection. Specifically, Demeter aims to couple various data models with appropriate user-defined data sources, addressing a disconnect that has hindered the efficient use of collected data sets by the scientists. Via its *Persephone* interface, Demeter allows users to graphically interconnect data sources, transformations, and models to create scenarios that bring together disparate resources in a way that reduces the time and effort required to execute simulations.

The SENSOR system will continue to be enhanced through the end of the current Track I funding. During this time, additional interfaces will be added to streamline infrastructure management and system configuration; data from external sources will be linked or integrated to consolidate and enhance information for researchers; project libraries will be extended to include additional publications and videos, simplified public interfaces that use live data will be incorporated; further development and coordination of controlled vocabularies will take place; new software tools will be developed; the data systems will be performance tuned and optimized; and additional QA and QC processes will be integrated, amongst other developments. SENSOR will also undergo improvements such as the implementation of OGC web services [12] [13] [14], and the increased exchange of data and metadata with Idaho and New Mexico as “Track II” developments. The end result will be a system that is well-poised for extension and reuse by new research projects, having a plethora of features and infrastructure readily available for consumption and further development. This is exactly where the work proposed here fits in, as a natural and essentially mandatory extension of a system that has involved the concerted effort of many researchers and developers and has been explicitly designed for growth.

2 RESULTS FROM PRIOR NSF AND OTHER FEDERAL SUPPORT

The inclusion of facilities, personnel, and infrastructure developed by the ongoing NSF EPSCoR RII (Track I) efforts, part of the "Nevada Infrastructure for Climate Change Science, Education, and Outreach" (2008-2013) [1], brings a significant number of relevant prior resources and results into the newly proposed project. In this current Track I project, 12 team members of the present proposal have been involved, while the other 12 are new collaborators on the proposed work. Faculty and technical staff involved in the current Track I Nevada-wide project are: Nick Lancaster (project co-PI and DRI organization PI), Scott Mensing (project co-PI and UNR organization PI), Sergiu Dascalu (leader of the CI component), Lynn Fenstermaker (leader of the Water Resources component), Franco Biondi (leader of the Ecological Change component), Jay Arnone (member, Ecological Change), Haroon Stephen (member, Water Resources), Fred Harris, Shahram Latifi, Mike McMahon, Eric Fritzinger (members, CI group), and Scotty Strachan (member, Ecological Change). This ongoing project has also supported about 3 Graduate Research Assistants (GRAs) per each project component, for instance in the CI component two PhD students and 1 Master student have been funded.

Chief amongst the results obtained in this project are the cyberinfrastructure developed as a part of the SENSOR system, which spans hardware and software systems. The hardware that constitutes the SENSOR system includes 31 computing cluster nodes, 3 24TB storage servers, 2 virtualization servers, multi-gigabit networking infrastructure, UPS systems, and a distributed data collection network spanning 12 remote data sites and incorporating hundreds of sensors. Resulting (newly designed and developed) software systems include the Nevada Climate Change Portal, various SENSOR-related software tools, applications, and data structures for data collection, management, and curation, 8 virtualized infrastructure servers, the Demeter software framework for data and model interconnectivity, a cutting-edge geospatial database and related schema, and visualizations that facilitate data search and retrieval. Together with the expertise of the personnel (i.e. professionals, post-doctoral members, and students) that architected, designed, and implemented them, these software and hardware systems form the initial cyberinfrastructure that will be significantly enhanced by the proposed research and new cyberinfrastructure-building activities.

Notably, the CI component's efforts have also resulted in several published articles, three on SENSOR and NCCP [2] [3] [4], and two the software framework for model and data interconnectivity [10] [11].

The ongoing NSF EPSCoR RII Track I efforts have also generated a number of results in terms of the scientific research (i.e. hydrological, ecological, environmental, and atmospheric). Researchers developed probability models of time-series episodes in terms of their duration (the number of time intervals continuously above or below a reference level), magnitude (the sum of all series values for a given duration), and peak (the absolute maximum value for a given duration). Applying these models to a new bivariate model for episode duration and maximum to a 2,300-year moisture-sensitive tree-ring chronology [15] resulted in significant progress toward the development of a trivariate model linking episode duration, magnitude, and peak [16] [17] [18] [19] [20] [21] [22] [23]. Other mathematical developments generated by the project included deriving the theoretical distribution of the ratio between maximum and magnitude for an episode [24].

Paleoclimatic methods were further improved by developing a watershed model for reconstructing streamflow from long proxy records [25], by quantifying variability in paleorecords using a new procedure based on the Gini coefficient [26], and by proposing a theory-driven method for computing tree-ring chronologies [27]. Public-domain software was generated from the project, either as a stand-alone tool [28] or as a component of a larger package [29]. The establishment of baseline biotic data sets –facilitated by project cyberinfrastructure– have produced a reference point for long-term environmental research on various fronts. Three graduate and five undergraduate students received training, and one graduate student used this project for his thesis research. This body of resulting scientific work provides guidance in identifying the research questions for this proposal, as well as a point of continuation for long-term studies and scientific developments.

A notable collaboration opportunity that stemmed from the ongoing NSF EPScoR RII (Track I) program was the NSF EPSCoR-funded project "Cyberinfrastructure Developments for the Western Consortium of Idaho, Nevada, and New Mexico" [9]. In this project, Dascalu and Harris and their Nevada CI group consisting of a postdoctoral research associate and a graduate research assistant have had the opportunity to collaborate with similar groups from Idaho (Idaho State University and University of Idaho) and New Mexico (University of New Mexico, Albuquerque). The project has extended network connectivity among the three states as well as data and metadata exchange among the Consortium states' main data repositories. Joint work on new software tools and collaborative modeling and simulation scenarios has also taken place.

In addition to prior work in the above mentioned projects [1] and [9], the inclusion of other project members further incorporates a broad base of previously-developed resources. Expertise in the fields of outreach and education includes significant experience with multi-million dollar grant funding involving various agencies, such as: the Nevada State Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) (USDoE); USDoE School to Work; USDA Cooperative Extension programs for Children, Youth and Families, Natural Resources, Nutrition, Diet and Health, Agriculture Profitability and Sustainability, and Community Development and Sustainability; and multiple USDA Smith Lever 3(d) supported programs. The results of these management and interaction activities will help ensure that the maximum outreach exposure and educational integration are obtained by the project and its participants.

Prior field-specific developments will also play a critical role in the proposed energy-related research, particularly some of the prior efforts of Dr. Trzynadlowski [30]. For the project "Communication Enhancement in Power Electronic Systems by Spectral Nulls" (09/01/2006 to 08/31/2009), the goal was to evaluate the feasibility of spectral shaping of output voltage in PWM power electronic converters. The spectral shaping is focused on elimination of specified frequency components from the electromagnetic noise by creating the so-called spectral nulls, which can then serve as communication channels in the noise. Computer simulations and laboratory experiments have confirmed the proposed theory.

For the project "Collaborative Research: High-Efficiency New Gearless Power Conversion Systems with Silent Permanent Magnet-Machines" (09/01/2008 to 08/31/2011), the aim of the collaborative effort with Louisiana State University (LSU) was to investigate novel permanent-magnet AC machines characterized by low speed and noise, and high efficiency. Two prototypes, both with an outer rotor and high number of magnetic poles, resulted: (1) multi-layer winding synchronous machine (at LSU), and (2) switched-flux machine (at UNR). They can be utilized as in-rim motors for gearless electric cars, carts, and automated wheelchairs, or as generators for low-power wind turbines.

For the project "Collaborative Research: Investigation of Fundamental Aerodynamic and Power Electronic Issues of Rooftop Wind Panels" (09/15/2009 to 08/31/2012), the aim of the collaborative effort with California State University Long Beach (CSULB) was to investigate a novel concept of rooftop wind panels. The panels, composed of horizontal wind rotors, are expected to gain a higher degree of public acceptance than the traditional blade turbines. Numerous computer simulations have been performed and a novel power electronic generator-grid interface has been designed.

The inclusion of the resulting systems, knowledge, and expertise of the personnel involved will strongly guide the direction and shape the design and implementation of energy monitoring and profiling systems. Further, the detailed knowledge of renewable power generation systems will be critical in properly leveraging the ample renewable resources present in Nevada, providing optimal energy conservation determinations and integration of renewable power systems.

3 RESEARCH PROGRAM

3.1 VISION AND GOALS

Building on the infrastructure, technical knowledge, and scientific expertise acquired in the current cycle of the NSF EPSCoR RII program, our vision is to take advantage of the interdisciplinary ties created and the CI developments made in this program and advance them to a higher level of research and education-supporting capabilities, from which an extended community of stakeholders could benefit. Specifically, these stakeholders will include scientists, educators, students, policy makers, and the general public.

The focus on this proposal is largely on CI advancements, yet these are driven by a number of important research questions. The overarching theme for this pre-proposal is "*Evolving Nevada CI to support research and education on topics that interconnect the environment, water, and energy*" and to pursue it we have assembled a project team with four components (or thrusts): Cyberinfrastructure, Water and Environment, Energy, and Education and Outreach.

Numerically, half of the proposed project's participants (12 in total) have been involved in the current NSF EPSCoR RII award, thus ensuring knowledge transfer and continued progress, while half are new collaborators, thus enabling new avenues of exploration and development. Important additions to the collaborating team are those of the energy experts from UNR and UNLV and, respectively, the formal involvement of specialists from the Nevada Seismological Laboratory (NSL).

The main research questions, stemming from the science groups, are as follows:

(1) What are the spatial and temporal responses of linked hydrologic, ecologic and human systems to climate and land use change?
(2) How does this response affect long-term availability and management of water for natural systems and water and energy for human use?
(3) How do temporal and spatial coordinates and atmospheric conditions affect the energy usage and production from renewable energy?

Regarding CI, the goal is to build upon the existing SENSOR system and the component that epitomizes it, the NCCP, and enhance the existing CI with advanced data management, communications, and computational capabilities that can serve more comprehensively the needs for multidisciplinary research and education in Nevada. The envisioned extended SENSOR system (Figure 4) is best represented by its new "front end," the Nevada Data Center for the Environment, Water, and Energy.

Substantial advancement and transformation of the NCCP into the Nevada Center for the Environment, Water and Energy will be achieved through the following: (i) Computational hardware expansion; (ii) Monitoring network expansion; (iii) Incorporation of broader environmental, energy, and hydrological research data; (iv) Development and optimization of data management software; (v) Creation of new software tools in support of research and education, in particular for new interactive simulations (including what-if scenarios), intelligent data mining and analysis, and new visualizations that facilitate education; and (vi) Development of dynamic models that utilize SENSOR data systems.

The CI component will also facilitate the use of research results in Education and Outreach by providing development support for this group's implementation of their planned formal, non-formal, and informal education activities.

While at core the above planned extensions and enhancements are focused on strengthening CI capabilities in Nevada, the implications of the proposed project are immediate and compelling, particularly in terms of: facilitating advanced research in environmental sciences and energy; supporting multidisciplinary scientific exploration for improved understanding of the interdependencies of energy, water, and the environment; providing powerful, new-generation computing capabilities for education and outreach; diversifying and expanding the involvement of stakeholders in using the CI currently being built in Nevada; and strengthening recently formed partnerships with scientists and engineers from other states (i.e., with Idaho [31] [32] and New Mexico [33]) and extending them to include organizations from additional states and, possibly, other countries. The new, advanced CI for Nevada will serve as hub for

interdisciplinary work and will bring Nevada to the forefront of scientific research and development in the Nation.

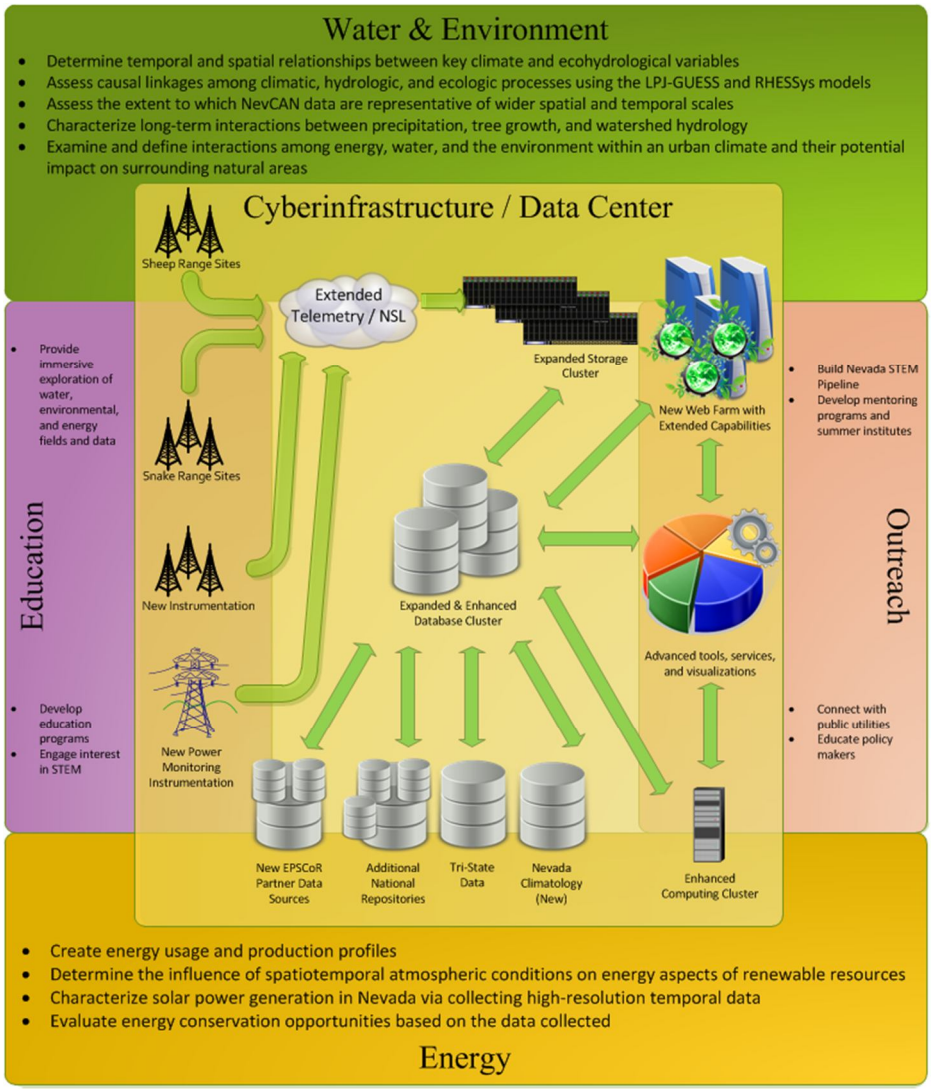

Fig.4 The Extended SENSOR System and its Hub, the Nevada Data Center for the Environment, Water, and Energy

3.2 BACKGROUND

One of the most basic requirements for almost every scientific research project is *the need to collect and manage the data* for that project; fields such as environmental research that rely on trend analysis depend almost exclusively on data collection. Often overlooked are the management and availability of the data over both the long- and short-term. Good research practices as well as changes to the requirements of funding agencies [34] require that these two broad problems be explicitly and satisfactorily resolved. Addressing these issues quickly exposes a host of other problems relating to data quality, verifiability, collection methods, documentation, and long-term usability of project data, to name a few.

Other entities around the world have attempted to address the need to create data repositories that collect, manage, and curate high-quality research data. Efforts focusing on centralization are rather common, resulting in the creation of data centers such as the New Mexico Resource Geographic Information System (RGIS) [33], the Northern Knowledge Network (NKN) [32], and the Western Regional Climate Center (WRCC) [35] that are very capable of aggregating data, but lacking in their

ability to retain or document data quality. At the other end of the spectrum are efforts such as the Digital Curation Center (DCC) [36] and the Joint Information Systems Committee Advanced Climate Research Infrastructure for Data (JISC ACRID or ACRID) [37] that provide only advice and expertise in managing / curating research data; the implementation of appropriate infrastructure and practices is left for the researchers. The novel and highly-elusive solution is the fusion of these two extremes: the unification of data management practices into the research process, ultimately resulting in the creation of a *data center* that incorporates lossless data acquisition infrastructure, centralized data storage, and advanced data curation and management practices. Such a center for CI would exist independently of any one research project, but would be extensible and reusable by any future research activity that generates data.

The SENSOR system was created as a part of NSF Nevada EPSCoR Track I efforts to provide high-quality data collection, management, access facilities for involved researchers and the public. Unlike other project-centric efforts, SENSOR was designed to address the immediate needs of the project, but also architected to be extensible and flexible enough to be reused and adapted to any future research. A *unique region* with a semi-arid, high desert environment, Nevada hosts a wide variety of research opportunities for scientists in climate research, hydrology, renewable energy, atmospheric sciences, ecology, and other fields. The extensible, cross-disciplinary nature of SENSOR is extremely conducive to the broad variety of research opportunities available in Nevada. As such, the proposed expansion of the SENSOR system from a project-level collection of CI to an independent, reusable "CI center" – a data center that incorporates reusable physical infrastructure, software, and policies to facilitate the lossless collection, management, and dissemination of high-quality research data – would streamline, optimize, and revolutionize research within Nevada, providing a concrete model of implementation for other regions around the world. The ample opportunities to integrate disparate cross-disciplinary data sources would simultaneously expand the capabilities of the SENSOR system (driving innovations for each incorporated discipline), reduce the repetitive hardware costs associated with research data activities, and empower researchers with data verifiability and quality –as well as advanced research opportunities and guidance– that were previously unavailable.

The growth of the SENSOR system in this manner will be challenging. The creation of this "CI center" will require the management, implementation, and development of a new combination of networks, data systems, software systems, maintenance policies, neutral data standards, server infrastructure, and access mechanisms to achieve the quality and management required by researchers. Further complicating development will be the diversity of data sources involved in each discipline and project, as well as the specialized data access and visualization needs of each of those fields; balancing the long-term need to retain flexibility through data neutrality and the highly specialized needs of researchers and disciplines will be a complicated and delicate –yet achievable– process.

3.3. RESEARCH AND DEVELOPMENT THRUSTS

3.3.1 CYBERINFRASTRUCTURE THRUST

[Dascalu, Harris, Louis, Varol, Latifi, Kent, Smith, Bryant, Gunes, McMahon, Fritzinger]

Objectives

Nevada's ability to compete for research funding at state, regional, and national levels depends upon the construction of a quality reusable cyberinfrastructure for multi-disciplinary research. Developed as a part of the current NSF EPSCoR RII program, the SENSOR system was architected and implemented to first serve the needs of climate researchers. Encompassing cutting-edge computing hardware, software, network, and research devices, SENSOR is ready to incorporate the needs of additional research fields, providing them with the expertise and infrastructure they require to perform high-quality, verifiable, accessible research that conforms to the highest scientific standards.

The main objective of the CI project component is to build upon the existing SENSOR system and enhance the existing infrastructure with advanced communication, computing, data acquisition, data processing, and data management capabilities that can serve more comprehensively the needs for

multidisciplinary work in Nevada on topics placed at the union and the intersection of our research thrusts on water, environment, and energy. The Nevada Data Center for the Environment, Water and Energy will incorporate large volumes of data and information as well as provide a broad range of software tools and services that will cater to the needs of numerous stakeholders in the state of Nevada and nationwide.

Proposed Work

Toward these ends, the CI component proposes the following activities:

- ***Computational hardware expansion:*** To accommodate the storage requirements of existing, proposed, and future research efforts, additional high-speed storage, computing, and related infrastructure hardware would be added to the SENSOR infrastructure. This additional hardware would facilitate the optimization of data access, improved redundancy, enhanced data curation and management activities, server virtualization upgrades, and improved database operations.
- ***Monitoring network expansion:*** Leveraging existing relationships with the NSL [38] and other entities, the communication network utilized by SENSOR would be expanded to include additional urban and sub-urban locations as determined by the scientific components. These expansions would continue to utilize high-speed, lossless communication mechanisms (e.g. TCP/IP radios, Ethernet networks, etc.) to enable cutting-edge, high-precision research.
- ***Incorporation of broader environmental, energy, and hydrological research data:*** This entails the inclusion of data sources (i.e., loggers, satellite imagery, and other repositories) utilized in these disciplines, beyond those already present in SENSOR. This development involves the incorporation of new sensors, import processes, metadata tracking, asset management, and appropriate visualizations using a combination of software, hardware, and network resources.
- ***Data management software development and optimization:*** Expanding upon the developments of the SENSOR system, the database schema and operations will be expanded and further optimized for the newly-incorporated research fields. Additionally, software systems will be developed and/or expanded to support additional data source import needs, curation activities, QA and QC assessments, format requirements, search features, and research activities.
- ***Creation of new software tools for scientific research and education:*** New software tools and applications will be researched and developed and/or integrated in the Data Center, in particular for interactive simulations, running what-if scenarios in user-friendly environments, intelligent data mining and analysis, and educational and outreach purposes. Also developed will be web-accessible data visualizations that correlate and represent data from multiple disciplines to facilitate education efforts and the efficient selection of appropriate data for detailed research analysis. Applications for portable devices such as iPhones and iPads will also be considered for design and development.
- ***Development of dynamic models that utilize SENSOR data systems:*** To aid researchers using software systems to analyze and manipulate data, additional web services will be created (potentially in-tandem and consultation with the new software systems involved in the project) to make the data efficiently accessible and consumable by those systems. Developing data services oriented specifically toward data modeling needs are critical for future modeling research.

Integrative Aspects

As a component whose role is the facilitation of nearly all activities in the scope of this project, the CI group will communicate with all components throughout the duration of the project. For the research thrusts, CI will guide hardware selection and management efforts to ensure data quality and accuracy, facilitating data acquisition and delivery to the researchers. For education components, CI will support access to collected research data, information related to the research (e.g. visualizations, videos, etc.), and communication between researchers and the education (student and teacher) community – likely through a project-specific website integrated within the existing portal. For policy makers, CI will facilitate the transparent dissemination of data and information upon which policy decisions are based from researchers

to the public and government officials. In short, CI will serve as the short- and long-term collection of computer expertise and technology that integrates all the project's components and stakeholders.

3.3.2 WATER AND ENVIRONMENT THRUST

[Fenstermaker, Lancaster, Arnone, S. Mensing, Biondi, Stephen, Tang, Strachan]

The Great Basin, which includes most of Nevada, is considered one of the most endangered environments in the U.S. as a result of numerous interacting factors including climate change, urbanization, changing land use, limited water resources, altered fire regimes, invasive species, insect outbreaks, and plant disease [39]. The close linkages that exist between stressors and their importance for land management and public policy highlight the need for an integrated approach in which biophysical and human responses are studied by interdisciplinary research groups. It is also vital that anthropogenic influences on the environment, particularly water resources, can be distinguished from responses to climate change. This requires access to large datasets, sophisticated modeling and data analysis tools, and experience interpreting the results of these efforts, which will be provided by the proposed infrastructure building effort.

For example, recent analyses relating temperature and precipitation records to stream flows (e.g., [40]) indicate strong relationships of seasonal and interannual climate variability with surface water flow. These relationships may reflect plant ecophysiological responses to climate or responses to purely physical hydrologic processes. One example is the unprecedented growth peaks during the last few decades of bristlecone pines (*Pinus longaeva*) growing near the upper tree line limit [41]. While this trend is matched by increased air temperature in PRISM data, there are no in-situ observations of environmental drivers that allow for a clear, physiological explanation of the diverse bristlecone growth patterns observed at different elevations. Other analyses describe recent and projected declines in the fraction of precipitation that falls as snow at upper elevations and decreases in rainfall amount as a result of atmospheric greenhouse gas radiative warming of the troposphere if the mean winter wet-day minimum temperatures increase above -5°C. Taken together, these responses may lead to earlier snowmelt, runoff, plus streamflow and seasonal flooding.

Major Science Questions and Proposed Work

The water and environment thrust will expand data archives and initiate research and modeling efforts to address two overarching science questions for the Great Basin environment: (1) What are the spatial and temporal responses of linked hydrologic, ecologic and human systems to climate and land use change? (2) How does this response affect long-term availability and management of water for natural systems and water and energy for human use?

These questions will take time, resources and decades of data to fully evaluate. We will combine the following four approaches to begin to address the questions: (1) acquisition, integration and scaling of spatially referenced data sets; (2) assessment of future and past climate and hydrologic model uncertainty; (3) linkage of hydrologic and ecosystem models; and (4) assessment of human activities on energy, water and environmental systems. We will use existing data sets compiled by the research team and others and we will collect critical new data sets to fill data gaps. We also will leverage existing physical infrastructure, constructed through a NSF EPSCoR award, which includes monitoring stations located along two elevational transects in the Snake and Sheep Ranges; the Nevada Climate-ecohydrological Assessment Network (NevCAN). These stations will provide atmospheric and hydrologic data within five vegetative zones, from basin-dwelling phreatophytes to high-elevation sub-alpine communities.

Objectives

1. Determine temporal and spatial relationships between key climate and ecohydrological variables, specifically between temperature, net radiation and precipitation with changes in soil moisture, basin recharge, ET and plant productivity.
2. Assess causal linkages among climatic, hydrologic, and ecologic processes using the LPJ-GUESS and RHESSys models.

3. Assess the extent to which NevCAN data are representative of wider spatial and temporal scales.
4. Characterize interactions between precipitation (timing, quantity, and phase) and tree growth, and determine their influence on watershed hydrology over long time scales using dendrochronological records as inputs to simulation models.
5. Examine and define interactions among energy, water and environment within an urban climate and their potential impact on surrounding natural areas.

General Methodology

In addition to statistical analyses of temporal and spatial relationships between variables measured by individual project personnel, LPJ-GUESS, RHESSys and other models will be used to integrate and interpret the relationships among variables to assess causal linkages among climatic, hydrologic, and ecologic processes. Assembling and archiving all the data sets required to run these models will be a valuable exercise in the verification and assimilation of multiple datasets from NevCAN and other sources and will result in an extensive database that will be made available to the public via SENSOR and the Nevada Climate Change data portal. The modeling exercises will build expertise within Nevada and will also serve to generate new hypotheses and identify data gaps, and thus guide future investigations.

The data from NevCAN represent two elevational transects at two different latitudes. Use of these data for regional studies of ecohydrologic responses to climate change (including climate and hydrologic modeling), as well as management of land and water resources, requires that the project assess the extent to which NevCAN data are representative of a wider spatial and temporal framework and develop methods to extrapolate NevCAN observations to larger temporal and spatial scales. This will be achieved in several ways, including: (1) linking NevCAN observations to satellite image data; (2) determining microclimate variability around selected NevCAN sites; (3) developing relationships between measured climate and ecohydrological variables and those simulated by models, including PRISM; (4) relating dendroclimatology at NevCAN sites to longer term records.

Urban areas, being a hybridization of natural and human systems, represent a complex and dynamic interaction among energy, water, and environment. With the rapid growth of urban areas, it is imperative to gain a better understanding of these interactions. Many urban water-energy-environment models have been developed in the past [42][43][44][45][46]. A major constraint in such studies is insufficient data for calibration and validation. We will develop sensor network infrastructure and research to better understand the relationship between urban structure, energy entrapment (urban heat island effect), and water demand. The proposed work will include three aspects: 1) deploying low cost urban sensor network to measure vital urban variables (solar insolation, temperature, precipitation, evaporation, etc.); 2) integrating the sensor network and ancillary data into the existing cyber infrastructure; and 3) creating partnerships with the urban planning agencies to incorporate the infrastructure and science into future urban planning. The proposed work will provide sensing network for measuring urban climate and answer key questions about urban water and energy balance and connections to urban environment.

These efforts will not only build a new urban sensor network and enhance existing NevCAN network, they will more importantly build human expertise to help understand the complex interactions of human and climate induced changes on water resources, energy availability and environmental consequences. This effort will highlight student training to ensure that knowledge gained is built upon by future generations of scientists within the desert Southwest.

Integrative Aspects

The measurement, storage, and analysis of these data will leverage and expand upon the NevCAN resources of the SENSOR system to create a high-quality, long-term repository for hydrological and environmental analysis. The raw data and final analyses will be available to and of interest to educators, students, public utilities, and policy makers. Further, the long-term collection of this data will benefit environmental researchers seeking to determine the extended impact of population growth and renewable resources on the local climate and resulting changes to the hydrological cycle within this arid region.

3.3.3 ENERGY THRUST [Trzynadlowski, Etezadi-Amoli, Baghzouz]

The Energy thrust seeks a comprehensive understanding of the role of renewable energy sources within Nevada's power infrastructure. With its substantial solar, wind, and geothermal power generation potentials, Nevada is just beginning to realize and explore its options for renewable energy expansion. Traditionally, a small number of easily monitored large power plants have supplied power to the grid. Now, thousands of small-scale renewable-energy units, especially the photovoltaic (PV) ones, are added. Their sheer number and their power electronic interfaces greatly complicate the analysis of local energy systems [47]. This trend is expected to continue as prices for PV panels decrease and individual homeowners, businesses, and government agencies install these arrays on their properties.

Major Science Questions and Proposed Work

Acquisition of high-resolution data from various power plants, including the wind, PV, and geothermal facilities, will provide invaluable answers to questions regarding the existing Nevada energy profile and optimal development of additional renewable energy resources throughout the state. Analysis of a host of energy related data will allow better understanding of the dynamic of the grid, production and usage of energy, and identification of potential energy conservation measures. Optimal allocation of energy resources and improved efficiency and reliability of the energy infrastructure will dramatically enhance Nevada's competiveness in many areas of economy.

Collection of data to perform an appropriate energy analysis requires installation of advanced measuring equipment at numerous locations. Quantitative assessment of energy generation facilities – especially the PV arrays utilizing the ample sunlight resources of Nevada – requires time-sensitive collection of temperature, irradiation, and electric output data. This data can be captured using advanced phasor measurement units (PMU) in concert with solar panel diagnostic information and other sensors. The energy consumption information can be obtained using existing or newly-installed smart meters at residences and businesses.

Objectives

1. Determine the energy usage profile by collection and analysis of power generation and consumption information. It will allow an accurate short- and long-term prediction of energy usage to be provided to public utilities [48]. Hourly correlated data values will form the basis of this invaluable information resource.
2. Determine how temporal and spatial coordinates and atmospheric conditions affect the energy usage and production from renewable sources.
3. Perform detailed characterization of solar energy in Nevada. Collection of high-resolution temporal data over a wide area will allow the analysis of the impact of variable-output PV systems on the grid. Such data are critical for prediction, optimization, and integration of PV sources with the grid [49].
4. Evaluate energy conservation opportunities and optimal allocation of resources. Combining the energy usage profiles and solar energy characterization results, the applicability of various energy conservation and resource-allocation opportunities can be evaluated [50]. These include energy storage systems and smart-energy coordination strategies.

General Methodology

To accomplish the objectives aimed for, an extensive infrastructure for collection of a variety of energy related data must first be putting in place. An optimal distribution of sensors and meters at crucial locations, such as outputs of representative producers and users of electrical energy is particularly important. Temperature and solar irradiation sensors will be placed at the PV plants and in urban centers, as these factors significantly affect the energy usage for heating and cooling.

Electrical quantities will be measured using the existing smart meters of energy, current and voltage sensors, PMUs, and power-quality analyzers (PQA). A PMU measures the electrical waves on an electricity grid, using a common time source for synchronization, usually the GPS. It allows synchronized real-time measurements of multiple remote measurement points on the grid. The PMUs are

considered one of the most important measuring devices in the future of smart grid. A PQA trends voltage, current, imbalance, power, energy, events, flicker, THD, TDD, individual harmonics, and frequency, provides real-time graphical display of data, an on-site integral analysis and data retrieval without a computer or PDA, as well as remote communications and alarming.

Measured data will automatically and continuously be collected by the SENSOR system. Then, they will be periodically analyzed using operational real-time data and events management infrastructure, such as OSIsoft's PI system. Important results and conclusions will be shared with the local utility company (Nevada Energy [51]), with which close collaboration is expected. Working contacts will also be maintained with a number of individual energy producers such as selected geothermal and PV plants.

Integrative Aspects

Acquisition, collection, and storage of the energy-related data will leverage and extend the resources of the SENSOR system to create a high-quality, long-term repository for energy analysis. Both the raw data and final analyses will be of interest to educators, students, public utilities, and policy makers. The long-term collection of this data will benefit environmental researchers seeking to determine the extended impact of renewable resources on the local climate and environmental entities.

3.3.4 EDUCATION AND OUTREACH THRUST [Usinger, D. Mensing]

Objectives

The Education and Outreach component seeks to ensure that the extensive data available in the Nevada Data Center for the Environment, Water, and Energy (Center) is effectively utilized by specific interest groups, the general public, and policy-makers. The work will include both educational and outreach programs, including specific curriculum for middle school, high school and undergraduates; and targeted outreach to engage specific constituencies.

Proposed Work

Formal, non-formal, and informal educational approaches are proposed. The core educational component (core) will consist of two parts. First, a variety of anticipated scenarios relevant to different groups will be created to illustrate the power of the data. Examples include, but are not limited to changes in environmental and water conditions that could affect wildlife habitat, water conditions for crop production, energy requirements and usage, and the impact of new energy sources on the energy grid. Second, efforts to encourage use of the data by the public will be developed using user-centered design processes targeted to specific constituencies.

Formal Education. Well-articulated curricula will be developed by teams of educators for the middle school, high school, and undergraduate level. Instruction will focus on the following: (1) review and analysis of the scenarios (core); (2) the process of rigorously collecting accurate and reliable environmental data; (3) retrieving data from the Center's databases (core); (4) the development and implementation of formal projects, utilizing data available from the Center; (5) reporting findings from the project; (7) tackling the intricacies of reporting environmental changes related to climate and energy. The difference between the curriculum developed for the K-12 and undergraduate students will be the level of sophistication and complexity.

Non-Formal Education. Experience shows that simply providing raw data rarely results in extensive public use. We propose to work closely with two specific groups who are likely to experience the effects of climate change in the foreseeable future: Nevada farmers/ranchers and the Nevada Fire Safe Councils. By working closely with these two groups we will be able to determine their needs and prototype solutions available from the Center. Usability tests of our designs will allow for the production of data visualizations, interactive modules, and social media programs to engage users and maximize the usefulness of the Center. By learning about the needs of the users and matching them with scientists and data available through the EPSCoR project, our work will insure that the data is utilized by Nevadans who most need the information available through the Center.

Informal Education. In addition to the curriculum, data visualizations, interactive modules and social media programs available on the Portal, we propose to work with journalism students to document the work of the scientists in collecting data and members of the public using the data. These stories, which would include educational goals as well as human interest, would be submitted to local media and be available through the Center.

Integrative Aspects

Each focus of the project, (i.e., environment, water, energy), has an historic education constituency. For example, farmers and ranchers have historically been concerned about water. In addition, new education constituencies are envisioned. For instance, as energy sources become more distributed, consumers and policy-makers will need to understand how to interpret environment and energy data. Entities that use Nevada's public lands desire immediate and up-to-date information. The premise of the education and outreach component is that all data sources available through the Center will be appropriately integrated to provide a comprehensive understanding of the inter-relationship between the environment, water, and energy.

3.3.5 THE TEAM: STRENGTHS AND ORGANIZATION

For this project we have put together a diverse team of researchers, educators, and technical staff that combines a wealth of experience in areas pertinent to the proposed work with the determination and enthusiasm required to undertake the project's planned efforts. Notably, 12 of the team members have been involved –many in leadership roles– in the previous NSF EPSCoR RII cycle that made possible the creation of the SENSOR CI system (with its front-end representative subsystem, the NCCP) while the other 12 participants have joined the team to substantially expand the scope of Nevada's CI resources and the multidisciplinary research, education, and outreach activities these resources will enable.

The team, as indicated previously, is organized in four main project components, Cyberinfrastructure, Water and Environment, Energy, and Education and Outreach. The *Cyberinfrastructure* component consists of two subgroups, one (based in the CSE Department at UNR and the ECE Department at UNLV) dedicated to research, design, and implementation pertaining to the creation of the proposed new Nevada Data Center for the Environment, Water, and Energy, the other (based in the Nevada Seismological Laboratory at UNR) focused on the research and development needed for the project's networking and communication subsystems.

The PI of the project is Sergiu Dascalu, the lead of the CI component in the current NSF EPSCoR RII project. He will use the experience gained in this project to take the NCCP and the SENSOR system into a new phase, with a larger scope and additional far-reaching targets. The proposed project's CI group also includes Frederick C. Harris, Jr., who has served as Nevada CI lead in the NSF EPSCoR funded "Cyberinfrastructure Developments for the Western Consortium of Idaho, Nevada and New Mexico." Their combined project management experience and expertise in software engineering, human-computer interaction (Dascalu), parallel processing, and computer graphics (Harris) is excellently complemented by other CI members' remarkable research experience in areas pertinent to this proposal: evolutionary computation, genetic algorithms (Sushil Louis), algorithm design and analysis, data fusion (Yaakov Varol), computer networks, image processing (Shahram Latifi), geophysics, advanced visualization techniques (Graham Kent), real-time data management systems (Ken Smith), AI in simulators, intelligent agents (Bobby D. Bryant), network security, and communication protocols (Mehmet Gunes). The CI group also includes Michael McMahon, database administrator and programmer, and Eric Fritzinger, software developer, the two professionals currently in charge of building the NCCP and its related software tools. In addition, an Assistant Professor specialized in Intelligent Data Mining and Analysis will be hired to join the CI group.

The project component focused on *Water and Environment* consists of well-accomplished, world-wide recognized researchers from DRI, UNR, and UNLV. This component includes five senior scientists

(Nick Lancaster, Jay Arnone, Scott Mensing, Franco Biondi, and Lynn Fernstermaker), two junior researchers (Haroon Stephen and Guoping Tang), and an environmental research coordinator (Scotty Strachan) who has been instrumental in developing the current Sheep and Snake research sites. The group's expertise is extensive. It ranges from evaluating the impact of climate change on desert regions (Lancaster) and understanding the effects of global environmental change on the functioning of terrestrial ecosystems (Arnone) to the use of remotely sensed data for mapping, monitoring, and assessing the effect of environmental stressors on vegetation (Fenstermaker), palynology and vegetation dynamics (Mensing), ecoclimatology and watershed processes (Biondi), remote sensing and mathematical modeling in hydrology (Stephen), and parallel computing for ecological and hydrological modeling (Tang).

The *Energy* component consists of three senior researchers, two from UNR, one from UNLV, all with an outstanding track of scholar accomplishments. The group members excel in research on power systems, signal processing (Mehdi Etezadi-Amoli), power electronics and electric machinery (Andy Trzynadlowski), power quality (Yahia Baghzouz) and renewable energy (all three). Previous projects in which they have been involved have led to remarkable results, published in many journal and conference papers.

The *Education and Outreach* component benefits from the vast experience and remarkable accomplishments of two distinguished UNR professors, Janet Usinger and Donica Mensing. The specific expertise brought by them to the proposed project encompasses career development, bringing social constructionism into the teaching and research process, promoting diversity in public education leadership (Usinger), interactive journalism, and journalism in education, training, and employment (Mensing).

3.3.6 PARTNERSHIPS

The research and developments discussed have the potential to leverage existing partnerships and strategic alliances with various agencies, as well as forge new ones. These partnerships and their associated collaborative efforts will incorporate entities at various organizational levels from regional (Nevada) to national and international.

At the regional level, new research and development connections between UNR, DRI, and UNLV groups are enabled by the proposed project, while partnerships established during the current Track I developments with the *Nevada Seismological Laboratory (NSL)* [38] and the *Western Regional Climate Center (WRCC)* [35] will continue to develop and strengthen. Extensions to the NSL communication infrastructure will expand and improve data gathering capabilities, while advisement from WRCC will occur in relation to specific climate hardware components.

New regional partnerships will also be established – a logical process considering the significant research scope and infrastructure of the proposed project. Collaboration with state the public utilities *NVEnergy* [51], *Truckee Meadows Water Authority (TMWA)* [52], and *Southern Nevada Water Authority (SNWA)* [53] will facilitate the collection and use of energy- and water-related research data. The public utilities will benefit from the research results and data, providing them additional conservation and optimization strategies. The establishment of a partnership with the *Nevada State Climatologist Office* [54] is another potential avenue for mutually-beneficial collaboration, offering them mechanisms for high-quality data collection and management for additional data sources and sustainability funds.

At the national level, the *Western Tri-State Consortium* – established as a part of the current NSF EPScoR-funded Track II efforts between Nevada, New Mexico, and Idaho – will continue to develop its data and metadata exchange efforts between the data repositories of each state. This effort will likely be expanded to include other national institutions such as *NCDC* [56], *NOAA* [55], and *DataONE* [57].

At the international level, the proposed research and development will facilitate pursuing collaboration efforts that have been initiated by project participants, for example on joint work on information integration and data translation research with the *University of Seville, Spain* or on ecological and climate dynamics with the *University of Tuscia* in *Viterbo, Italy*. Undoubtedly, research made possible by the proposed project will lead to many new opportunities for international scientific collaboration for members of all project components.

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[44] J.L. Pina, E. Cerezo, and F. Seron, “Semantic visualization of 3D urban environments, Multimedia Tools and Applications,” 1-17, 2011.

[45] F. Rodriguez, H. Andrieu, and F. Morena, “A distributed hydrological model for urbanized areas – Model development and application to case studies,” Journal of Hydrology, 351, 268-287, 2008.

[46] E. Berthier, E. Dupont, P.G. Mestayer, and H. Andrieu, “Comparison of two evapotranspiration schemes on a sub-urban site,” Journal of Hydrology, 328, 635-646, 2006.

[47] A. M. Trzynadlowski, "Introduction to Modern Power Electronics," 2nd Ed., *John Wiley & Sons, Inc.*, New York, 2010.

[48] M. Hassanzadeh, M. Etezadi-Amoli, and M. S. Fadali, “Practical approach for sub-hourly and hourly prediction of PV power output,” *NAPS 2010*, Arlington, TX, Sept. 2010.

[49] S. Jafarzadeh, M. S. Fadali, M. Etezadi-Amoli, and A. Nafeh, ”Type 1 and type 2 fuzzy TSK modeling of solar radiation for PV power generation,” *NAPS 2010* , Arlington, TX, Sept. 2010.

[50] A. Arabali, M. Ghofrani, M. Etezadi-Amoli, M. S. Fadali, and Y. Baghzouz, "Probabilistic genetic algorithm based optimization approach for energy management," to be submitted to the *IEEE PES Transactions.*

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[52] Truckee Meadows Water Authority, “Mission & Vision Statement,” http://tmwa.com/about_us/mission, 2011.

[53] Southern Nevada Water Authority, “History,” http://www.snwa.com/about/history.html, 2011.

[54] State of Nevada, “Climatologist,” State Library and Archives, http://nsla.nevadaculture.org/index.php?option=com_content&task=view&id=1369&Itemid=95, 2011.

[55] National Oceanic and Atmospheric Administration, http://www.noaa.gov, 2011.

[56] National Climatic Data Center, http://www.ncdc.noaa.gov, 2011.

[57] Data Observation Network for Earth (DataONE), https://www.dataone.org/, 2011.

BIOGRAPHICAL SKETCHES: PROJECT PI AND CO-PIS

Name	Organization	Project Group	Position
Dascalu, Sergiu (PI)	UNR	Cyberinfrastructure	Associate Professor
Arnone, Jay	DRI	Water & Environment	Research Professor
Baghzouz, Yahia	UNLV	Energy	Professor
Biondi, Franco	UNR	Water & Environment	Professor
Bryant, Bobby	UNR	Cyberinfrastructure	Assistant Professor
Etezadi, Mehdi	UNR	Energy	Professor
Fenstermaker, Lynn	DRI	Water & Environment	Research Associate Professor
Fritzinger, Eric	UNR	Cyberinfrastructure	Admin. Faculty Software Developer
Gunes, Mehmet	UNR	Cyberinfrastructure/Communications	Assistant Professor
Harris, Frederick	UNR	Cyberinfrastructure	Professor
Kent, Graham	SEISMO/UNR	Cyberinfrastructure/Communications	Professor
Lancaster, Nick	DRI	Water & Environment	Research Professor
Latifi, Shahram	UNLV	Cyberinfrastructure	Professor
Louis, Sushil	UNR	Cyberinfrastructure	Professor
McMahon, Michael	UNR	Cyberinfrastructure	Admin. Faculty Database Developer
Mensing, Donica	UNR	Water & Environment	Associate Professor
Mensing, Scott	UNR	Water & Environment	Professor
Smith, Kenneth	SEISMO/UNR	Cyberinfrastructure/Communications	Research Associate Professor
Stephen, Haroon	UNLV	Water & Environment	Assistant Professor
Strachan, Scotty	UNR	Water & Environment	Environmental Research Coordinator
Tang, Guoping	DRI	Water & Environment	Research Assistant Professor
Trzynadlowski, Andrzej	UNR	Energy	Professor
Usinger, Janet	UNR	Education & Outreach	Associate Professor
Varol, Yaakov	UNR	Cyberinfrastructure	Professor

Sergiu Dascalu
Associate Professor
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

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

Appointments

University

07/02 - now	*Associate Professor* (07/1/2008 - present); *Assistant Professor* (07/02-06/08), Department of Computer Science and Engineering, University of Nevada, Reno. *Director*, Software Engineering Laboratory (SOELA), UNR (since 07/03/2008). Areas: Software Engineering, Human-Computer Interaction.
09/93 - 10/01	Research Assistant and Lecturer, Dalhousie University, Canada.
09/85 - 08/93	Assistant Professor (09/85-09/90) and Associate Professor I (09/90-08/93), Faculty of Control and Computers, Polytechnic U. of Bucharest, Romania.

Industry

01/91 - 07/93	Software Engineer, Alget Software Company, Bucharest, Romania.
09/82 - 09/84	Control Systems Engineer, Digital Equipment Maintenance Co., Romania.

Related Publications

- Dascalu, S., Fritzinger, E., Okamoto, S., and F.C. Harris, Jr. (2011). Towards a software framework for model interoperability. *Procs. of the 9th Intl. Conf. on Industrial Informatics (INDIN-2011)*, Lisbon, Portugal, IEEE Computer Society, pp. 705-710.
- McMahon, M.J., Jr., Dascalu, S., Harris, F.C., Jr., Strachan, S., and F. Biondi (2011). Architecting climate change data infrastructure for Nevada. In Salinesi, C. and Pastor, O. (editors), Advanced Information Systems Engineering Workshops CAISE-2011, *Lecture Notes in Business Information Processing*, LNBIP-83, Springer, pp. 354-365.
- Okamoto S., Fritzinger E., Dascalu S., Harris F.C. Jr., Latifi S., and M. McMahon, Jr. (2010). Towards an intelligent software tool for enhanced model interoperability in climate change research, *World Automation Congress (WAC-2010)*, Kobe, Japan, pp. 1-6.
- Brown D., Hoang R., Sgambati M., Brown T., Dascalu S., and F.C. Harris, Jr. (2010). An application for tree detection using satellite imagery and vegetation data. *Journal of Computational Methods in Sciences and Engineering (JCMSE)* 10 (1, 2) s1: 13-25.
- Elpern J. and S. Dascalu (2009). A framework for understanding the open source revolution. *Journal of Open Source Software and Processes* 1 (3): 1-16.

Additional Publications

- Jayet-Bray, L.C., Anumandla, S.R., Thibeault, C.M., Hoang, R.V., Goodman, P.H., Dascalu, S., Bryant, B.D., and F.C. Harris, Jr. (2012). Real-time human-robot interaction underlying neurorobotic trust and intent recognition. Invited article for the *Journal of Neural Networks*. Submitted 2011, under review.
- McMahon, M.J., Jr., Harris, F.C., Jr., S. Dascalu, and S. Strachan (2011). S.E.N.S.O.R.- Applying modern software and data management practices to climate reseach. *Procs. of the 2011 Intl. Conf. on Computer App. in Industry and Engineering (CAINE-2011)*, 6 pages.

- Motwani R., Harris F.C., Jr., and S. Dascalu (2010). An Eigen-normal approach for 3D mesh watermarking using support vector machines. *J. of Electronic Science and Technology (JEST)* 8 (3): 237-243.
- Karam, M., Smedley, T., and S. Dascalu (2008). Unit level test adequacy criteria for visual dataflow languages and a testing methodology. *ACM Trans. on Software Eng. and Methodology (TOSEM)* 18 (1): 1/1-37.
- Goodman, P., Zou, Q., and S. Dascalu (2008). Framework and implications of virtual neurorobotics, *Frontiers in Neuroscience* 2 (1): 123–128.

Synergistic Activities

- *UNR Donald Tibbitts Distinguished Teacher of the Year Award 2011,* University of Nevada.
- *Outstanding Undergraduate Research Mentor Award 2011,* University of Nevada Reno.
- *Mentor of UNR College of Engineering's Senior Scholar (Steve Komarov),* Spring 2011.
- *Runner-Up, Donald Tibbitts Distinguished Teacher Award 2010,* University of Nevada.
- *Faculty Advisor Award 2009,* Nevada Center for Entrepreneurship and Technology (NCET).
- *Lemelson Award for Innovation and Entrepreneurship 2005*, College of Engineering, UNR.
- Three *Best Paper Awards* at conferences: CAINE-2008, Honolulu, HI, 2008; CATA-2006, Seattle, WA, 2006; and WITS-2001, New Orleans, LA, 2001.
- Program Chair/Co-Chair of 8 international conferences and member of Technical Program Committee of over 70 international conferences.
- Member of NSF review panels, 2007 and 2008.

Recent Collaborators & Other Affiliations

Dan Ames (Idaho State U.), Jay Arnone (DRI), Karl Benedict (University of New Mexico), Franco Biondi (UNR), Bobby D. Bryant (UNR), Wendy Calvin (UNR), Kendra Cooper (University of Texas at Dallas), Kent Crippen (UNLV), Gayle Dana (DRI), Philippe Dugerdil (University of Applied Sciences, Geneva), Lynn Fenstermaker (DRI), Jeff Gray (UA), Mehmet Gunes (UNR), Frederick C. Harris, Jr. (UNR), Nick Lancaster (DRI), Shahram Latifi (UNLV), Sushil Louis (UNR), Donica Mensing (UNR), Scott Mensing (UNR), Monica Nicolescu (UNR), Michael Nussbaum (UNLV), Tom Piechota (UNLV), Gale Sinatra (UNLV), Pavel Solin (UNR), Haroon Stephen (UNLV), 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: 2 PhD and 31 MS in Computer Science who graduated 2003-2011: Sermsak Buntha, Muhanna Muhanna (PhD), C. Freinkel, M. Nilawar, G. Shum, M. Chandy, J. Jusayan, N. Hao, S. Okamoto, S. Buntha, E. Fritzinger, T. Calic, M. Parkar, R. Larmore, M. McMahon, M. Muhanna, Burcu Nemutlu, J. Quiroz, O. Akinwale, M. Haque, S. Talekar, S. Yendluri, N. Herndon, S. Chandrasekar, K. Huang, H. Kulkarni, J. Patel, E. Essa, C. Fleming, S. Reddy, C. King, Bilal Nemutlu, Victor Ivanov(MS).

Current advisor for 2 postdoctoral RAs (Adrienne Breland, Laurence Jayet – co-advised with Dr. Fred Harris), 5 PhD (S. Okamoto, I. Gibbs, S. Reed, Q. Yan, J. Patel) and 3 Master students.

John ("Jay") A. Arnone III
Research Professor
Division of Earth and Ecosystem Sciences
Desert Research Institute

Professional Preparation

Ph.D	1988	Yale University	Plant Physiological Ecology
M.Phil.	1985	Yale University	Tree Physiology/Plant Physiological Ecology
M.F.S.	1981	Yale University	Tree Physiological Ecology, Forest Science
B.S.	1979	University of Vermont	Forestry/Forest Science

Appointments

2004-present	Research Professor; Desert Research Institute (DRI), Division of Earth and Ecosystem Sciences (DEES), Reno, Nevada
Jul 2000-2004	Associate Research Professor; (DEES)
1999-present	Director, Frits Went Laboratory—EcoCELL facility; DRI
1998-Jun 2000	Assistant Research Professor; DRI
1994-1998	Assistant Professor; University of Basel, Switzerland (non-tenure track)
1990-1993	Postdoc; University of Basel, Switzerland.
1998-1990	Postdoctoral Associate; Yale University
1984-1988	Doctoral Research Assistant; Yale University
1981-1982	Research Assistant; University of Munich
1980-1981	Research Assistant; Harvard University (Master's Thesis research)

Related Publications

- Arnone JA III, Verburg PSJ, Johnson DW, Larsen JD, Jasoni RL, Lucchesi AJ, Batts CM, von Nagy C, Coulombe WG, Schorran DE, Buck PE, Braswell BH, Coleman JS, Sherry RA, Wallace LL, Luo Y, Schimel DS (2008) Prolonged suppression of ecosystem carbon dioxide uptake following an anomalously warm year. *Nature* 455:383-386
- Arnone JA III, Obrist D (2003) A large daylight geodesic dome for quantification of whole-ecosystem CO_2 and water vapor fluxes in arid shrublands. *Journal of Arid Environments* 55:629-643
- Arnone JA III, Jasoni RL, Lucchesi AJ, Larsen JD, Leger EA, Sherry RA, Luo Y, Schimel DS, Verburg PSJ (2011) A climatically extreme year has large impacts on C4 species in tallgrass prairie ecosystems but only minor effects on species richness and other plant functional groups. *Journal of Ecology* 99:678-688
- Obrist D, Yakir D, Arnone JA III (2004) Temporal and spatial patterns of soil water following wildfire-induced changes in plant communities in the Great Basin. *Plant and Soil* 262:1-12
- Obrist D, DeLucia EA, Arnone JA III (2003) Consequences of wildfire on ecosystem CO_2 and water vapor fluxes in the Great Basin. *Global Change Biology* 9:563-574

Additional Publications

- Sherry RA, Zhuo XH, Gu SL, Arnone JA III, Schimel DS, Verburg PSJ, Wallace LL, Luo Y (2007) Divergence of reproductive phenology under climate warming. *Proceedings of the National Academy of Sciences* 104:198-202

- Obrist D, Verburg PSJ, Young MH, Coleman JS, Schorran DE, Arnone JA III (2003) Quantifying the effects of phenology on ecosystem evapotranspiration in planted grassland mesocosms using EcoCELL technology. *Agricultural and Forest Meteorology* 118:173-183
- Jasoni RL, Smith SD, Arnone JA III (2005) Net ecosystem CO_2 exchange in Mojave Desert shrublands after eight years of exposure to elevated CO_2. *Global Change Biology* 5:749-756
- Wohlfahrt G, Fenstermaker LF, Arnone JA III (2008) Large annual net ecosystem CO_2 uptake of a Mojave Desert ecosystem. *Global Change Biology* 14:1475-1487
- Prater MR, Obrist D, Arnone JA III, Delucia EH (2006) Net carbon exchange and evapotranspiration in post-fire and intact sagebrush communities in the Great Basin. *Oecologia* 146:595-607

Synergistic Activities

Committee service and advisory boards: (i) NSF Division of Environmental Biology Advisory Panels (2001-2005); (ii) Columbia University's Biosphere 2 review panel—1999; (iii) National Phytotron Strategic Planning Workshop at Duke University—2001; (iv) National Academy of Sciences Review Panel of Biosphere II (2004); Associate Editor of *Plant and Soil* (1998-2001); (v) DOE Advisory Workshop on Exploring Science Needs for the Next Generation of Climate Change and Elevated CO2 Experiments in Terrestrial Ecosystems—April 2008; (vi) U.S. Congressional Briefing on Carbon Sequestration in Deserts—2008 (vii) EU Ecotron International Advisory Panel invited participant—J. Roy, CNRS Montpellier, France, July 2009; (ix) Editorial Board of *Ecology Letters* (2009-); Associate Editor of *Frontiers in Plant Sciences* (2010-) Referee for 15 peer reviewed journals in ecology, biology and soil science.

Professor, University of Nevada Reno, Graduate Program in Hydrologic Sciences; Adjunct Professor, UNR, Department of Natural Resources and Environmental Sciences and in the Ecology Evolution and Conservation Biology Graduate Program since 1998.

Courses taught: Climate Change and Its Environmental Consequences (UNR, ATMS/GEOG 121); Field Methods in Plant and Ecosystem Ecology, Ecology of Plant Nutrition (University of Basel, Switzerland)

Recent Collaborators & Other Affiliations

J. Coleman (Rice U.), E. Delucia (U. Illinois), R.D. Evans (Wash. St. U.), R. Nowak (UNR), D. Johnson, E. Leger, W. Miller, S. Tyler (UNR), Y. Luo (U. Oklahoma), S. Smith (UNLV), D. Schimel (NEON Inc, Boulder)

Graduate Advisors

J. C. Gordon, Yale, D. M. Smith, Yale, C. R. Schwintzer, Harvard/Univ of Maine

Students & Postdocs Advised (major professor)

J. Zaller, M. Goverde, M. Gruber, W. Hilti, C. Hufschmid-Kovinen, G. Hofer, C. Kestenholz, D. Obrist, R. Stocker, M. Würth, H. Weatherly, C. Batts, J. Larsen, A. Lucchesi, A. Lue, B. Johnson; L. Tarnay, R. Jasoni (postdocs); A. Darouzett-Nardi, M. Thomey, N. Chellman, P. Zed, C. Irschick, D. Fulstone (interns)

Yahia Baghzouz
Professor
Electrical & Computer Engineering Department
University of Nevada, Las Vegas

Professional Preparation

Louisiana State University, Baton Rouge, LA	Electrical Engineering	B.S. /May 1981
Louisiana State University, Baton Rouge, LA	Electrical Engineering	M.S./ Dec 1982
Louisiana State University, Baton Rouge, LA	Electrical Engineering	Ph.D./May 1986

Appointments

	Electrical & Computer Engineering Dept.,	7/96 – present
Professor	University of Nevada, Las Vegas	
Department Chair	Electrical & Computer Engineering Dept.,	7/93-6/96
	University of Nevada, Las Vegas	
Associate Professor	University of Nevada, Las Vegas	7/91 – 6/96
Assistant Professor	University of Nevada, Las Vegas	8/87 – 6/91
Assistant Professor	University of Louisiana at Lafayette, LA	8/86 – 6/87
Adjunct Assistant Prof.	Louisiana State University, Baton Rouge, LA	8/86 – 6/87

Recent Publications

- Y. Baghzouz and M. Etezadi-Amoli, "Air Conditioning Load Control in residential Feeders under the Presence of Distributed PV Systems", *10th European Conference on Power Systems*, Crete, Greece, June 2011.
- A. Krishna and Y. Baghzouz, "Impact of High PV Penetration on Voltage Regulation in Electrical Distribution Systems", *International Conference on Clean Electric Power* (ICCEP), Ischia, Italy, June 2011.
- W. Peng and Y. Baghzouz, "Accurate Circuit Model of Stead-State and Dynamic Performance of Lead-Acid Batteries", *International Conference on Power Systems (ICUE)*, September 2011.
- Y. Baghzouz, "Evaluation of an Energy Storage System on a Distribution Feeder with Distributed PV Systems", CIRED, Lyon, France, 2010.
- J. Sanguinetti, Y. Baghzouz, "Evaluation of Harmonic Current Reduction for the Purpose of Energy Savings – A Case Study", *IEEE/ICHQP VIII*, Bergamo. Italy, Sep 26 – 29, 2010.
- C. Venu, Y. Reffanneau, S. basha, Y. Baghzouz, *Battery Storage System Sizing in Distribution Feeders with Distributed Photovoltaic Systems*, IEEE PowerTech, Bucharest, Romania, June 29-July 2, 2009.
- Y, Baghzouz, Charge/Discharge Control of Battery Energy Storage System for Peak Shaving, EESAT, Seattle, WA, Oct 4-7, 2009.
- Y. Baghzouz, Y. Baghzouz, Fundamental-Frequency Components in Single-Phase Motors with SCR Voltage Controllers, *IEEE/ICHQP VIII*, Wollongong, Australia, Sep 27 – Oct 1, 2009.
- D.Sera and Y. Baghzouz, On the Impact of Partial Shading on PV Output Power, Int. Conference on Renewable Energy, Corfu, Greece, Oct 25-28, 2008

- F. Bouzidi and Y. Baghzouz, “On the optimal efficiency of split-phase induction motors under light load”, IEEE/PES Annual Meeting, Pittsburgh, PA, July 15, 2008.
- F. Bouzidi and Y. Baghzouz, “Power loss in single-phase induction motors with SCR voltage controllers”, IEEE/SPEEDAM, Ischia, Italy, June 12-14, 2008.
- Y. Baghzouz, R. Hurt (student), and R.F. Boehm, “Evaluation of a Fuel Cell for Powering the Electrical Load of ICE Vehicles”, Int. Conf. on Clean Electrical Power, Capri, Italy, May 21-23, 2007.
- Delvio F. Bernardes, Francisco Galvao (student), Y. Baghzouz, **“**Power Factor Decomposition in Unbalanced 3-Wire Sinusoidal Networks”, IEEE/PowerTech, paper No. 233, Luasanne, Switzerland, July 1-5, 2007.
- Y. Baghzouz, M. Popek, R.F. Boehm, R. Hurt (student), “Hydrogen APU System Analysis & Bootstrap Battey Charging Method”, NHA Annual Meeting, San Antonio, TX, March 19-22, 2007.
- R. Boehm, Y. Baghzouz, R. Hurt, R. Mauldin (student), E. Bulla (student), R. Fifield (student) and J. Gardner (student), and T. Maloney, “Development of a Renewably-Based Hydrogen Generation/Utilization System,” Paper ISEC2006-99081, National Solar Energy Conference, Denver, Colorado. 2007

Synergistic Activities

- Associate Director, Center for Energy Research, University of Nevada, Las Vegas (2004-present). Responsible for proposal writing, student supervision in various related projects, monthly progress reports, participations in design, construction and testing of numerous subsystems related to fuel cell integration in vehicles, hydrogen generation, photovoltaic performance and ant integration with utility systems.
- Co-Chair of the IEEE Executive Committee of the International Conference on Harmonics and Quality of Power (2003-present). Responsible for evaluation of proposals to host the conference, technical paper review, conference programs, invited speakers, selection of session chairs, technical directions, and best paper selection.

Recent Collaborators & Other Affiliations

Samir Moujaez (UNLV), Chen Yi-Tung (UNLV), John Wang (UNLV), Mehdi Etezadi-Amoli (UNR), Chen Xu-Sheng (Seattle University), John Hust (Power Efficiency), Bruno Osorno (Cal State Northridge), Shazad Lateef (NV Energy), Randy Collins (Clemson University), Mickey Cox (Louisiana Tech), Alex Emanuel (Worcester Polytechnic), Mac Grady (Univ. of Texas – Austin), Dario Zaninelli (Milan Polytechnic), Robert Boehm (UNLV)

Graduate and Ph.D Students Advised

Peng Wenxin (Ph.D), Chensong Dai (Ph.D), Derzo Seza (Ph.D), Julius Johnson (M.S.), Ari Krishna (M.S.), Peng Wenxin (M.S.), Fatima Bouzidi (M.S.), Ramzey Mahadeva (M.S.), Ryan Mauldin (M.S.), Pradeep Kumar (M.S.), Mehesh Venkat (M.S.), Lee Olyniec (M.S.)

Franco Biondi
Professor
Department of Geography
University of Nevada, Reno

Professional Preparation

1980-'85	Laurea *summa cum laude* (Italian Doctorate), Forestry; Università di Firenze, Italy.
1985-'87	M.S., Watershed Management; University of Arizona, Tucson
1990-'94	Ph.D., Watershed Management and Geosciences; University of Arizona, Tucson.
1994-'97	Postgraduate Researcher, Paleoclimate; Geosciences Research Division, Scripps Institution of Oceanography, University of California-San Diego, La Jolla.

Academic Appointments

2011-present	Professor, Department of Geography, University of Nevada, Reno (UNR).
2008-present	Faculty Member, Interdisciplinary Graduate Program in Environmental Sciences, UNR.
2008-present	External Faculty Member, PhD Program in "Scienze e Tecnologie per la Gestione Forestale e Ambientale", University of Tuscia, Viterbo, Italy.
2007-present	Faculty Member, Graduate Program of Atmospheric Sciences, UNR.
2005-present	Faculty Member, PhD Program in Ecology, Evolution and Conservation Biology, UNR.
2000-present	Faculty Member, Graduate Program of Hydrologic Sciences, UNR.
2000-present	Director, DendroLab, Department of Geography, UNR.
2005-2010	Associate Professor with tenure, Department of Geography, UNR.
2007	Visiting Associate Professor, School of Earth Sciences, Stanford University, California.
2007	Guest Professor, Chair of Terrestrial Ecology, Swiss Federal Inst. of Technology (ETH), Zurich, Switzerland.
2000-2005	Assistant Professor, Department of Geography, University of Nevada, Reno (UNR).
1999-2000	Adjunct Professor, Biology Department, San Diego State University, San Diego.
1998-2000	Assistant Project Scientist, Geosciences Research Division, Scripps Institution of Oceanography, University of California-San Diego, La Jolla.

Related Publications

2011 *Biondi, F.*, L. Jamieson, S. Strachan, and J. Sibold. Dendroecological testing of the pyroclimatic hypothesis in the central Great Basin, Nevada, USA. ***Ecosphere*** 2(1): art5 (20 pages). doi:10.1890/ES10-00068.1 [1]

2010 *Biondi, F.*, and P. Hartsough. Using automated point dendrometers to analyze tropical treeline stem growth at Nevado de Colima, Mexico. ***Sensors*** 10: 5827-5844 [1]

2008 *Biondi, F.*, and F. Qeadan. Inequality in paleorecords. ***Ecology*** 89(4): 1056–1067 [1]

2008 *Biondi, F.*, T.J. Kozubowski, A.K. Panorska, and L. Saito. A new stochastic model of episode peak and duration for eco-hydro-climatic applications. ***Ecological Modelling*** 211: 383–395 [1]

2005 *Biondi, F.*, P.C. Hartsough, and I. Galindo Estrada. Daily weather and tree growth at the tropical treeline of North America. ***Arctic, Antarctic, and Alpine Research*** 37(1): 16–24 [1]

[1] Reprint (PDF file) linked from http://wolfweb.unr.edu/homepage/fbiondi/pubs.html

Additional Publications

2009 *Biondi, F.*, P.C. Hartsough, and I. Galindo Estrada. Recent warming at the tropical treeline of North America. ***Frontiers in Ecology and the Environment*** 7(9): 463–464 [1]

2004 *Biondi, F.* and K. Waikul K. DENDROCLIM2002: A C++ program for statistical calibration of climate signals in tree-ring chronologies. ***Computers and Geosciences*** 30(3): 303-311.[1]

2001 *Biondi, F.*, A. Gershunov, and D.R. Cayan. North Pacific decadal climate variability since AD 1661. ***Journal of Climate*** (Letters) 14: 5–10 [1]

1999 *Biondi, F.* Comparing tree-ring chronologies and repeated timber inventories as forest monitoring tools. ***Ecological Applications*** 9: 216–227 [1]

1996 *Biondi, F.* Decadal-scale dynamics at the Gus Pearson Natural Area: evidence for inverse (a)symmetric competition? ***Canadian Journal of Forest Research*** 26: 1397–1406 **[1]**

Synergistic Activities

Service to the Scientific Community

- Subject Matter Editor, 2010-present, *Ecosphere*, the open-source journal of the Ecological Society of America (ESA).
- Member, 2010-present, Publications Committee, American Geophysical Union (AGU).
- Organizer, Special Sessions (2) on "Climate, Wildfire, and Woodland Dynamics in the Great Basin of North America", *2009 Annual Meeting of the Association of American Geographers*, Las Vegas, NV.
- Member, 2002-2006 and 2007-2009, Selection Committee for the Paper of the Year Award, Climate Specialty Group, Association of American Geographers.
- Member, 2006, National Academy of Sciences Committee on *Surface Temperature Reconstructions for the Last 2,000 Year*.
- Member, Scientific Board, *Eurodendro 2005 International Conference of Dendrochronology*, Sep 20-Oct 2, 2005, Viterbo, Italy.
- Member, 1999-2004, Advisory Board, *Dendrochronologia*.
- Reviewer of grant proposals submitted to the *National Science Foundation*, the *National Oceanic and Atmospheric Administration*, the *United States Department of Agriculture*, the *International Arid Lands Consortium*, the *International Foundation for Science, Sweden*, and the *Austrian Science Fund*.
- Reviewer of manuscripts submitted to refereed journals (including *Science* and *PNAS*) and books.

Research Honors (since 2000)

2011 Fulbright Senior Specialist in Environmental Science, University of Tuscia, Viterbo, Italy
2008 Hyung K. Shin Award for Excellence in Research, College of Science, UNR.
2008 Senior Ecologist, Ecological Society of America (ESA) Board of Professional Certification
2008 Outstanding Researcher Award, Mackay School of Earth Sciences and Engineering, UNR
2001 Paper of the Year Award, Climate Specialty Group, Association of American Geographers

Recent Collaborators & Other Affiliations

Collaborators in the past 48 months: T. Albright (UNR), T. Kozubowski (UNR), S. Mensing (UNR), A. Panorska (UNR), L. Saito (UNR), P. Weisberg (UNR), J. Salas (Colorado).

Graduate and Postdoctoral Advisors: M.K. Hughes (U. of Arizona), W.H. Berger (UC-San Diego).

Students Advised at UNR: M. Bradley (M.S.), J. Cheek (M.S.), M. Hay (M.S.), K. Hoover (M.S.), L. Jamieson (M.S.), M. Kilpatrick (M.S., Ph.D.), P. Kirchner (M.S.), R. Monnar (M.S.), K. Solander (M.S.); S. Strachan (M.S., Ph.D.); P.C. Hartsough (Ph.D.); J. Sibold (Postdoc).

Bobby D. Bryant
Assistant Professor
Department of Computer Science & Engineering
University of Nevada, Reno

Professional Preparation

University of Houston	Classical Studies	BA *summa cum laude*	1995
The University of Texas at Austin	Computer Sciences	MSCS	1999
The University of Texas at Austin	Computer Sciences	PhD	2006

Appointments

Assistant Professor	University of Nevada, Reno	2006 – present

Related Publications

- Matt Parker and Bobby D. Bryant (to appear). Neuro-Visual Control in the Quake II Environment. *IEEE Transactions on Computational Intelligence and AI in Games*. Piscataway, NJ: IEEE Press.
- Bobby D. Bryant (2010). Virtual Bagging for an Evolved Agent Controller. *Proceedings of the 2010 IEEE Conference on Computational Intelligence in Games (CIG'10)*, pp. 99-106. Piscataway,NJ: IEEE Press.
    - http://nebl.cse.unr.edu/archive/papers/bryant-2010-cig.pdf
- Bryant, Bobby D. and Miikkulainen, Risto (2007). Acquiring Visibly Intelligent Behavior with Example-Guided Neuroevolution. *Proceedings of the Twenty-Second National Conference on Artificial Intelligence (AAAI-07)*, pp. 801-808. Menlo Park, CA: AAAI Press.
    - http://www.cse.unr.edu/~bdbryant/papers/bryant.aaai07.pdf
- Bryant, Bobby D. (2006). *Evolving Visibly Intelligent Behavior for Embedded Game Agents*. PhD thesis, Department of Computer Sciences, The University of Texas at Austin, Austin, TX.
    - http://www.cse.unr.edu/~bdbryant/papers/bryant.utcstr06.pdf
- Stanley, Kenneth O., Bryant, Bobby D., and Miikkulainen, Risto (2005). Real-time Neuroevolution in the NERO Video Game. *IEEE Transactions on Evolutionary Computation*, Vol. 9, No. 6, pp. 653-668. Piscataway, NJ: IEEE Press.
    - http://www.cse.unr.edu/~bdbryant/papers/stanley.ieeetec05.pdf

Additional Publications

- Jennifer Mahon, Bobby Bryant, Ben Brown, and Miran Kim (2010). Using Second Life to Enhance Classroom Management Practice in Teacher Education. *Educational Media International (EMI)*, Vol. 47, No. 2, pp. 121 - 134. London, UK: Routledge.
    - http://dx.doi.org/10.1080/09523987.2010.492677
- Matt Parker and Bobby D. Bryant (2009). Backpropagation without Human Supervision for Visual Control in Quake II. *Proceedings of the 2009 IEEE Symposium on Computational Intelligence and Games (CIG'09)*, pp. 287-293. Piscataway, NJ: IEEE Press.
    - http://nebl.cse.unr.edu/archive/papers/parker-2009-cig.pdf
- Bryant, Bobby D. and Miikkulainen, Risto (2006). Evolving Stochastic Controller Networks for Intelligent Game Agents. *Proceedings of the 2006 Congress on Evolutionary Computation (CEC 2006)*, pp. 1007-1014. Piscataway, NJ: IEEE Press.
    - http://www.cse.unr.edu/~bdbryant/papers/bryant.cec06.pdf
- Bryant, Bobby D. and Miikkulainen, Risto (2006). Exploiting Sensor Symmetries in Example-based Training for Intelligent Agents. *Proceedings of the 2006 IEEE Symposium on Computational Intelligence and Games (CIG'06)*, pp. 90-97. Piscataway, NJ: IEEE Press.

    - http://www.cse.unr.edu/~bdbryant/papers/bryant.cig06.pdf
- Miikkulainen, R., Bryant, B. D., Cornelius, R., Karpov, I. V., Stanley, K. O., and Yong, C. H. (2006). Computational Intelligence in Games. In Yen, G. Y. and Fogel, D. B. (editors), *Computational Intelligence: Principles and Practice*, pp. 155-191. IEEE Computational Intelligence Society.
    - http://www.cse.unr.edu/~bdbryant/papers/miikkulainen-2006-wcci.pdf

Synergistic Activities

- Director of the UNR CCRC Agent Modelling Laboratory; Technical Lead for agent modelling on the Cyber Conict Research Consortium's DECIDE project (2008 - 2010).
- Collaborator with Education Professor Jennifer Mahon on a classroom simulation based on Second Life (per publication list above). Dr. Bryant's students created a simple AI controller for the simulated students in the classroom.
- Co-Chair of the Special Session on Games for the 2011 Congress on Evolutionary Compuation.
- Organizer of an EPSCoR-funded interdisciplinary *Workshop on Behavior Analysis for Artificial and Simulated Agents* at UNR (November 2007).
- Member of the IEEE Computational Intelligence Society's *Technical Committee on Games*; Chair of that committee's Task Force on Education (2011-); member of the committee's Task Force on Real-Time Strategy Games (Chair 2007-2008; Assistant Chair 2009-present).

Recent Collaborators & Other Affiliations

Agarwal, Akshata	UNR	Kim, Miran	UNR
Brown, Ben	UNR	Louis, Sushil	UNR
Carr, David	N/A	Mahon, Jennifer	UNR
Crowther, David T.	UNR	Miikkulainen, Risto	UT – Austin
Dascalu, Sergiu	UNR	Motwani, Mukesh	UNR
Egbert, Dwight	UNR	Motwani, Rakhi	UNR
Folmer, Eelke	UNR	Parker, Matthew	N/A
Harris, Fred	UNR	Penrod, Nathan	N/A
Houmanfar, Ramona	UNR	Varol, Yaakov	UNR

Graduate Advisor

Risto Miikkulainen, Department of Computer Sciences, The University of Texas at Austin

Students Advised

Harmer, Mark	M.S. Thesis Advisor	N/A
Parker, Matthew	M.S. Thesis Advisor	N/A

Total graduate students advised (including in-progress):

1 PhD thesis
5 MS thesis
3 MS professional paper

Mehdi Etezadi-Amoli, Ph.D., P.E.
Professor
Department of Electrical and Biomedical Engineering
University of Nevada, Reno

Professional Preparation

B.S. in Electrical Engineering, 1970, New Mexico State University, Las Cruces, NM.
M.S. in Electrical Engineering, 1972, New Mexico State University Las Cruces, NM.
Ph.D in Electrical Engineering, 1974, New Mexico State University Las Cruces, NM.

Appointments

University

07/10 - Present	Chair, Department of Electrical and Biomedical Engineering (EBME) , University of Nevada, Reno (UNR).
07/88 - Present	Professor, EBME Department, UNR. Main areas: Power systems planning, protection and transient analysis, applications of AI to power system problems, and renewable energy applications, analysis, protection, and interfacing.
07/83 - 06/88	Associate Professor of Electrical Engineering, University of Nevada, Reno.
07/77 - 05/79	Assistant Professor of Electrical Engineering, University of New Mexico, Albuquerque, NM
07/75 - 05/77	Assistant Professor of Electrical Engineering, University of New Mexico State University, Las Cruces, NM

Industry

06/79 - 06/83	Senior Protection Engineer, Arizona Public Service Company, Phoenix, Az.
Summers 85-98	Senior Engineer, NV Energy (formerly Sierra Pacific Power Company), Reno, NV.

Related Publications (Grad students in bold italics)

- ***A. Arabali, M. Ghofrani***, **M. Etezadi-Amoli**, and Y. Baghzouz, "Ramping Requirements and Operation Cost in a Power System with Dispersed Wind Generation," Submitted to *IEEE-PES Society Conference on Transmission and Distribution (T&D) 2012*, Orlando, FL, May 2012.
- ***M. Ghofrani, A. Arabali***, **M. Etezadi-Amoli**, and Y. Baghzouz, "Operating Reserve Requirements in a Power System with Dispersed Wind Generation," accepted for the *IEEE-PES Conference on Innovative Smart Grid Technologies (ISGT)*, Washington DC, Jan. 2012.
- **M. Etezadi-Amoli, *K. Choma, J. Stefani***, "Rapid Charge Electric Vehicle Stations" IEEE Transactions on Power Delivery, Vol. 25, no. 3, 1883-1887, 2010.
- ***M. Ghofrani, M. Hassanzadeh***, **M. Etezadi-Amoli**, and M. S. Fadali, "Smart Meter Based Short-Term Load Forecasting for Residential Customers," *Proceedings of the 2011 North American Power Symposium Conference*, Boston, USA, September 2011.
- **M. Etezadi-Amoli, *K. Choma, J. Ahmad***, "An Investigation of Select Barriers and Solution for Renewable Energy Deployment," *Proceedings of IEEE-PES Meeting*, June 2006.

Additional Publications (Grad students in bold italics)

- ***S. Jafarzadeh,*** M.S. Fadali, **M. Etezadi-Amoli,** A. Nafeh, "Type 1 and Type 2 Fuzzy TSK Modeling of Solar Radiation for PV Gemneration," *Proceedings of 2010 North American Power Symposium* , September 2010.
- ***M. Jensen, R. Louie,* M. Etezadi-Amoli**, M. Sami Fadali, "Model and Simulation of a 75 kW PV Solar Array," *Proceedins of the 2010 IEEE PES-T&D Conference, April 2010.*
- ***K. Choma,* M. Etezadi-Amoli**, "The Application of a DSTATCOM to an Industrial Facility," *Proceedings of the IEEE-PES Winter Meeting*, January, 2002.
- ***K. Choma,* M. Etezadi-Amoli**, "Electrical Performance Characteristics of a New Micro-Turbine Generator", *IEEE Power Engineering Society Winter Meeting*, January, 2001.
- ***A. Graham,* M. Etezadi-Amoli**, "Design, Implemantation, and Simulation of a PLC Based Speed Controller Using Fuzzy Logic, "*IEEE Power Engineering Society Summer Meeting Procedings Vol. 4*, pp. 2475-2480, July, 2000.

Synergistic Activities

- Coordinator for the power grid cluster for the Renewable Energy Center at UNR.
- Member of National Council of Examiners for Engineers and surveyors. Prepare national exams for professional engineering registration within the country. Also, a Registered Professional Engineer in Nevada.
- Life Senior Member of IEEE, member of IEEE power Engineering Education Committee.
- Reviewer for IEEE Transaction papers on Power Systems and Power Delivery.
- Developed a number of graduate and undergraduate courses in power systems planning distribution, protection, and transient analysis.
- Member of UNR Faculty Network for Undergraduate Research

Sponsored Research

Presently funded by NV Energy and NV Renewable Energy Center

Recent Collaborators & Other Affiliations

- Nevada State Office of Energy, Albert Keri at ABB, Travis Johnson at NV Energy, Yahia Baghzouz at UNLV, Cansin Evrensoglo at virginia Tech, John Kleppe and Sami Fadali at UNR

Present Graduate Student Advisor

- Surabhi Chaudhri, MS, University of Nevada, Reno
- Russel Louie, MS, University of Nevada, Reno
- Mike Jensen, MS, University of Nevada, Reno
- Erik Chalko MS, University of Nevada, Reno
- Erik Madsen MS, University of Nevada, Reno
- Mahmoud Ghofrani, Ph.D., University of Nevada, Reno
- Amir Saman Arabali, Ph.D., University of Nevada, Reno
- Kent Choma, Ph.D., University of Nevada, Reno

Lynn F. Fenstermaker
Associate Research Professor
Division of Earth and Ecosystem Sciences
Desert Research Institute

Professional Preparation

The Pennsylvania State University	Environmental Resource Management	B.S.	1981
The Pennsylvania State University	Agronomy	M.S.	1986
University of Nevada, Las Vegas	Biological Sciences	Ph.D.	2003

Appointments

2004 – Present	*Associate Research Professor*
	Desert Research Institute, Division of Earth and Ecosystem Sciences, Nevada System of Higher Education, Las Vegas, Nevada
1990 - 2004	*Ecological Remote Sensing Scientist*
	Desert Research Institute, Division of Earth and Ecosystem Sciences, Nevada System of Higher Education, Las Vegas, Nevada
1989 - 1990	*Soil Scientist*
	Environmental Research Center, University of Nevada, Las Vegas.
1987 - 1989	*Assistant to the Director*
	Environmental Research Center, University of Nevada, Las Vegas.
1984 - 1987	*Remote Sensing Scientist*
	Lockheed Engineering and Mgmt Services Co., Inc., Las Vegas, Nevada.
1979 - 1984	*Laboratory/Field Technician*
	Agronomy Department, The Pennsylvania State University.
1981 – 1983	*Research/Teaching Assistantship; Assistant Coach, Soil Judging Team*
	Agronomy Department, The Pennsylvania State University.

Related Publications

- Devitt D, LF Fenstermaker, MH Young, B Conrad, BM Bird and M Baghzouz. 2010. Evapotranspiration of mixed shrub communities in phreatophytic zones of the Great Basin. Ecohydrology. DOI: 10.1002/eco.169.
- Smith, SD, TN Charlet, LF Fenstermaker and BA Newingham. (2009) Effects of Global Change on Mojave Desert Ecosystems, pp 31-56, in RH Webb, LF Fenstermaker, JS Heaton, DL Hughson, EV McDonald, DM Miller (editors), The Mojave Desert: Ecosystem Processes and Sustainability, University of Nevada Press.
- Young, MH, TG Caldwell, DG Meadows and LF Fenstermaker. (2009) Variability of soil physical and hydraulic properties at the Mojave Global Change Facility, Nevada: implications for water budget and evapotranspiration. Journal of Arid Environments, doi:10.1016/j.jaridenv.2009.01.015
- Wohlfahrt, G, LF Fenstermaker and JA Arnone III. 2008) Large annual net ecosystem CO_2 uptake of a Mojave Desert ecosystem. *Global Change Biology*, 14:1475-1487.
- Fenstermaker, LF, TN Charlet, TE Huxman, JS Coleman, RS Nowak and SD Smith, (2002) Global Climate Change Research in the Nevada Desert. Pages 97-106 *in* DA Charlet (*editor*). Nevada Environmental Issues, Kendall/Hunt Publishing Company, Dubuque, IA.

Additional Publications

- Wohlfahrt, G, A Haslwanter, L Hörtnagl, RL Jasoni, LF Fenstermaker, JA Arnone III and A Hammerle, (2009) On the consequences of the energy imbalance for calculating surface conductance to water vapour. Agricultural and Forest Meteorology 149:1556-1559.
- McGwire, K, T Minor and LF Fenstermaker. (2000) Hyperspectral mixture modeling for quantifying sparse vegetation cover in arid environments. *Remote Sensing of Environment*, 72(3):360-374.
- Smith SD, TE Huxman, SF Zitzer, TN Charlet, DC Housman, JC Coleman, LF Fenstermaker, JR Seemann, and RS Nowak. (2000) Elevated CO_2 increases productivity and invasive species success in an arid ecosystem. *Nature* 408: 79-82.
- Fenstermaker-Shaulis, LK, A Leskys, and DA Devitt, (1997) Utilization of remotely sensed data to map and evaluate turfgrass stress associated with drought. *Journal of Turfgrass Management* 2:65-81.
- Fenstermaker, LK, *editor*, (1994) Remote Sensing Classification Accuracy Assessment: A Compendium. *American Society for Photogrammetry and Remote Sensing*, Bethesda, MD, ISBN 1-57083-002-9, 413p.

Synergistic Activities

- Mentoring: Participation in K-12 outreach programs to enhance knowledge of science and research. Past activities included: Expanding Your Horizons in Science and Math for high school girls; Science Fair, Science Bowl and a Mentoring and Modeling program.
- Reviewer for: Remote Sensing of Environment, International Journal of Remote Sensing, Photogrammetric Engineering & Remote Sensing; Astrobiology; and Proposal reviews for AAAS, ARO and EPA
- Consultant to: Capstone Press (K-12 educational "Fact Finders" series; gratis)

Recent Collaborators & Other Affiliations

J. Arnone, Desert Research Institute
J. Belnap, USGS, Moab, UT
M. Berli, Desert Research Institute
S. Cady, Portland State University
D. Devitt, University of Nevada, Las Vegas
R.D. Evans, Washington State University
J. Gamon, University of Alberta
R. Jasoni, Desert Research Institute
E. McDonald, Desert Research Institute
K. McGwire, Desert Research Institute
T. Minor, Desert Research Institute
B. Newingham, University of Idaho
R. Nowak, University of Nevada, Reno
D. Shafer, Desert Research Institute
S. Smith, University of Nevada, Las Vegas
R. Webb, USGS, Phoenix, AZ
G. Wohlfahrt, University of Innsbruck
M. Young, University of Texas

Graduate Advisors

MS Advisor: Dr. Gary Petersen, Emeritus, The Pennsylvania State University
Ph.D. Advisor: Dr. Stanley Smith, University of Nevada, Las Vegas
Ph.D. co-Advisor: Dr. Dale Devitt, University of Nevada, Las Vegas

Students Advised

M. Baghzouz, Ph.D., L. Apodaca, M.S., and A. Wagner, M.S., University of Nevada, Las Vegas

Eric Fritzinger
Administrative Faculty/Software Developer
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

University of Nevada, Reno	Computer Science *Minor: Mathematics*	B.S. 2004
University of Nevada, Reno	Computer Science	M.S. 2006

Appointments

University

2009	*Software Developer*; University of Nevada, Reno Model coupling framework researcher; Data portal software developer
2004	*Teaching Assistant*; University of Nevada, Reno; Computer Science Department Introduction to Computer Science pilot course lab manager and assistant; Analysis of Algorithms grader and assistant

Industry

2006	*Hamilton Company*; Reno, Nevada Robotics software engineer; Robotics resource scheduling researcher

Related Publications

- Dascalu, S., Fritzinger, E., Okamoto, S., and F.C. Harris, Jr. (2011). Towards a software framework for model interoperability. *Procs. of the 9th Intl. Conf. on Industrial Informatics (INDIN-2011),* Lisbon, Portugal, IEEE Computer Society, pp. 705-710.
- Okamoto S., Fritzinger E., Dascalu S., Harris F.C. Jr., Latifi S., and M. McMahon, Jr. (2010). Towards an intelligent software tool for enhanced model interoperability in climate change research, *World Automation Congress (WAC-2010)*, Kobe, Japan, pp. 1-6.
- Dascalu, S., Harris, F.C., Jr., Latifi, S., Fritzinger E., Okamoto, S., and McMahon, M., Jr., "Visual Software Environment in Support of Model Interoperability for Climate Change Research in Nevada", accepted at the 2nd European Symposium on Coupled Problems (ESCO-2010), Pilsen, Czech Republic.
- Dascalu, S., Okamoto, S., Fritzinger E., McMahon, M., Jr., Latifi, S., and Harris, F.C., Jr., "Software Framework for Increased Effectiveness in Interdisciplinary Climate Change Research," submitted to the World Automation Congress (WAC-2010), Kobe, Japan.

Synergistic Activities

- Attended IEMSS 2010 in Ottawa, Ontario, Canada. An all-day workshop on the discussion of model and data interoperability was held, consisting of discussions, examples, considerations, and feedback
- Guest lecturer during a class in the Summer of 2010 on the difficulties associated with environmental model coupling and several solutions to the problem
- Attended a Tri-state Innovative Working Group in 2010 to speak with the scientists of the different states and get their feedback as to how the different Cyberinfrastructure groups can best assist them in their endeavors
- Presented at the ERTAB/Nevada EPSCoR conference in early 2011 to present progress and merits of the Demeter Framework for Model Interoperability

Recent Collaborators & Other Affiliations

- **University of Nevada, Reno**: Sergiu Dascalu, Mike McMahon, Fred Harris, Scotty Strachan, Franco Biondi, Nick Lancaster
- **Idaho State University**: Dan Ames
- **University of New Mexico**: Karl Benedict
- **Desert Research Institute**: John Mejia, Dark Koracin, Jay Arnone

Graduate Advisor

M.S. Advisor: Dr. Sergiu Dascalu, University of Nevada, Reno

Mehmet Hadi Gunes
Assistant Professor
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

B.S., Isik University, Istanbul, Turkey, July 2002, Computer Science & Engineering
B.S., Isik University, Istanbul, Turkey, July 2002, Electronics Engineering
M.S., Southern Methodist University (SMU), Dallas, TX, May 2004, Computer Science & Eng.
Ph.D., The University of Texas at Dallas (UTD), Richardson, TX, August 2008, Computer Science

Appointments

8/2008 – Present	**Assistant Professor** Dept. of Comp. Science and Engineering, University of Nevada, Reno, NV
1/2005 – 8/2008	**Teaching Assistant** Department of Computer Science, UTD, Richardson, TX
8/2002 – 12/2004	**Research Assistant** Department of Computer Science & Engineering, SMU, Dallas, TX,
9/1999 – 7/2002	**Lab Assistant** Isik University, Istanbul, Turkey
6/2001 – 7/2001	**Intern** IBM-Turk, Istanbul, Turkey
7/2000 – 8/2000	**Intern** Information Technologies Research Institute, TUBITAK, Istanbul, Turkey

Related Publications

- Devid Shelley and Mehmet H. Gunes, "*Inner Sphere Network Visualization*", ComNet Complex Dynamic Networks: Tools and Methods, (to appear).
- Kakajan Komurov, Mehmet H. Gunes, and Michael A. White,"*Fine-scale dissection of functional protein network organization by statistical network analysis*", PLoS ONE (June 2009)
- Hema Andal Jayaprakash Narayanan and Mehmet H. Gunes, "*Ensuring Access Control in Cloud Provisioned Healthcare Systems*", IEEE International Workshop on Consumer eHealth Platforms, Services and Applications, Las Vegas, NV, Jan 8, 2011.
- Adrienne E. Breland, Mehmet H. Gunes, Karen A. Schlauch, and Frederick C. Harris "*Mixing Patterns in a Global Influenza A Virus Network Using Whole Genome Comparisons*", Computational Intelligence in Bioinformatics and Computational Biology (CIBCB 2010), Montreal, Canada, May 2-5, 2010.
- Murat Yuksel, Kostas Bekris, Cansin Y. Evrenosoglu, Mehmet H. Gunes, Sami Fadali, Mehdi Etezadi-Amoli, and Frederick C. Harris "*Open Cyber-Architecture for Electrical Energy Markets*", Proceedings of IEEE Workshop on Smart Grid Networking Infrastructure (SGNI), Denver, CO, October 2010.

Additional Publications

- Jeffrey Naruchitparames, Mehmet H. Gunes and Cansin Y. Evrenosoglu, "*Secure Communications in the Smart Grid*", IEEE Consumer Communications & Networking Conference Session on Smart Grids, Las Vegas, NV, Jan 9-12, 2011.

- Mehmet H. Gunes, and Kamil Sarac, "*Resolving IP Aliases in Building Traceroute-Based Internet Maps*", IEEE Transactions on Networking 17(16):1738-1751, Dec 2009.
- Mehmet H. Gunes and Kamil Sarac, "*Resolving Anonymous Routers in Internet Topology Measurement Studies*", IEEE INFOCOM, Phoenix, AZ, USA, April 15-17 2008.
- Mehmet H. Gunes, Sevcan Bilir, Kamil Sarac, and Turgay Korkmaz, "*A Measurement Study on Overhead Distribution of Value-Added Internet Services*", Computer Networks (October 2007).
- Fatih Kocan and Mehmet H. Gunes, "*On the ZBDD-based Path Delay Fault Coverage Calculation*", IEEE Transactions on CAD (July 2005).

Synergistic Activities

- **Publication Chair:** IEEE International Conference on Network Protocols 2010.
- **Session Chair:** IEEE INFOCOM 2010.
- **Program Committee:** IEEE NAS 2012, TMA 2012, IEEE LCN WNM 2011, PAM 2011, IEEE INFOCOM 2011, IEEE ICNP 2010, IEEE ICCCN 2010, IEEE INFOCOM WiP 2010, IEEE LCN SGNI 2010, DCNET 2010, ISCN 2010.
- **Referee:** IEEE/ACM Transactions on Networking; Elsevier Computer Networks; Elsevier Computer Communications; IEEE WCNC 2011, IEEE INFOCOM 2010/2009/2006; IEEE LCN 2010, ACM IMC 2008; CAMAD 2008; IEEE ICC 2010/2008; ISCN 2009.
- **Invited**: NSF GFRP Microbiology & Cell Biology Panel (Computational Biology field) 2010, Teaching Complex Networks Workshop 2011, ISMA 2011 - Workshop on Active Internet Measurement, DIMACS Workshop on Internet Tomography 2008, DatCat Community Contribution Workshop 2007.

Recent Collaborators & Other Affiliations

Collaborators (non-UNR)

Mehmet Baysan, National Health Institute, Bethesda, MD
Cansin Y. Evrenosoglu, Virginia Tech, Blacksburg, VA
Kakajan Komurov, MD Anderson Cancer Center, Houston, TX.
Turgay Korkmaz, The University of Texas at San Antonio, San Antonio TX.
Stephen Szygenda and Mitchell Thornton, Southern Methodist University, Dallas, TX
Michael White, University of Texas Southwestern Medical Center, Dallas, TX.

Graduate Advisor

Kamil Sarac, The University of Texas at Dallas, Richardson, TX.
Fatih Kocan, Southern Methodist University, Dallas, TX

Students Advised

Alumni (MS): David Shelley, Engin Arslan, Hema A.J. Narayanan, Jeffrey Naruchitparames and Talha Oz
MS: Afrin Sk, Christopher Zachor, and Hayreddin Ceker
PhD: Bingdong Li, Esra Erdin, Hakan Kardes, and Mehmet B. Akgun

Frederick C. Harris, Jr.
Professor
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

B.S., Bob Jones University, Mathematics, Minor: Physics, 5/86
M.S., Bob Jones University, Educational Administration, 8/88
M.S., Clemson University, Computer Science, 12/91
Ph.D., Clemson University, Computer Science, 5/94

Appointments

7/2007 – present Professor	Department of Computer Science, Univ. of Nevada, Reno
7/2007 – 9/2008 Interim Sr. Director,	Center for Advanced Visualization, Computation, and Modeling, DRI
7/2004 – 9/2008	Affiliated Faculty, Division of Atmospheric Sciences, DRI
7/2000 – 6/2007 Associate Professor	Department of Computer Science, Univ. of Nevada, Reno
8/1994 - 6/2000 Assistant Professor	Department of Computer Science, Univ. of Nevada, Reno

Related Publications

- Dascalu, S., Fritzinger, E., Okamoto, S., and F.C. Harris, Jr. (2011). Towards a software framework for model interoperability. *Procs. of the 9th Intl. Conf. on Industrial Informatics (INDIN-2011)*, Lisbon, Portugal, IEEE Computer Society, pp. 705-710.
- McMahon, M.J., Jr., Dascalu, S., Harris, F.C., Jr., Strachan, S., and F. Biondi (2011). Architecting climate change data infrastructure for Nevada. In Salinesi, C. and Pastor, O. (editors), Advanced Information Systems Engineering Workshops CAISE-2011, *Lecture Notes in Business Information Processing*, LNBIP-83, Springer, pp. 354-365.
- Okamoto S., Fritzinger E., Dascalu S., Harris F.C. Jr., Latifi S., and M. McMahon, Jr. (2010). Towards an intelligent software tool for enhanced model interoperability in climate change research, *World Automation Congress (WAC-2010)*, Kobe, Japan, pp. 1-6.
- Adrienne Breland, Sara Nasser, Karen Schlauch, Monica Nicolescu, Frederick C. Harris, Jr. Efficient Influenza A Virus Origin Detection, *Journal of Electronics and Computer Science* Vol. 10, No 2, December, 2008, pgs 1-12.
- Juan C. Macera, Philip H Goodman, Frederick C. Harris, Jr., Rich Drews, and James B. Maciokas, Remote-Neocortex Control of Robotic Search and Threat Identification, *Robotics and Autonomous Systems*, Vol. 46, No. 2, February 2004, pp 97-110.

Additional Publications

- Romain Brette1, Michelle Rudolph, Ted Carnevale, Michael Hines, David Beeman, James M. Bower, Markus Diesmann, Abigail Morrison, Philip H. Goodman, Frederick C. Harris, Jr., Milind Zirpe, Thomas Natschlager, Dejan Pecevski, Bard Ermentrout, Mikael Djurfeldt, Anders Lansner, Olivier Rochel, Thierry Vieville, Eilif Muller, Andrew P. Davison, Sami El Boustani and Alain Destexhe, Simulation of networks of spiking neurons: A review of tools and strategies, *Journal of Computational Neuroscience* Vol. 23, pgs 349-398.
- Adrienne Breland, Sara Nasser, Karen Schlauch, Monica Nicolescu, Frederick C. Harris, Jr. Efficient Influenza A Virus Origin Detection, *Journal of Electronics and Computer Science* Vol. 10, No 2, December, 2008, pgs 1-12.
- Sara Nasser, Adrienne Breland, Frederick C. Harris Jr., Monica Nicolescu, and Gregory L. Vert. Fuzzy Genome Sequence Assembly for Single and Environmental Genomes in Yaochu Jin and Lipo Wang, editors, *Bioinformatics, Bioengineering and Computational Biology* Springer Book Series for Computational Intelligence (March 2009).

- Bill Sherman, Simon Su, Phil McDonald, Yi Mu, Fred Harris, Open-source Tools for Immersive Environmental Visualization, *IEEE Computer Graphics and Applications* Vol. 27, No. 2, March/April 2007, pp 88-91. Beifang Yi, Frederick C. Harris, Jr., Sergiu M. Dascalu, and Ali Erol, "User Interface Aspects of a Human-Hand Simulation System," *Journal of Systems, Cybernetics, and Informatics*, vol 3, no 5, 2006
- Robert Geist, A. Jefferson Offutt, and Frederick C. Harris, Jr., 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

- Editor or Associate Editor, Conf Proceedings: IS '96, SERP '04, '05, CAINE '08, '10
- Program Committee Member for annual conferences: CAINE, CATA, SEDE, ICIW, ACHI, IWSSA, ITNG
- Best Paper Award: CATA 2010, CAINE 2008, CATA 2006, SCI 2003, ACM SE 1992
- Who's Who Among America's Teachers, 7th ed (2002), 6th ed (2000), 5th ed (1998), 4th ed (1996)
- F. Donald Tibbitts University Distinguished Teacher Award, Univ. of Nevada, Reno, 2005

Collaborators & Other Affiliations (last 48 months)

- University of Nevada, Reno collaborators: Rawan Alkadi, Mark Ballew, Scott Bassett, Jason Baurick, William E. Brandstetter, Adrienne Breland, Sermsak Buntha, Wendy Calvin, Sergiu M. Dascalu, Rich Drewes, Michael Dye, Dwight D. Egbert, Sherif Elfass, Ali Erol, Eelke Folmer, Eric Fritzinger, James Frye, Philip H. Goodman, Joshua Hegie, Roger V. Hoang, Lance Hutchinson, Andrew Kimmel, Josh Koberstein, Hrishikesh Kulkarni, Marcel Levy, Michael J. McMahon, Joseph D. Mahsman, Siraj Malik, Kim P. Martin, Scott Mensing, James Motta, Mukesh Motwani, Rakhi Motwani, Muhanna Muhanna, Jeremy Murray, Monica Nicolescu, Sohei Okamoto, Kelvin Parian, Michael A Penick, Jesse D. Phillips, Fares Qedan, Juan C. Quiroz, Alexander Redei, Karen Schlauch, Matthey R. Sgambati, Michael J Smith, Danny Taylor, Ed Tumbusch, Gregory Vert, Bei Yuan, Xiaolu Zhang, Milind Zirpe
- Desert Research Institute, Nevada: Timothy J. Brown, Gayle Dana, Darko Koracin, Chris Fritzen, Nick Lancaster, Phil McDonald, Yi Mu, William Sherman, S. Steinberg, Simon Su, Henry Sun
- 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) Karl Benedict (UNM), Abhijit Bhoite (Vishwakarma I. of T., India) Sami El Boustani (CNRS France) Romain Brette (ENS, Paris) David T. Brown (Balley) James M. Bower (UT San Antonio) Ted Carnevale (Yale) Kent Crippen (UNLV) Andrew P. Davison (CNRS France) Alain Destexhe (CNRS France) Markus Diesmann (RIKEN Japan) Mikael Djurfeldt (KTH Stockholm) Bard Ermentrout (U of Pittsburgh) Billy Gaston (Anautics) Michael Hines (Yale) Gongzhu Hu (Cent. Mich.) Marcel Karam (AUB, Lebanon), John Kearney (John Deere), John L. Kenyon (EPFL) James G. King (EPFL) Anders Lansner (KTH Stockholm) Gordon Lee (SDSU), William Michner (UNM), Abigail Morrison (RIKEN Japan) Yi Mu (WUStL) Eilif Muller (KIP, Heidelburg) Sara Nasser (TGen) Thomas Natschlager (SCC Hagenberg) Dejan Pecevski (Tech Univ Graz) Tom Pichote (UNLV), Olivier Rochel (Univ of Leeds, UK) Stuart Rubin (SPAWAR) Michelle Rudolph (CNRS) TC Ting (UConn) Thierry Vieville (INRIA France) Beifang Yi (Salem State)

Graduate Advisors

Stephen T. Hedetniemi (Clemson), Robert M Geist (Clemson)

Students Advised

Judith R. Fredrickson (2006), Beifang Yi (2006), Sara Nasser (2008), Bei Yuan (2009), Rakhi Motwani (2010), Laurence Jayet Bray (2010), Adrienne E. Breland (2011), Mukesh C. Motwani (2011), and 48 MS Thesis students.

Graham M. Kent
Director, Nevada Seismological Laboratory
Professor, Department of Geological Sciences and Engineering
University of Nevada, Reno

Professional Preparation

Degree	Year Conferred	Institution and Location
B.S.	1985	San Diego State University, CA
Ph.D.	1992	Scripps Instit. of Ocean., San Diego CA

Research and/or Professional Experience

2009-present	Director, Nevada Seismological Laboratory, UNR
2009-present	Professor, DGSE, Mackay, UNR
2002-2009	Director, Visualization Center at Scripps, IGPP/UCSD
2002-2009	Research Geophysicist, IGPP/UCSD
2000-2002	Associate Research Geophysicist, IGPP/UCSD
1998-present	Assistant Research Geophysicist, IGPP/UCSD
1996-present	Assistant Project Scientist/IGPP Scholar, UCSD
1994-1996	Assistant Scientist, Geology & Geophysics, WHOI
1992-1996	Postdoctoral Scholar, Geology & Geophysics, WHOI
1987-1992	Assist. Researcher, Scripps Institution of Oceanography
1985	Geophysicist (summer-hire), UNOCAL, Ventura, CA
1984	Geophysicist (summer-hire), Getty, Bakersfield, CA

Related Publications

- Brothers, D., D. Kilb, K. Luttrell, N. Driscoll and G. Kent, Loading of the San Andreas fault by flood-induced ruptures beneath the Salton Sea, *Nature Geosciences*, pp. 1-7, NGEO1184, DOI:10.1038, 2011.
- Brothers, D. S., N. W. Driscoll, G. M. Kent, A. J. Harding. J. M. Babcock and R. L. Baskin, Tectonic evolution of the Salton Sea inferred from seismic reflection data, *Nature Geosciences*, DOI:10.1038/NGEO590, 1-4, **590**, 2009.
- Brothers, D. S., G. M. Kent, N. W. Driscoll, S. B. Smith, R. Karlin, J. A. Dingler, A. J. Harding, G. G. Seitz and J. M. Babcock, New Constraints on the deformation, slip-rate, and timing of the most recent earthquake on the West Tahoe-Dollar Point Fault Lake Tahoe Basin, California, *Bull. Seis. Soc. Am.*, pp. 499-519, v. 99, doi: 10.1785/0120080135, 2009.
- Dingler, J., G. Kent, N. Driscoll, G. Seitz, J. Babcock, A. Harding, B. Karlin, and C. Goldman, A high-resolution seismic CHIRP investigation of active normal faulting across the Lake Tahoe basin, California-Nevada, *Bull. Geol. Soc. Am.*, pp. 1089-1107, v. 121, doi:10.1130/B26244.1 , 2009.
- Kent, G. M., J. A. Babcock, N. W. Driscoll, A. J. Harding, G. G. Seitz, J. A. Dingler, J. V. Gardner, C. R. Goldman, A. C. Heyvaert, P. Gayes, R. Karlin, L. A. Mayer, C. W. Morgan, L. A. Owen, R. C. Richards, A 60 k.y. record of extension across the western boundary of the Basin and Range Province:

Estimate of slip rates from offset shoreline terraces and a catastrophic slide beneath Lake Tahoe, *Geology*, **33**, 365-368, 2005.

Additional Publications

- Lizarralde, D., G. J. Axen, H. E. Brown, J. M. Fletcher, A. Gonzalez-Fernadez, A. J. Harding, W. S. Holbrook, G. M. Kent, P. Paramo, F. Sutherland and P. J. Umhoefer, Variations in styles of rifting in the Gulf of California, Nature, 466-469, doi:10.1038/nature06035, 2007
- Kent, G. M., Singh, S. C., Harding, A. J., Sinha, M. C., Orcutt, J. A., Barton, P. J., White, R. S., Bazin, S., Hobbs, R. W., Tong, C. H., and Pye, J. W., Evidence from three-dimensional seismic reflectivity images for enhanced melt supply beneath mid-ocean-ridge discontinuities, *Nature*, 614-618, **406**, 2000.
- Singh, S. C., G. M. Kent, J. S. Collier, A. J. Harding, and J. A. Orcutt, "Melt to mush variations in crustal magma properties along the ridge crest at the southern East Pacific Rise", *Nature*, **394**, 874-878, 1998.
- Detrick, R. S., A. J. Harding, G. M. Kent, J. A. Orcutt, J. C. Mutter, and P. Buhl, "Seismic Structure of the Southern East Pacific Rise", *Science*, **259**, 499-503, 1993.
- Kent, G. M., A. J. Harding, and J. A. Orcutt, "Evidence for a smaller magma chamber beneath the East Pacific Rise at 9°30'N", *Nature*, **344**, 650-653, 1990.

Synergistic Activities

Director, Nevada Seismological Laboratory; Nevada State Seismologist; Chair, Marcus Langseth Steering and Oversight Committee (UNLOS)**;** Member, Nevada Earthquake Safety Council.

Recent Collaborators & Other Activities

Gary Axen, Jeff Babcock, Rob Baskin, Glenn Biasi, Danny Brothers, Neal Driscoll, John Fletcher, Antonio Gonzalez, Bill Hammond, Alistair Harding, Steve Holbrook, Dan Lizarralde, John Louie, John A. Orcutt, Satish Singh, Larry Smarr, Paul Umhoefer, Robert Karlin, Gordon Seitz and Ken Smith.

Graduate Advisors

Doctoral Advisors
John Orcutt, University of California, San Diego; Alistair Harding, University of California, San Diego

Postdoctoral Advisor
Robert S. Detrick, Woods Hole Oceanographic Institution

PhD Students Advised
Stephen A. Hussenoeder (WHOI), Eric Hallenborg (Scripps/UCSD), Fiona Sutherland (Scripps/UCSD), Allison Jacobs-Dingler, Jeffrey Dingler (Scripps/UCSD), Danny Brothers (Scripps/UCSD), Annie Kell (UNR-PhD, current), Amy Eisses (UNR-MS, current), Gretchen Schmauder (UNR-PhD, current).

Nicholas Lancaster
Research Professor
Desert Research Institute

Professional Preparation

B.A	1971	Geography, University of Cambridge.
M.A.	1975	Geography, University of Cambridge.
Ph.D.	1977	Geography, University of Cambridge.

Appointments

2005-2008	Senior Director, Center for Arid Lands Environmental Management, Desert Research Institute.
2003-2005	Program Coordinator, Earth Surface Dynamics Program, US Geological Survey (on assignment from DRI)
2002-2007	Distinguished Research Associate, School of Geography, University of Oxford.
1999-2005	Adjunct Professor, Department of Geography, University of Guelph, Guelph, Ontario, Canada.
1994-present	Research Professor, Quaternary Sciences Center (now Division of Earth and Ecosystem Sciences) Desert Research Institute, Reno, Nevada.
1991-1994	Associate Research Professor, Quaternary Sciences Center, Desert Research Institute, University of Nevada System, Reno, Nevada.
1986-1990	Visiting Assistant Professor and Faculty Research Associate, Department of Geology, Arizona State University.
1983-1985	Lecturer and Senior Research Officer, Department of Environmental and Geographical Science, University of Cape Town.
1980-1982	Research Officer, Desert Ecological Research Unit, Gobabeb, Namibia.
1978-1979	Assistant Lecturer, Department of Geography, University of the Witwatersrand, Johannesburg.
1973-1978	Lecturer in Soil Science/Hydrology, Chancellor College, University of Malawi.

Related Publications

- Lancaster, N., 2011, Dune Dynamics and Morphology, in Thomas, A.S.G. (editor), *Arid Zone Geomorphology*, Wiley-Blackwell, 487-516.
- Scheidt, S., Lancaster, N., Ramsey, M., 2011, Eolian dynamics and sediment mixing in the Gran Desierto, Mexico determined from thermal infrared spectroscopy and remote sensing data, *Geological Society of America Bulletin*, 123; 1628–1644; doi: 10.1130/B30338.1.
- Lancaster, N., Nickling, W.G., Gillies, J.A., 2010, Sand transport by wind on complex surfaces: field studies in the McMurdo Dry Valleys, Antarctica, *Journal of Geophysical Research, Earth Surface*, 115, F03027, doi:10.1029/2009JF001408.
- Bourke, M.C, Lancaster, N., Fenton, L.K, Parteli, E. J. R., Zimbelman, J. R., Radebaugh, J, 2010. Extraterrestrial dunes: An introduction to the special issue on planetary dune systems. *Geomorphology*, 121(1-2): 1-14.
- Lancaster, N., 2009, Deserts, In: Spencer, T.S., Slaymaker, O., Embleton-Hamann, C., *Geomorphology and Global Environmental Change*, Cambridge University Press, 276-296.

Additional Publications

- Lancaster, N., 2009, Aeolian features and processes, *in* Young, R.S., and Norby, L., *Geological Monitoring*, Boulder, Colorado, Geological Society of America, 1–26, doi: 10.1130/2009.monitoring(01).
- Lancaster, N., 2009, Dune morphology and dynamics, In: Parsons, A.J. and Abrahams, A.D (eds.) *Geomorphology of Desert Environments*, 2nd edition, 557-595.
- Lancaster, N., 2008, Desert dune dynamics and development: insights from luminescence dating, *Boreas*, 37, 559–573. 10.1111/j.1502-3885.2008.00055.
- Bristow, C.S., Duller, G.A.T., Lancaster, N., 2007, Age and dynamics of linear dunes in the Namib Desert, *Geology*, 35, 6, 555-558.
- Lancaster, N., 2007, Low latitude dune fields, in Elias, S.A. (editor), *Encyclopedia of Quaternary Science*, Elsevier, 626-642.

Synergistic Activities

Member of the editorial boards of *Sedimentology, Geomorphology, Quaternary Research, and Earth Surface Processes and Landforms.*

2011	Scientific Advisory Panel Member California Desert Renewable Energy Conservation Plan
2011	AAAS Research Competitiveness Program Review Panel for King Abdulaziz City for Science and Technology.
2008–2009	Founding President, International Society for Aeolian Research.
2006-2007	Guest Editor, *Journal of Geophysical Research, Earth Surface*, Special section on aeolian processes
2006-2009	Member - International Association of Geomorphologists Working Group on the Geomorphic Implications of Global Environmental Change
2006-2010	DRI representative to International Arid Lands Consortium (IALC) Research and Demonstration Awards Committee (RADAC)
2005-present	Member, Academic Committee, Key Laboratory of Desert and Desertification, Cold and Arid Regions Research Institute, Chinese Academy of Sciences
2005-2007	National Park Service Working Group on monitoring of geologic resources in national parks

Recent Collaborators & Other Affiliations

Bristow, C., Gilles, J., Kocurek, G., Muhs, D., Nickling, W.G., Ramsey, M.S., Reynolds, R., Singhvi, A.K., Wolfe, S.

Graduate Advisor

A.T. Grove, Department of Geography, University of Cambridge, 1971-1975

Students Advised

Past: Kurt Cupp, Steven Jacobson (MS); *Current:* Nate Pepe, MS, University of Nevada, Reno, Geological Sciences;

Shahram Latifi
Professor, Department of Electrical and Computer Engineering
Director, Center for Communication and Information Technology (CICT)
University of Nevada, Las Vegas

Professional Preparation

Tehran University, Iran	Electrical Engineering	M.S.	1980
Louisiana State University	Electrical & Computer Engineering	M.S.	1986
Louisiana State University	Electrical & Computer Engineering	Ph.D.	1989

Appointments

1998-present	Professor, Department of Electrical and Computer Engineering, UNLV
1994 - 1998	Associate Professor and Tenured, ECE Dept, UNLV
1994 - 1995	Network Consultant, US Assist
1989 - 1994	Assistant Professor, ECE Dept, UNLV
1989-1991	Senior Research Scientist, Lockheed Corporation

Related Publications

- D. Walker, S. Latifi, "Climate Change Data Portals for Nevada and Their Reliability", 19th International Conference on Software Engineering and Data Engineering, pp. 167-172, San Francisco, 2010.
- S. Shreck, S. Latifi, "K-12 Computer Education Deficiencies in Nevada", Frontiers in Education, FECS 2011, pp. 114-118.
- S. Dascalu, F.C. Harris, Jr., S. Latifi, E. Fritzinger, S. Okamoto, and M. McMahon, Jr., "Visual Software Environment in Support of Model Interoperability for Climate Change Research in Nevada", 2nd European Symposium on Coupled Problems (ESCO-2010), July 2010, Pilsen, Czech Republic.
- S. Dascalu, S. Okamoto, E. Fritzinger, M. McMahon, Jr., S. Latifi, and F.C. Harris, Jr., "Software Framework for Increased Effectiveness in Interdisciplinary Climate Change Research, the World Automation Congress (WAC-2010), September 2010, Kobe, Japan.
- N. Kimura, V. Jolly and S. Latifi, "Energy Restrained Data Dissemination in Wireless Sensor Networks", International Journal of Distributed Sensor Networks, 2: pp. 251-265, 2006.

Additional Publications

- D. Walker and S. Latifi, "Improving Bounds on Link Failure Tolerance of the Star Graph," Information Sciences, 180 (13): 2571-2575 (2010).
- S. M. Sethi, S. Latifi, "Optimal Subcube Embeddability in Hypercubes with Additional Dimension", Parallel Processing Letters, 20 (1):91-99 (2010).
- S. M. Sethi, S. Latifi, "Reliability Modeling of Augmented Hypercube Networks," Int'l Journal of Computers and their Applications, 16(4): 247-257 (2009) **.**

- S. Latifi, E., Saberinia, X. Wu, "Robustness of star graph network under link failure", International Journal of Information Sciences, 178(3): 802-806 (2008).
- S. Latifi, "A Study of Fault Tolerance in Star Graph", Information Processing Letters 102 (2007), pp. 196-200 (2007).

Synergistic Activities

- S. Latifi (Task Lead), "Nevada Infrastructure for Climate Change", NSF-EPSCoR, UNLV Cyber Component, September 2008- August 2013, $261,000.
- S. Latifi (PI), "Remote Sensing Education- K-14", Computing Education for the 21st Century (CE21)", NSF, under preparation.
- S. Latifi (PI), "Software and Hardware Implementation of Algorithms for Radiation Detection", NSTech, $100,000, December 2006-December 2007.
- S. Latifi (Co-PI), "Cargo Imaging", $100,000, RF/UNLV/DoE, August 2005-July 2006.
- S. Latifi (PI) and J. Kanai, "Efficient Transmission and Manipulation of Scientific Image Data", $260,000, NASA, 1997-1999.

Recent Collaborators & Other Affiliations

- Sergiu Dascalu, School of Computer Science and Engineering, UNR (Collaborator on current NSF project)
- Fred Harris, School of Computer Science and Engineering, UNR/DRI (Collaborator on current NSF project)
- Emma Regentova, ECE Dept, UNLV (Co-author in some previous papers)
- Pradip K. Srimani, School of Computer Science, Clemson University (Co-author)
- Kazem Taghva, School of Computer Science, UNLV (Co-author in some previous papers)

Thesis Advisor and Postdoctoral Sponsors

Dr. Ahmed El-Amawy, Electrical Engineering Dept, Louisiana State University

Sushil J. Louis
Professor
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

Ph. D.	Indiana University, Bloomington	Computer Science	1993
Master's (1st class)	Delhi University, Delhi	Computer Applications	1986
B. Sc. (1st class)	Delhi University, Delhi	Physics (Honors)	1983

Appointments

- July 2006 – Present: Professor, Department of Computer Science and Engineering, University of Nevada, Reno
- July 1999 – June 2006: Associate Professor, Department of Computer Science and Engineering, University of Nevada, Reno
- June 2000 – April 2001: Senior Software Engineer and Software Architect, ePatterns Inc. Palo Alto, CA (while on sabbatical from University).
- July 1994 – June 1999: Assistant Professor of Computer Science, University of Nevada, Reno.

Selected Sponsored Research

- "Air support for Intelligent Aggressor," **Office of Naval Research**, 2010-2011, Amount: $499,900
- "Co-evolving tactics and strategies for virtual at sea training," **Office of Naval Research,** - DEPSCoR, 2008 – 2011, Amount: 910000
- "Affordable modeling of human decision making with Case-Injected Genetic Algorithms," **Office of Naval Research,** 2002 – 2005, Amount: 510,000
- ``CAREER - Combining Genetic Algorithms with Case-Based Systems," **National Science Foundation**. 1996 - 2002, Amount: **206,814**

Related Publications

- Sushil J. Louis and Chris Miles. "Playing to learn: Case-injected genetic algorithms for learning to play computer games." In *IEEE Transactions on Evolutionary Computation*, 9(6):669-681, 2005.
- *Louis, S.J.,* "Case Injected Genetic Algorithms for Learning Across Problems," *Journal of Engineering Optimization,* vol. 26, no 2. April 2004, pp. 237 – 247. Taylor and Francis.
- Chris Miles and Sushil J. Louis. "Co-evolving real-time strategy game playing influence map trees with genetic algorithms." In *Proceedings of the IEEE Congress on Evolutionary Computation*, pp , IEEE Press, New York, 2006.
- Chris Miles and Sushil J Louis. "Co-evolving influence map tree based strategy game players." In *Proceedings of the 2007 IEEE Symposium on Computational Intelligence in Games*, IEEE Press, New York, 2007.
- Miles, C., Louis S.J., Cole, N., and McDonnell, J., "Learning to Play Like a Human: Case Injected Genetic Algorithms for Strategic Computer Gaming," *Proceedings of the IEEE Congress on Evolutionary Computation,* pp. 1441 – 1446, IEEE Press, 2004.
- Cole, N., Louis S. J., and Miles, C., "Using a Genetic Algorithm to Tune First-Person Shooter Bots," in *Proceedings of the IEEE Congress on Evolutionary Computation,* pp. 139 – 145, IEEE Press, 2004.
- Louis, S. J. and McDonnell, J., "Learning with Case Injected Genetic Algorithms," *IEEE Transactions on Evolutionary Computing*, 8 **(4)**, pp. 316 – 328, 2004.

- Bebis, G., Louis, S. J., Varol, Y., and Yfantis, A., "Genetic Object Recognition Using Combinations of Views," *IEEE Transactions on Evolutionary Computation*, **6** (2), pp. 132-146. April 2002.
- Golovkin, I., Mancini, R., Louis, S.J., Fujita, K., Nishimura, H., Shirga, H., Miyanaga, N., Azechi, H., Butzbach, R., Uschmann, I., Delettrez, J., Koch, J., Lee, R.W., and Klein.,L., "Spectroscopic determination of dynamic plasma gradients in implosion core," *Physical Review Letters, **88(4)**, Article 045002.*
- Fadali, M.S., Louis, S.J., and Zhang, Y., "Robust Stability Analysis of Discrete-Time Systems Using Genetic Algorithms," *IEEE Transactions on Systems Man and Cybernetics, Part A: No. 5, Sept 1999.*

Additional Publications

- Louis, S. J., "Learning from Experience: Case Injected Genetic Algorithm Design of Combinational Logic Circuits," *Proceedings of the 5th Adaptive Computing in Design and Manufacturing Conference*, 2002, pp. 296 - 306.
- Louis, S.J., and Li, G., "Genetic Algorithms with Memory for Traveling Salesman Problems," *Information Sciences Journal, 122 (2000), pp. 201 – 225*. North Holland.
- Louis, S.J., and Zhao, F., "Domain Knowledge for Genetic Algorithms," *International Journal of Expert Systems*, **8** (3), pp. 195 - 212, JAI Press, 1995.
- Gero, J. and Louis, S.J., "Improving Pareto Optimal Design," *Microcomputers in Civil Engineering*, **10** (4), pp. 241 - 249, Elsevier Applied Science, 1995.
- Gero, J., Louis, S.J., and Kundu, S., "Evolutionary Learning of Novel Grammars for Design Improvement,"*Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, Cambridge University Press, **8**, pp. 83 - 94, 1994.
- Lousi, S.J., "Working from Blueprints: Evolutionary Learning in Design," *Artificial Intelligence in Engineering*, Elsevier, **11,** pp. 335 - 341, 1997.

Synergistic Activities

- NSF panel reviewer.
- Program committee of CEC-2004, GECCO-2004.
- Associate Editor of IEEE Transactions on Evolutionary Computation.
- Reviewer for Evolutionary Computation, Journal of Soft Computing, Artificial Intelligence in Engineering Design And Manufacturing, and others.

Recent Collaborators & Other Affiliations

Yaakov Varol, Sergiu Dascalu, George Bebis, Roberto Mancini, Gary Raines, Monica Nicolescu, Fang Zhao, Jesse Adams, Phil Goodman.

Thesis Advisor

Gregory J. E. Rawlins, Indiana University, Bloomington, IN.

Graduate Students

12 Masters students advised, 3 current Ph.D. students.

Honors

- Lemelson Award for innovation and entrepreneurship, 1999.
- Esther Kinsley dissertation award. Indiana University's highest award for best dissertation, 1993.

Michael McMahon
Administrative Faculty / Database Administrator & Programmer
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

Institution	Major / Area	Degree & Year
University of Nevada, Reno	Computer Science *Minor: Mathematics*	Bachelor of Science, 2004
University of Nevada, Reno	Computer Science	Master of Science, 2007

Appointments

Dates	Position	Organization
2009 – Present	Database Administrator & Programmer	**University of Nevada, Reno** *Department of Computer Science & Engineering*
2007 – 2009	Software Developer / Database Administrator	**GameTech International, Inc.** *Information Technology*
2006 – 2007	Graduate Assistant	**University of Nevada, Reno** *Department of Information Systems*
2004 – 2006	Graduate Assistant	**University of Nevada, Reno** *Department of Computer Science & Engineering*
1997 – 2007	System Administrator	**Dr. William P. O'Gara, D.D.D. Ltd.**

Publications

- Michael J. McMahon Jr., Frederick C. Harris, Jr., Sergiu M. Dascalu, Scotty Strachan, "S.E.N.S.O.R. – Applying Modern Software and Data Management Practices to Climate Research," Computer Applications in Industry and Engineering 2011 (CAINE 2011), 2011.
- Michael J. McMahon Jr., Sergiu M. Dascalu, Frederick C. Harris, Jr., Scotty Strachan, Franco Biondi, "Architecting Climate Change Infrastructure for Nevada," International workshop on System / Software Architectures 2011 (IWSSA 2011), 2011.
- Scotty Strachan, Brian Bird, Bradley Lyles, Gregory McCurdy, Michael J. McMahon Jr, "Building Climate Monitoring Infrastructure in Nevada: Integration of Field Science and Cyberinfrastructure Along High Elevational Transects," Annual Meeting of the Association of American Geographers, Seattle, 2011
- Muhanna Muhanna, Sermsak Buntha, Sohei Okamoto, Michael J. McMahon Jr., Sergiu Dascalu, Frederick C. Harris, Jr., "CAVEMANDER: Creating 3-D Command-and-Control Scenarios for the Cave Automatic Virtual Environment," DMS, International Workshop on Visual Languages and Computing 2010 (DMS 2010), 2010.
- Michael J. Jr. McMahon, Sergiu M. Dascalu, Frederick C. Jr. Harris,, Juan Quiroz, "An Extensible Architecture for Network-Attached Device Management," icsea, pp.66, International Conference on Software Engineering Advances (ICSEA 2007), 2007.

- http://doi.ieeecomputersociety.org/10.1109/ICSEA.2007.87.
- Dascalu, S., Harris, F.C., Jr., Latifi, S., Fritzinger E., Okamoto, S., and McMahon, M., Jr., "Visual Software Environment in Support of Model Interoperability for Climate Change Research in Nevada", accepted at the 2nd European Symposium on Coupled Problems (ESCO-2010), Pilsen, Czech Republic.
- Dascalu, S., Okamoto, S., Fritzinger E., McMahon, M., Jr., Latifi, S., and Harris, F.C., Jr., "Software Framework for Increased Effectiveness in Interdisciplinary Climate Change Research," submitted to the World Automation Congress (WAC-2010), Kobe, Japan.

Synergistic Activities

- Journal paper reviewer: The DATA BASE for Advances in Information Systems (2009)
- Conference paper reviewer: SEDE 2010, IASTED HCI 2008, ITNG 2008, ACIS 2007, AICCSA 2007, COMPRASS 2.0 Special Edition 2007, ICSEA 2007, ITNG 2007, SBLP 2007, SEDE 2007, SNDP 2007, CATA 2006, IWSSA 2006, SBLP 2006, SEDE 2006, CAINE 2005, SEA 2005
- Host weekly Microsoft .NET training workshops for students, sponsored by the ACM chapter of the Department of Computer Science & Engineering: Spring 2011, Fall 2011.

Graduate Advisors:

Sergiu M. Dascalu (University of Nevada, Reno), Frederick C. Harris, Jr. (University of Nevada, Reno)

Collaborators & Other Affiliations

- **University of Nevada, Reno:** Sermsak Buntha, Franco Biondi, Michael Callopy, Sergiu M. Dascalu, Eric Fritzinger, Frederick C. Harris, Jr., Victor Ivanov, Scott Mensing, Rakhi Motwani, Muhanna Muhanna, Sohei Okamoto, Juan C. Quiroz, William Smith, Scotty Strachan
- **University of Nevada, Las Vegas:** Shahram Latifi, Shama Perveen, Thomas Piechota
- **Desert Research Institute, Nevada:** Gayle Dana, Nick Lancaster, Grant Kelly, Darko Koracin, Greg McCurdy, John Mejia, Michael Young
- **University of New Mexico:** Karl Benedict, Renzo Sanchez-Silva
- **Idaho State University:** Dan Ames

Donica Mensing
Associate Professor
Reynolds School of Journalism
University of Nevada, Reno

Professional Preparation

University of California, Berkeley	Political Economy of Natural Resources	B.S. (1978)
George Washington University	Science, Technology and Public Policy	M.A. (1982)
University of Nevada, Reno	Journalism	M.A.(1996)
University of Nevada, Reno	Political Science	Ph.D.(2001)

Appointments

2007 - present	Associate Professor, *University of Nevada, Reno*
1999 - 2006	Assistant Professor, *University of Nevada, Reno*

Related Publications

- Mensing, D. and B. Franklin (2010) (co-editors) *Journalism in Education, Training and Employment* Routledge: New York.
- Mensing, Donica (2010). Rethinking (again) the future of journalism education. *Journalism Studies*, 11:4, 511-523.
- Mensing, D. and D. Ryfe (2009) "Citizen Journalism in a Historical Frame" in *Public Journalism 2.0: The Promise and Reality of a Citizen Engaged Press*, Jack Rosenberry and Burton St. John, co-editors, Routledge,.
- Mensing, D. (Spring 2007) "Prospects for profit: The slowly evolving business model for online newspapers" *Newspaper Research Journal*, 28:2, 22.
- Greer, J. and D. Mensing (2006) "Changes in online newspapers in the United States, 1997 to 2003" in *Internet Newspapers, Making of a Mainstream Medium*, Xigen Li (ed.) Lawrence Erlbaum Associates.

Additional Publications/Presentations

- Mensing, D. and J. Greer (2006). "Above the Fold: A Comparison of the Lead Stories in Print and Online Newspapers" in *Internet Newspapers, Making of a Mainstream Medium*, Xigen Li (ed.) Lawrence Erlbaum Associates.
- Greer, J. and D. Mensing (Spring 2004) "U.S. News Web Sites Better, But Small Papers Still Lag" *Newspaper Research Journal*, 25: 2, 98.
- Mensing, D. (April 2006). "Click here to learn more: A comparison of learning attributes in online news sites." Paper presented at the 7th International Symposium on Online Journalism, University of Texas at Austin. Juried conference paper.
- Mensing, D. (April 2004). "Examining the media agenda: How traditional and online media presented the 2000 and 2004 presidential primaries." Paper presented at the 5th International Symposium on Online Journalism, University of Texas at Austin. Awarded top paper at the conference.

- Greer, J. and D. Mensing (Sept. 2000) "Are the old media taking new media seriously? How traditional media outlets covered cyber-campaigning in the 2000 elections." Poster presented at the American Political Science Association Annual Meeting, San Francisco.

Synergistic Activities

- Bi-lingual Interactive Journalism. A New Voices grant awarded by the J-Lab: Institute for Interactive Journalism, $17,000, May 2007-May 2009.
- Significant involvement in two Web sites that won a J-Lab Knight Batten award for innovation in journalism education, one on the Tahoe environment and one on Nevada politics (2007).
- Significant involvement in the OurTahoe Web site that won a first place award from the Online News Association (2007).
- Graduate director of innovative graduate program designed to foster citizen engagement in environmental decision making at Lake Tahoe.
- F. Donald Tibbetts Distinguished Teacher Award, runner-up, 2006 (university top teaching award)
- Silver Compass Award, 2005 (university award)
- Nevada Semenza Christian Award for Teaching Excellence, Reynolds School of Journalism, May 2001 and May 2006.

Recent Collaborators & Other Affiliations

- Professor Larry Dailey, University of Nevada, Reno
- Dr. Jennifer Greer, University of Alabama, Tuscaloosa
- Dr. Michael Lenert, University of Nevada, Reno
- Dr. David Ryfe, University of Nevada, Reno
- Professor Len Witt, Kennesaw State University

Graduate Advisors

- Dr. Bill Eubank, University of Nevada, Reno
- Dr. Stacy Gordon, University of Nevada, Reno
- Dr. Jimmy Gentry, University of Kansas, Lawrence
- Professor Travis Linn, University of Nevada, Reno
- Dr. Allan Wilcox, University of Nevada, Reno
- Dr. Steven Zink, University of Nevada, Reno
- Dr. John Logsdon, George Washington University

Scott A. Mensing
Professor
Department of Geography
University of Nevada, Reno

Professional Preparation

1989 - 1993	Ph.D.	Geography, University of California, Berkeley
1986 - 1988	M.A.	Geography, University of California, Berkeley
1973 - 1977	B.A.	Landscape Architecture, University of California

Appointments

2008 - present	Professor, Dept. of Geography, University of Nevada, Reno
2009	Assistant Dean, College of Science, Undergraduate Education
2002 -2008	Associate Professor and Chair, Dept. of Geography, University of Nevada, Reno
2000 - 2002	Associate Professor, Geography, University of Nevada, Reno
1993 - 2000	Assistant Professor and Director, Geographic Information Systems (GIS) Computing Facility, Dept. of Geography, University of Nevada, Reno
1992 - 1993	Graduate Student Researcher, Lawrence Livermore Laboratory/U.C. Berkeley
1991 (summer)	Lecturer, University of California, Berkeley
1989 (summer)	Research Associate, Field ecologist, University of California, Riverside

Related Publications

(in press) Mensing, S. A., Korfmacher, J., Minkley, T., Musselman, R A. A 15,000 year record of vegetation and climate change from a treeline lake in the Rocky Mountains, Wyoming, USA" *The Holocene* DOI: 10.1177/0959683611430339

2008 Mensing, S. A., Smith, J., Allan, M., Norman, K. B. Extended drought in the Great Basin western North America in the last two millennia reconstructed from pollen records. *Quaternary International* 188. p79-89.

2004 Mensing, S., Benson, L., Kashgarian, M, and Lund, S. A Holocene pollen record of persistent droughts from Pyramid Lake, Nevada, USA. *Quaternary Research* 62, 29-38.

2006 Mensing, S., Livingston, S., and Barker, P. Long-term fire history in Great Basin sagebrush reconstructed from macroscopic charcoal in spring sediments, Newark Valley, Nevada. *Western North American Naturalist*. **66**, 64-77..

1997 Benson, L, Burdett, J., Kashgarian, M., Lund, S., and Mensing, S. Nearly synchronous climate change in the Northern Hemisphere during the last glacial termination. *Nature* 388, 263-265.

Additional Publications

2007 Biondi, F., Strachan, S., Mensing, S. A., Piovesan, G. Radiocarbon analysis confirms the annual nature of sagebrush growth rings. *Radiocarbon, 49*(3) p1231-1240.

2006 Mensing, S. A. The history of oak woodlands in California, Part II: The Native American and historic period. The California Geographer **46**, 1-31.

2005 Mensing, S. A. 2005. The History of Oak Woodlands in California, Part I: The paleoecologic record. *The California Geographer* **45**, 1-38.

2002 Benson, L., Kashgarian, M., Rye, R., Lund, S., Paillet, F., Smoot, J., Kester, C., **Mensing, S**., Meko, D., and Lindstrom, S. Holocene multidecadal and multicentennial droughts affecting Northern California and Nevada. *Quaternary Science Reviews*, 21: 659-682.

2001 Mensing, S. A. Late Glacial and Early Holocene Vegetation and Climate Change near Owens Lake, Eastern California. *Quaternary Research* 55, 57-67.

Synergistic Activities

Innovations in teaching and training

Developed hands on classroom and field-based instructional materials to develop science based research skills among undergraduates and implemented these materials in numerous courses including Geographic Field Methods, Biogeography, and Inroductory Physical Geography. For this work I was honored for my teaching on three occasions, first in 2005 in the College of Science at UNR with the LeMay Award for Excellence in Teaching, next in 2006 with the highest teaching award in our university, the F. Donald Tibbitts Memorial Distinguished Teaching Award, and most recently in our state in 2007 with the Nevada System of Higher Education Regents Teaching Award. In 2010 I received the CASE Nevada Professor of the Year - Carnegie Foundation for Advancement of Teaching award. I have taught with the University Studies Abroad Consortium in Viterbo, Italy on two occasions, Summer 2007 (Environmental History of the Mediterranean) and Fall 2009 (Geography of Europe, and Field Methods).

Broadening the participation of underrepresented groups

I serve as a high school recruiter for our Department, College and University and have given numerous classroom presentations to students in High School across the state, as well as making presentations to high school counselors and community members. Presentations target underrepresented groups.

Service to the Scientific Community

Member, 1988 – present, Association of American Geographers – Secretary-Treasurer of the Biogeography Specialty Group between 1996 and 2000.

Reviewer of grant proposals submitted to the *National Science Foundation, United States Geological Survey, National Geographic Society, National Oceanic and Atmospheric Association.*

Reviewer of manuscripts submitted to refereed journals: *Madroño, The Holocene, Wetlands, Landscape Ecology, Western North American Naturalist, The Geographical Review, The Annals of the Association of American Geographers, Nature, Quaternary Research.*

Senior Panelist – National Science Foundation, Geography and Spatial Science program (2011 – 2013)

Collaborators and Other Affiliations

Students Advised at the University of Nevada, Reno: Anna Patterson (PhD), Anna Higgins (PhD),Jeff Crawford (PhD), Cassie Hansen (PhD), Peter Noles (M.S.), K. Burkle Norman (M.S.), M. Trammell (M.S.), B. Greenslate (M.S.),G. Lohrmeyer (M.S.), C. Kolden (M.S.), M. Morrison (M.S.), J. Smith (M.S.), R. Elston Jr. (M.S.), M. Allen (M.S.), J. Korfmacher (M.S.), J. Hastings (M.S.), C. Ryan (M.S.), R. Bamford (M.S.), A. Shallaby (M.S.), N. Little (M.S.).

Kenneth Smith
Research Associate Professor/Seismic Network Manager
Nevada Seismological Laboratory
University of Nevada Reno

Professional Preparation

Ph.D. Geophysics:	*Earthquake Seismology, University of Nevada, Reno, Nevada 1991*
B.Sc. Geophysics:	*Exploration Geophysics, Boise State University, Boise, Idaho 1984*
B. A. Geology:	*Indiana University, Bloomington, Indiana 1976*

Appointments

July 2006:	Research Associate Professor/NSL Seismic Network Manager
July 2005:	Research Associate Professor
July 1997 – 2006:	Research Assistant Professor.
July 1995 – July 1997:	Project Coordinator Yucca Mountain Project; Administrative Faculty
July 1994 - July 1995:	Research Assistant Professor.
July 1992 - July 1994:	Post-Doctoral
1990-1992:	Consultant FMC Gold Corporation, Reno, Nevada
1984-1990:	Graduate Student University of Nevada Reno

Relevant Publications

Smith, K., Pechmann,J., Meremonte, M., and Pankow, K. (2011). Preliminary analysis of the Mw 6.0 Wells, Nevada, earthquake eequence, Special Publication 36, Nevada Bureau of Mines and Geology, 127-146.

Anderson, J.G., Tibuleac, I, Anooshehpoor, A., Biasi, G. Smith, K.D., von Seggern D. (2009) Exceptional ground motions recorded during the 26 April 2008 Mw 5.0 Mogul, Nevada earthquake, Bulletin of the Seismological Society of America 99, 3475-3486.

Preston, L., Smith, K.D., and von Seggern D.H., (2007) P-wave velocity structure in the Yucca Mountain Nevada region, accepted for publication, Journal of Geophysical Research, 112, B11305, doi:10.1029/2007JB005005.

von Seggern, D.H., Smith K.D., and Preston L.A., (2008) Seismic Spatial-Temporal Character and Effects of a Deep (25-30 km) Magma Intrusion below North Lake Tahoe, California-Nevada, Bulletin of the Seismological Society of America*; June 2008; v. 98; no. 3; p. 1508-1526*

Smith, K.D., von Seggern, D, Blewitt, G, Anderson, J, Preston, L, Wernicke, B, Davis, J, (2004). Evidence for deep magma injection Lake Tahoe, Nevada-California, Science v. 305, 1277-1280.

Brune, J.N., Smith, K.D., Zeng, Y, (2003) Precarious Rock Evidence for seismic shaking during and before the 1992 M 5.6 Little Skull Mountain, Nevada, Earthquake, Earthquake Spectra, Vol. 21(4, pp. 967-985. Nov.).

Schweickert, R.A, Lahren, M.M., Smith, K.D., and J. F. Howle. (2003) Transtensional defomation in the Lake Tahoe region, CA and NV, Tectonophysics, 392, 303-323.

Ichinose, G. A, Anderson, J. G, Smith, K.D., Zeng, Y, 2003, Source parameters of Eastern California and western Nevada earthquakes from regional moment tensor inversion: Bulletin of the Seismological Society of America, vol.93, no.1, p. 61-84.

Smith, K.D., Brune, J.N., Savage, M., dePolo, D.M., and Sheehan, A. (2001). The 1992 Little Skull Mountain earthquake sequence, Bulletin of the Seismological Society of America 91, 1595-1606.

Smith, K.D. and K.F. Priestley (2000) Faulting in the 1986 Chalfant, California, Sequence; Local Tectonics and Earthquake Source Parameters, Bulletin of the Seismological Society of America 90, 813-831.

Ichinose, G., Anderson, J., Smith, K., dePolo, D., Anooshehpoor, R., Schweickert, R.A., and Lahren, M.M., (1999). The seismotectonics of the 30 October 1998 Incline Village, Nevada earthquake and its effects: *Seismological Research Letters*, v. 70, p. 297-305.

Ichinose, G.A, Smith, K.D., Anderson, J.G. (1998), Moment tensor solutions of the 1994-1996 Double Spring Flat, Nevada, earthquake sequence and implications for local tectonic models, *Bulletin of the Seismological Society of America, 88 1363-1379.*

Ichinose, G., K.D. Smith and J.G. Anderson (1997b), Source Parameters of the 1995 Border Town, Nevada Earthquake, Sequence, *Bulletin of the Seismological Society of America*, v. 87, 652-688.

Synergistic Activities

- Co-PI: USGS Cooperative Agreement Western Great Basin Seismic Monitoring
- Co-PI: USGS America Recovery and Reinvestment Act Network Upgrade
- PI: Spectrum relocation activities Nevada Seismic Network (various government agencies and private entities). Redesign of Nevada seismic network communications systems
- Expertise in the seismicity and seismotectonics of the Western Nevada and Walker Lane

Recent Collaborators & Other Affiliations

- Rob Abbott: Sandia Nat. Lab.
- Gene Ichinose: AFTAC
- Steve Meyers: :LLNL
- Keith Priestley Cambridge University, UK
- Leiph Preston: Sandia National Labs
- Artie Rodgers: LLNL
- Cathy Snelson: New Mexico Tech., UNLV
- Bill Walter: LLNL
- Cathy Snelson: National Securities Technology, Las Vegas

Graduate Student Advisors

Keith Priestley
Jim Brune: UNR

Graduate Students (not principal advisor)

Gene Ichinose
Mahesh Dhar

Haroon Stephen
Assistant Professor
Civil and Environmental Engineering
University of Nevada, Las Vegas

Professional Preparation

University of Agriculture, Faisalabad, Pakistan	Agricultural Engineering	B.S. (1995)
Asian Institute of Technology, Bangkok, Thailand	Remote Sensing and GIS	M.S. (1997)
Brigham Young University, Provo, UT	Electrical & Computer Eng.	Ph.D. (2006)
Brigham Young University, Provo, UT	Wireless Comm. Lab	Postdoc(2006-2007)
University of Nevada, Las Vegas NV	Water Resources Lab	Postdoc(2007-2009)

Appointments

2011-present	Assistant Professor Civil and Environ. Engineering, *University of Nevada, Las Vegas, Nevada*
2009-present	Director GIS & Remote Sensing Core Lab., *University of Nevada, Las Vegas, Nevada*
1998-1998	GIS Training Coordinator, *Asian Institute of Technology, Bangkok, Thailand*
1997-1998	Research Associate, *Asian Institute of Technology, Bangkok, Thailand*

Related Publications

Stephen H., S. Ahmad, and T. C. Piechota, 2010, Land Surface Brightness Temperature Modeling using Solar Insolation. *IEEE Transactions on Geoscience and Remote Sensing*, 48(1), 491-498.

Stephen H., S. Ahmad, T. C. Piechota, and C. Tang, 2010, Relating Surface Backscatter Response from TRMM Precipitation Radar to Simulated Soil Moisture: Results over a Semi-Arid Region. *Hydrology and Earth System Sciences*, 14, 193-204.

Stephen H. and D. G. Long, 2005, Modeling Microwave Emissions of Erg Surface in the Sahara Desert. IEEE Transactions on Geoscience and Remote Sensing, 43(12), 2822-2830.

Puri S., H. Stephen, and S. Ahmad, "Relating TRMM Precipitation Radar Land Surface Backscatter Response to Soil Moisture in the Southern United States," *Journal of Hydrology*, vol. 402, 115-125, 2011.

Acharya A., T. C. Piechota, H. Stephen, and G. Tootle, "Modeled Streamflow Response under Cloud Seeding in the North Platte River Watershed," *Journal of Hydrology*, doi: 10.1016/j.jhydrol.2011.08.027

Additional Publications

Stephen H. and D. G. Long, 2002, Multi-Spectral Analysis of the Amazon Basin using SeaWinds, ERS, NASA, Seasat Scatterometers, TRMM-PR and SSMI. *Proceedings of the 2002 International Geoscience and Remote Sensing Symposium*, Toronto, Canada, 3, 2808-2810.

Stephen H., D. G. Long, and Hardin P. J., 2000, Vegetation Study of the Amazon using QSCAT in comparison with SASS, ESCAT and NSCAT. *Proceedings of the 2000 International Geoscience and Remote Sensing Symposium*, Honolulu, HI, 1, 429-431.

Stephen H., R. L. G. Schumann, V. Wismann, K. Honda, and K. Nualchawee, 1998, Comparison of NOAA AVHRR and ERS Wind Scatterometer Data for Vegetation Signatures. *Space Technology*, 18(4), 233-238.

Stephen H. and D. G. Long, 2004, Analysis of Scatterometer Observations of Saharan Ergs Using A Simple Rough Facet Model. *Proceedings of the 2004 International Geoscience and Remote Sensing Symposium*, Anchorage, Alaska, 3, 1534-1537.

Stephen H. and D. G. Long, 2002, Azimuth Modulation of Backscatter from SeaWinds and ERS Scatterometer over the Saharo-Arabian Deserts. *Proceedings of the 2002 International Geoscience and Remote Sensing Symposium*, Toronto, Canada, 5, 1780-1782.

Synergistic Activities

1. Developed, GIS and Remote Sensing Core Lab and Capabilities at UNLV
2. Developing, Visualization Facility at UNLV funded by EPSCoR Climate Change Project
3. Organizing Committee, Nevada Geographic Information Society 2012 Conference
4. Reviewer, *IEEE Transactions on Geoscience and Remote Sensing* and *Remote Sensing of Environment*
5. Recent Conferences, *American Association of Geographers Annual Meeting, 2011, Seattle, WA*
   3rd Annual Tri State Western Consortium Meeting, 2011, Albuquerque, NM

Recent Collaborators & Other Affiliations

Craig Palmer	Harry Reed Center, *University of Nevada Las Vegas*
Danial Thompson	College of Life Sciences, *University of Nevada Las Vegas*
Jaci Batista	College of Engineering, *University of Nevada Las Vegas*
Sajjad Ahmad	College of Engineering, *University of Nevada Las Vegas*
Thomas C. Piechota	College of Engineering, *University of Nevada Las Vegas*
William Smith	Greenspun College of Urban Affairs, *University of Nevada Las Vegas*

Professional affiliations

- Institute of Electrical and Electronic Engineers (IEEE), NY
- Geoscience and Remote Sensing Society, IEEE, NY
- Sigma Xi, The Scientific Research Society, NC
- American Geophysical Union (AGU), Washington, DC
- American Society of Engineering Education (ASEE), Washington, DC
- Association of American Geographers (AAG), Washington, DC
- State Mapping Advisory Committee, Reno, NV
- Nevada Geographic Information Society, Reno, NV

Graduate Advisors and Postdoctoral Sponsors

David G. Long	Ph.D. Advisor	*Brigham Young University, Provo, Utah*
Micheal Jensen	Postdoctoral Sponsor	*Brigham Young University, Provo, Utah*
Thomas C. Piechota	Postdoctoral Sponsor	*University of Nevada Las Vegas*
Sajjad Ahmad	Postdoctoral Sponsor	*University of Nevada Las Vegas*

Recognitions

- Regional Educational Development Program Fellowship, Government of Japan, 1998
- Quaid- e -Azam Scholarship, Government of Pakistan, 1998
- Asian Institute of Technology Alumni Association Fellowship, 1997
- Graduate Fellowship, Government of Japan, 1996-1997
- Undergraduate Merit Scholarship, Government of Pakistan, 1991-1995

Scotty D.J. Strachan
Environmental Research Coordinator
Department of Geography
University of Nevada, Reno

Professional Preparation

B.S., University of Nevada, Reno, Geography, Minor: Economics, 2001
M.S., University of Nevada, Reno, Geography, 2011

Appointments

07/10 – present Administrative Faculty Department of Geography, Univ. of Nevada, Reno
02/07 – 06/10 Research Associate Department of Geography, Univ. of Nevada, Reno
02/06 – 10/06 Helicopter Drilling Logistics Manager Tonogold Resources, Nyac Camp, Alaska
01/02 – 02/06 Research Technician Department of Geography, Univ. of Nevada, Reno

Related Publications

- (accepted) Biondi, F., and S. Strachan. *Dendrohydrology in 2050: Challenges and Opportunities.* In: W. Grayman, P. Loucks, and L. Saito (editors), Water and Environmental Resources Vision 2050, American Society of Civil Engineers (ASCE).
- (in press) Strachan, S., F. Biondi, and J. Leising. *A 550-year reconstruction of streamflow variability in Spring Valley, Nevada, USA.* Journal of Water Resources Planning and Management. DOI: 10.1061/(ASCE)WR.1943-5452.0000180
- 2011 McMahon Jr., M., S.M. Dascalu, F.C. Harris Jr., S. Strachan, and F. Biondi. *Architecting Climate Change Data Infrastructure for Nevada*. In: C. Salinesi and O. Pastor (editors), Advanced Information Systems Engineering Workshops CAISE-2011, Lecture Notes in Business Information Processing, LNBIP-83, Springer, London, UK, pp. 354-365.
- 2011 Strachan, S., B. Bird, B. Lyles, G. McCurdy, M. McMahon. *Building Climate Monitoring Infrastructure in Nevada: Integration of field science and cyberinfrastructure along high elevational transects*. Annual Meeting of the Association of American Geographers, Seattle.
- 2009 Saito, L.S., F. Biondi, J. Salas, and S. Strachan. *Combining a water balance model for streamflow simulations with long tree-ring records to improve estimation of water resources variability.* EOS Transactions of the American Geophysical Union, 90(52) Fall Meeting Supplement, San Francisco, California. Abstract H23I-05.

Additional Publications

- 2011 Biondi, F., L. Jamieson, S. Strachan, and J. Sibold. *Dendroecological testing of the pyroclimatic hypothesis in the central Great Basin, Nevada, USA.* Ecosphere 2(1): art5 (20 pages). DOI:10.1890/ES10-00068.1
- 2011 Biondi, F., and S. Strachan. *The Nevada NSF-EPSCoR Instrumented Transects: A Tool for Mountain-to-Valley Ecohydrology*. The Newsletter of the Consortium for Integrated Climate Research in Western Mountains (CIRMOUNT), Vol.5, No.1.

- 2009 Biondi, F. and S. Strachan. *An expanded tree-ring network for eco-hydro-climatic research in the Great Basin of North America.* Annual Meeting of the Association of American Geographers, Paper Session on "Climate, Wildfire, and Woodland Dynamics in the Great Basin of North America - II", Las Vegas, Nevada.
- 2008 Biondi, F., T.J. Kozubowski, A.K. Panorska, and S. Strachan. *Estimating the likelihood of eco-hydro-climatic episodes from tree-ring records.* Abstracts of the 8th National Conference on Science, Policy and the Environment on Climate Change: Science & Solutions , National Council for Science and the Environment, Washington D.C., USA.
- 2007 Biondi, F., S. Strachan, S.A. Mensing, and G. Piovesan. *Radiocarbon analysis confirms the annual nature of sagebrush growth rings*. Radiocarbon 49(3): 1232-1240

Recent Collaborators & Other Affiliations

- University of Nevada, Reno: Tom Albright, Franco Biondi, Jennifer Briggs, Jennifer Gworek, Fred Harris, Jill Heaton, John James, Graham Kent, Peter Kirchner, John Kleppe, Mike McMahon, Scott Mensing, Rohit Patil, Laurel Saito, David Slater, Ken Smith, Jasmine Vittori, Kishor Waikul, Peter Wigand.
- Others: Gretchen Baker (NPS), Brian Bird (UNLV), Tom Brinkoetter (RDF Wireless), David Charlet (College of Southern Nevada), David Holt (USM), Brian Jansen (USGS), Richard Jasoni (DRI), Joseph Leising (SNWA), Susan Lindstrom (Consulting Archaeologist), Bradley Lyles (DRI), Farrel Lytle (EXAFS Company), Gregory McCurdy (DRI), Robert McQueen (Summit Envirosolutions, Inc.), Robert Means (BLM), Constance Millar (USFS), Zachary Peterson (BLM), Alexander Rose (Long Now Foundation), Carrie Smith (USFS), Donald Stevens (Consulting Geologist), Robin Tausch (USFS), Lawrence Winship (Hampshire College).

Synergistic Activities

- Establishment of a remote monitoring high-speed communications network in eastern Nevada (NV-EPSCoR)
- Collaborator on establishment of state-wide UNR-managed high-speed wireless research and education data network (Digital Nevada)
- Assembly of over 40 multi-century climatically-sensitive tree-ring palaeo datasets in the Great Basin
- Establishment of geospatial query engine for published PRISM datasets (www.dendrolab.org)
- Consultation and advising for dendroarchaeological projects within the Great Basin
- Member, American Geophysical Union
- Member, Association of American Geographers

Guoping Tang
Assistant Research Professor
Division of Earth and Ecosystem Sciences
Desert Research Institute

Professional Preparation

Physical Geography	University of Oregon	Ph.D.	2008
Environmental Science	Beijing Normal University (China)	M.S.	1998
Geography	Hunan Normal University (China)	B.S.	1993

Appointments

2011- Present	*Assistant Research Professor* Desert Research Institute, Division of Earth and Ecosystem Sciences, Nevada System of Higher Education, Reno, Nevada
2010 – 2011	*Research Associate* GIS/Modeling Group, CUNY Institute for Sustainable Cities, Hunter College, the City University of New York, New York.
2008-2010	*Postdoctoral Associate* Department of Plant Biology, University of Vermont, Burlington, Vermont.
2001-2008	*Graduate Research Assistant; Ph.D. Student* Department of Geography, University of Oregon, Eugene, Oregon.
1998-2001	*Research Assistant* Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing, China.

Five Relevant Publications

- **Tang G**, Beckage B, and Smith B (2011) Modeling the transient dynamics of vegetation in New England to historical and future projected climate change (Recommended for publication in *Climatic Change*)
- **Tang G,** Beckage B, Smith B, and Miller PA (2010) Estimating potential forest NPP and biomass for New England using a regional dynamic ecosystem model. *Ecosphere,1(6), 1-20. Article (18).*
- **Tang G,** and Beckage B (2010) Projecting the distribution of forests in New England in response to climate change. *Diversity and Distribution, 16,144-158.*
- **Tang G,** Shafer SL, Bartlein PJ, and Holman J. (2009) Effects of experimental protocol on the evaluation of global vegetation model accuracy: a comparison of simulated and observed vegetation patterns for Asia. *Ecological Modelling, 220(2009), 1481-1491.*
- **Tang G**, and Bartlein PJ (2008) Simulating the responses of terrestrial vegetation to past and future projected climate change: approaches, issues and challenges. *Progress in Physical Geography*, **32**(5), 543-556.

Five Other Publications

- **Tang G** (2008) A new metric for evaluating the correspondence of spatial patterns in vegetation models. *Global Ecology and Biogeography*, **17**,465-478.
- Long HL, **Tang G**, Li XB, and Heilig CK (2006) Socio-economic driving forces of land-use change in Kunshan, the Yangtze River Delta Economic Area of China. *Journal of Environmental Management*, **83**(2007), 352-364.
- Ran SH, **Tang G**, and Xue JY (2001) The impacts of global climate change on fragile economic development region of China. *Resources Sciences***, 23**(3), 45-50 *(In Chinese)*.
- **Tang G**, Li XB, Fischer G, and Preyler S (2000) Climate change and its impacts on China's agriculture. Acta Geographica Sinica, 55(2), 129-138 (In Chinese).
- **Tang G**, and Yang ZY (2000) The optimization of the population carrying capacity of water resource in Miyuan reservoir area. Acta Scientiae Circumstantiae, 20(2), 225-229 (In Chinese).

Synergistic Activities

- **Journal reviewer** for 'Ecological Modelling', 'Applied Vegetation Sciences', 'International Journal of Remote Sensing' and '***Journal of the American Water Resources Association'***
- **Membership** of '*Ecological Society of America', 'American Geophysical Union'* and *'Association of American Geographers'*

Graduate and Postdoctoral Advisors

Research Associate Supervisors

Don Pierson, Section Chief, Watershed Quality Science and Research, Bureau of Water Supply, NYC Department of Environmental Protection, Kingston, New York 12401

Elliot Schneiderman, Watershed Quality Science and Research, Bureau of Water Supply, NYC Department of Environmental Protection Agency, Kingston, New York 12401

Postdoctoral Associate Supervisor

Brian Beckage, Professor, Plant Biology Department, University of Vermont, Burlington, VT 05405-0086

PhD Advisor

Patrick J. Bartlein, Professor, Department of Geography, University of Oregon, Eugene, OR 97403-1251

Andrzej M. Trzynadlowski
Professor
Department of Electrical and Biomedical Engineering
University of Nevada, Reno

Professional Preparation

M.S. in Electronics, 1969, Technical University of Wroclaw, Poland
Ph.D. in Electrical Engineering, 1974, Technical University of Wroclaw, Poland

Appointments

1987 -	Associate Professor/Professor, Dept. of Electrical and Biomedical Engineering, University of Nevada, Reno
1984 - 1987	Assistant Professor, Dept. of Electrical Engineering, University of Wyoming
1983 - 1984	Visiting Assistant Professor, Dept. of Electrical Engineering, U. of Texas at Arlington
1980 - 1982	Visiting Associate Professor, Dept. of Electrical Engineering, University of Salahuddin, Arbil, Iraq
1969 - 1979	Lecturer/Senior Lecturer, and Assoc. Director for Faculty Affairs (1978-1979), Institute of Electromachine Systems, Technical University of Wroclaw, Poland
1966 - 1969	Teaching Assistant/Lecturer, Institute of Power Systems, Technical University of Wroclaw, Poland

Related Publications

- O. Dobzhanskyi, E. A. Mendrela, and A. M. Trzynadlowski, "Performance of a 3-phase permanent magnet transverse flux wind power generator with internal stator," *3rd Ann. IEEE Green Technologies Conf.*, Baton Rouge, Louisiana, 2011.
- R. L. Kirlin, C. Lascu, and A. M. Trzynadlowski, "Shaping the noise spectrum in power electronic converters," *IEEE Transactions on Industrial Electronics*, vol. 58, no. 7, pp. 2780-2788, 2011.
- A.M. Trzynadlowski, "Introduction to Modern Power Electronics," 2nd Ed., *John Wiley & Sons, Inc.*, New York, 2010.
- K. Borisov, H. L. Ginn, and A. M. Trzynadlowski, "Attenuation of electromagnetic interference in a shunt active power filter," *IEEE Trans. on Power Electronics*, vol. 22, no. 5, pp. 1912-1918, 2007.
- M. Imecs, A. M. Trzynadlowski, I. I. Incze, and C. Szabo, "Vector control schemes for tandem-converter fed induction motor drives," *IEEE Transactions on Power Electronics*, vol. 20, no. 2, pp. 493-501, 2005.

Additional Publications

- O. Dobzhanskyi, E. A. Mendrela, and A. M. Trzynadlowski, "Analysis of leakage flux losses in the transverse flux permanent magnet generator," *3rd Ann. IEEE Green Technologies Conf.*, Baton Rouge, Louisiana, 2011.
- A.M. Trzynadlowski, "High efficiency gearless power conversion systems with silent permanent magnet machines," *2010 NSF-ECCS Grantees' Conf.*, Honolulu, Hawaii, 2010.
- A.M. Trzynadlowski, M. B. Tayahi, and C. Lascu, "Application of spectral nulls for communication enhancement in pulse-width modulated power electronic systems," *Advanced Microelectronics and Photonics for Space Conf.*, Tahoe Ridge, California, June 2008.
- A.M. Trzynadlowski, "Active attenuation of electromagnetic noise in an inverter-fed automotive electric drive system," *IEEE Transactions on Power Electronics*, vol. 21, no. 3, pp. 693-700, 2006.
- M. Malinowski, M. P. Kazmierkowski, and A. M. Trzynadlowski, "Review and comparative study of control techniques for three-phase PWM rectifiers," *Mathematics and Computers in Simulation*, vol. 63, pp. 349-361, 2003.

Synergistic Activities

- Pioneered the concept of random pulse width modulation (RPWM) for power electronic converters, and developed several RPWM techniques. The RPWM has been widely adopted by industry, e.g., General Motors, Texas Instruments, and Cypress MicroSystems.
- Developed a new methodology of computer-aided design of energy-efficient electric drives (elected Fellow of the IEEE for (1) and (2)).
- Developed a new generator for low-power wind-turbine systems (two US patents granted).
- Authored five books and three book chapters on power electronics and electric drives for the use of students and practicing engineers.
- Associate Editor of IEEE Transactions on Industrial Electronics and IEEE Transactions on Power Electronics.

Recent Collaborators & Other Affiliations

- Bech, Michael M., Aalborg University, Denmark
- Beguenane, Rachid, Universite du Quebec a Chicoutimi, Canada
- Blaabjerg, Frede, Aalborg University, Denmark
- Borisov, Konstantin, Johnson Controls, USA
- Dascalu, Sergiu, University of Nevada, Reno, USA
- Gabrys, Chris, Mariah Power, USA
- Gieras, Jacek, United Technologies, USA
- Imecs, Maria, University of Cluj-Napoca, Romania
- Kazmierkowski, Marian P., Warsaw Institute of Technology, Poland
- Kirlin, R. Lynn, University of Victoria, Canada
- Lascu, Cristian, V., University of Nevada, Reno, USA
- Malinowski, Mariusz, Warsaw Institute of Technology, Poland
- Mendrela, Ernest A., Louisiana State University, USA
- Nagashima, James, General Motors Advanced Technology Center, USA
- Ouhrouche, Mohand, A., Universite du Quebec a Chicoutimi, Canada
- Patriciu, Niculina, University of Cluj-Napoca, Romania
- Pedersen, John K., Aalborg University, Denmark
- Rahai, Hamid, California University Long Beach, USA
- Stancu, Costin, General Motors Advanced Technology Center, USA
- Tayahi, Moncef B., Rutgers University, USA
- Zigliotto, Mauro, University of Udine, Italy

Graduate and Postdoctoral Advisors

Wladyslaw Kedzior, Technical University of Wroclaw, Poland (retired)

Thesis Advising and Postgraduate-Scholar Sponsor within the Last Five Years

- Jha, Vandana, MS, University of Nevada, Reno
- Karaman, Ekrem, PhD, University of Nevada, Reno
- Farasat, Mehdi, PhD, University of Nevada, Reno
- Lascu, Cristian, Post-Doc, University of Nevada, Reno
- Luo, Xiaozhong, MS, University of Nevada, Reno
- Mulupuri, Ramesh, MS, University of Nevada, Reno
- Niu, Fen, MS, University of Nevada, Reno
- Qin, Ling, PhD, Texas Instruments, Houston, TX

Total number of graduate students advised and postdoctoral scholars sponsored: 9.

Janet Usinger
Associate Professor
College of Education
University of Nevada, Reno

Professional Preparation

Institution	Major	Degree	Year
University of Nevada, Reno	Home Economics	B.S.	1976
University of Nevada, Reno	Nutrition	M.S.	1978
Walden University	Education Admin.	Ph.D.	1995

Appointments

2000-present	Associate Professor, College of Education, University of Nevada, Reno, Reno, NV
1995-1999	Associate Director, Nevada Cooperative Extension, University of Nevada, Reno, Reno, NV
1992-1994	Interim Deputy Administrator, Extension Service (ES), USDA
1989-1995	Assistant Director, Nevada Cooperative Extension, University of Nevada, Reno, Reno, NV
1981-1989	Area Extension Specialist – Nutrition, Nevada Cooperative Extension, University of Nevada, Reno, Reno, NV

Related Publications

- Usinger, J., Smith, M. (2010). Career development in the context of self-construction during adolescence. *Journal of Vocational Behavior 76:*580-591.
- Usinger, J., Della Sala, M.(2010). *Nevada State GEAR UP Report: Interim Case Study Descriptions of the Rural Nevada GEAR UP Middle and High Schools* (pp. 191).
- Sanchez, J., Thornton, B. W., Usinger, J. (2009). Increasing the ranks of minority principals. *Educational Leadership, 67*(2)
- Sanchez, J., Thornton, B. W., Usinger, J. Promoting diversity in public education leadership. *International Journal of Educational Leadership Preparation, 3*(3)
- Evans, L.M., Thornton, B.W., Usinger, J., (2010). Shared vision or collective assumptions? A study of educational leaders' perceptions of walkthroughs. *International Journal of Educational Leadership Preparation*. 5(4).

Additional Publications

- Meier, A. L., Smith, M. G., Usinger, J. (2010). Environmental project provides work experience for rural youth. *Journal of Extension 48*(3):3IAW3.
- Sanchez, J., Thornton, B. W., Usinger, J. (2009).P-16 alignment of educational success. *International Journal of Educational Leadership Preparation, 6*(4)
- Usinger, J. and Canavero, S. (2007). Perceptions of and interactions with the other: How parents/guardians and middle school personnel communicate in support of student success. *Education, 128*(1)
- Hill, G., Thornton, B., Usinger, J. (2006). An examination of a fissure within the implementation of the NCLB accountability process. *Education, 127*(1), 115-120.
- Usinger, J. (2005). Parent/guardian visualization of career and academic future of seventh graders enrolled in low achieving schools. *The Career Development Quarterly, 53*(3), 234-245.

Synergistic Activities

- Since 2001, in collaboration with the Nevada Department of Education, I have served as the co-director of two Nevada State GEAR UP projects (2001-2006 and 2007-2012) and have provided leadership in its evaluation and related research. The purpose of the project is to provide academic and financial support to first generation college-going students in a state with one of the lowest college-going rates in the country. This project involves coordinating with the seven academic institutions of the Nevada System of Higher Education, 13 Title I middle schools and 45 high schools in 8 of Nevada's 17 school districts. One of the objectives of the GEAR UP project is to increase the number of students pursuing STEM related fields in their secondary and postsecondary educational experiences.
- Provided leadership to the final year of the US Department of Education funded School to Career project which involved collaborating with all 17 Nevada school districts, the seven Nevada institutions of higher education, numerous businesses and community organizations.
- Served on the American Distance Education Consortium (ADEC) Program Panel to facilitate distance education opportunities to rural and underserved communities.
- Have developed numerous community-based nutrition education programs offered both in school and out of school.
- Several courses and research projects within the higher education focus of Educational Leadership program have explored diversifying the student body and the academic faculty at the University of Nevada, Reno as well as universities in general. My particular role in the research has been to bring social constructionism into the teaching and research process.
- I have served as doctoral committee member for students in computer science and masters committee member of students in nutrition and nursing.

Recent Collaborators & Other Affiliations

- Eric Barela Partners in School Innovation
- James Beattie University of Nevada, Reno
- Charlotte Curtis Nevada Department of Education
- Lisa Evans Toronto, Canada
- Leslie Goodyear Education Development Center, Inc., National Science Foundation (until 12/31/11)
- George C. Hill University of Nevada, Reno
- Kathleen Hill University of Nevada, Reno
- Jennifer Jewiss University of Vermont
- Jafeth Sanchez Washoe County School District
- Bill Thornton University of Nevada, Reno

Graduate Advisor

James W. Tomasson, Ph.D. (Ph.D. Advisor), Jerold App, Ph.D., Norman Pearson, Ph.D.

Thesis Advising

I was the doctoral advisor for Melanie Minarik at University of Nevada, Reno from 2003-2008; for John Kyle Dalpe at University of Nevada, Reno from 2003-2008; for Marvin Castagna at University of Nevada, Reno from 2005-2010; for Diane Nicolet at University of Nevada, Reno from 2005-2010. I am currently chairing the following students who are on schedule to defend their dissertations prior to May, 2012: Lauren LaCombe, Natalia Callahan, and Stephanie Woolf, all at University of Nevada, Reno.

Yaakov L. Varol
Professor and Chair
Department of Computer Science and Engineering
University of Nevada, Reno

Professional Preparation

Ph.D., Mathematics, 1971, University of Wyoming, Laramie, Wyoming.
Bachelor of Engineering, Electrical Engineering, 1967, Robert College, Istanbul, Turkey.

Appointments

1996 – present	Professor and Department Chair, Computer Science and Engineering, University of Nevada, Reno.
1978 – 1996	Department of Computer Science, Southern Illinois University, Carbondale, Illinois, Associate Professor (1978-1982), Professor (1982-1996), Chair (1986-1992).
1976 – 1978	Senior Lecturer, Department of Applied Mathematics and Computer Science, University of the Witwatersrand, Johannesburg, South Africa.
1971 – 1976	Assistant Professor, Department of Mathematics and Computer Science, Ben Gurion University of the Negev, Beer Sheva, Israel.

Related Publications

- Varol, Y. L., "Questions, Thoughts & Ideas Concerning IGT in general and about Engineering at IGT in particular", report presented to senior IGT Management, August 2008.
- Leverington, L., Mahon, J., Varol, Y. L. (2008). *Exposing the Cool Stuff in C.S.*, Frontiers in Education, Saratoga Springs, NY, October 2008.
- Kongmunvattana, Y. Varol, J. Zeng, "Lightweight Fault Detection for SharedVirtual Memory clusters", Proc. IEEE Region Ten Conf., Thailand, 2004.
- X. Yuan, Z. Sun, Y. Varol, G. Bebis, "A Distributed Visual Surveillance System", Proc. IEEE Int. Conf. on Advanced Video and Signal Based Surveillance, 2003.
- G. Bebis, S. Louis, Y. Varol, A. Yfantis, "Genetic Object Recognition Using Combinations of Views", IEEE Transactions on Evolutionary Computation, vol.6, no.2, pp.132-146, 2002.
- S. Tragoudas, Y. Varol, "Disjoint Paths with Length Constraints", Int. Journal of Computers and their Applications, vol.9, no.3, pp.158-167, 2002.
- Looney, Y. Varol, "Multisensor Multitarget Tracking with Central to Local Feedback", FUSION, 2000.
- Looney, Y. Varol, "Soft Data Fusion", Chapter 12 in Soft Computing in Systems and Control Technology, Ed. S.G. Tzafestas, Kluwer Academic Press, 1998.

Additional Publications

- S. Tang, C. Looney, Y. Varol, "Multisensor Fusion for Multitarget Tracking", SCA, PDCS – 2000.
- G. Bebis, S. Louis, Y. Varol, "Genetic Object Recognition", Lecture notes in Computer Science, Springer Verlag, 1998.
- R. Pamula, S. Thanawastien, Y. Varol, "Global Checkpointing for a Concurrent Processing System", Int. Journal of Systems Science, vol.21, no.11, pp.2145-2160, 1990.
    - Kalvin, Y. Varol, "On the Generation of All Topological Sortings", Journal of Algorithms, vol.4, pp.150-162, 1983.

- D. Rotem, Y. Varol, “Generation of Binary Trees from Ballot Sequences”, Journal of the ACM, vol.25, no.3, pp.396-404, 1978.
- Y. Varol, A. Kaufman, M. Hanani, “Applying Simulation to Highway Intersection Design” Simulation, pp.97-105, 1977.

Synergistic Activities

Over the 40 years of professional activity in academia, I have taught diverse subject matter in computer science and engineering, conducted research and supervised projects and dissertations on a variety of topics. Some were applied and development oriented like traffic simulation and road design, others were more fundamental and theoretical. Work on data fusion, image processing, and security have provided me with tools and techniques and understanding that would be directly applicable to this proposal. My interest and long-term involvement in curricular issues and graduate education, as well as, my participation in the Hewlett Foundation project on Engineering Education, will also be relevant and significant assets to this proposal, as we attempt to integrate interdisciplinary research and development into new courses and graduate mentoring. This proposal will benefit from the administrative, management and human resources skills I developed as department chair over 20 years of serving in that capacity. It is likely that part of my contribution to the project will be as a generalist and as a coordinator and integrator.

Recent Funding

Varol, Yaakov L (Supporting), Dascalu, Sergiu-Mihai (Co-Principal), Dana, Gayle (Principal), Mensing, Scott A (Co-Principal). "Infrastructure for a Sustainable Future: Nevada's Climate Change Initiative", Sponsored by NSF EPSCoR, Federal, $21,670,000, 2008-2013

Varol, Yaakov L (Co-Principal), Bryant, Bobby D (Principal). "Web*DECIDE", Sponsored by Department of Homeland Security, Federal, $790,000, 2008-2010.

Varol, Yaakov L (Principal). "Game Engineering Program Development", Sponsored by IGT, International Game Technology, Private, $500,000, 2006-2009.

Recent Collaborators & Other Affiliations

Collaborators

G. Bebis, F. Harris, C. Looney, S. Louis, Z. Sun, T. Batchman, S. Dascalu (UNR), V. Grubisic (DRI), S. Tragoudas (SIUC).

Other Professional Affiliations

ABET/CAC Program Evaluator.

Thesis Advisor

John Rowland, Professor Emeritus, University of Wyoming.

Thesis Advisees

D. Rotem, Ph.D., 1978, Lawrence Berkeley National Laboratories. R. Pamula, Ph.D., 1989, California State University, Los Angeles

Total number of graduate students advised: over 40

SUMMARY **Year 1**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Reno		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Sergiu Dascalu	AWARD NO.		

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			Funds Requested By	Funds Granted by NSF
	CAL	ACAD	SUMR	Proposer	(If Different)
1. Sergiu Dascalu Salary: $ -			2	$ 26,667	
2. Franco Biondi Salary: $ -			1	$ 10,283	
3. Janet Usinger Salary: $ -	1.5			$ 16,253	
4. Mehdi Etazadi Salary: $ -		0.5	1	$ 22,937	
5. Graham Kent Salary: $ -			1	$ 16,251	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ 288,869	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	1.5	0.5	5	$ 381,260	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 46,350	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ 56,375	
3. (3) GRADUATE STUDENTS				$ 178,000	
4. ( ) UNDERGRADUATE STUDENTS				$ 5,800	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ 3,450	
6. ( ) OTHER				$ 7,159	
TOTAL SALARIES AND WAGES (A+B)				$ 678,394	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 141,152	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 819,546	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
CI- Data Storage, Compute Nodes, and Interconnect $ 295,000					
WE-Lignostation Densitometer $ 120,000					
E-Phasor Measurement Units and Associated Devices $ 100,000					
E- Megger's PA9-Plus Monitoring Systems $ 20,000					
71312					
TOTAL EQUIPMENT				$ 606,312	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 55,625	
2. FOREIGN				$ 5,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 42300					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 42,300	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 60,696	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 7,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ 10,000	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 77,696	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 1,606,479	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 41% Base = $957,867					
TOTAL INDIRECT COSTS (F&A)				$ 392,725	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 1,999,204	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 1,999,204	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Sergiu Dascalu	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 2**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Reno		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Sergiu Dascalu	AWARD NO.		

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			Funds Requested By	Funds Granted by NSF
	CAL	ACAD	SUMR	Proposer	(If Different)
1. Sergiu Dascalu Salary: $ -			2	$ 27,200	
2. Franco Biondi Salary: $ -			1.5	$ 15,887	
3. Janet Usinger Salary: $ -	1.5			$ 16,253	
4. Mehdi Etazadi Salary: $ -		0.5	1	$ 22,937	
5. Graham Kent Salary: $ -			1	$ 16,739	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ 299,673	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	1.5	0.5	5.5	$ 398,689	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 47,741	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ 57,275	
3. (3.5) GRADUATE STUDENTS				$ 198,040	
4. ( ) UNDERGRADUATE STUDENTS				$ 11,800	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ 3,554	
6. ( ) OTHER				$ 82,374	
TOTAL SALARIES AND WAGES (A+B)				$ 799,473	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 157,904	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 957,377	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
CI-Data Storage, Compute Nodes, and Interconnect $ 315,000					
WE-Transect Sensors 60000					
69114					
TOTAL EQUIPMENT				$ 444,114	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 58,232	
2. FOREIGN				$ 5,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 42300					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 42,300	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 39,446	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 4,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ 10,000	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 53,446	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 1,560,469	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 41% Base = $1,074,055					
TOTAL INDIRECT COSTS (F&A)				$ 440,363	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 2,000,832	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 2,000,832	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Sergiu Dascalu	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 3**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Reno		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Sergiu Dascalu	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Sergiu Dascalu Salary: $ -			2	$ 27,744	
2. Franco Biondi Salary: $ -			1.5	$ 16,363	
3. Janet Usinger Salary: $ -	1.5			$ 16,253	
4. Mehdi Etazadi Salary: $ -		0.5	1	$ 22,937	
5. Graham Kent Salary: $ -			1	$ 17,241	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ 416,132	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	1.5	0.5	5.5	$ 516,670	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 49,173	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ 74,116	
3. (3.5) GRADUATE STUDENTS				$ 200,661	
4. ( ) UNDERGRADUATE STUDENTS				$ 11,980	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ 3,661	
6. ( ) OTHER				$ 82,595	
TOTAL SALARIES AND WAGES (A+B)				$ 938,856	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 204,338	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 1,143,194	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000) 65101					
TOTAL EQUIPMENT				$ 65,101	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 59,432	
2. FOREIGN				$ 5,000	
F. PARTICIPANT SUPPORT COSTS 1. STIPENDS 2. TRAVEL 3. SUBSISTENCE 4. OTHER Tuition 42300					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 42,300	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 51,296	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 7,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ 10,000	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ 70,000	
TOTAL OTHER DIRECT COSTS				$ 138,296	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 1,453,323	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 41% Base = $1,345,922					
TOTAL INDIRECT COSTS (F&A)				$ 551,828	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 2,005,151	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 2,005,151	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $

PI/PD TYPED NAME & SIGNATURE* Sergiu Dascalu	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 4**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Reno		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Sergiu Dascalu	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Sergiu Dascalu Salary: $ -			2	$ 28,299	
2. Franco Biondi Salary: $ -			1.5	$ 16,363	
3. Janet Usinger Salary: $ -	1.5			$ 16,253	
4. Mehdi Etazadi Salary: $ -		0.5	1	$ 22,937	
5. Graham Kent Salary: $ -			1	$ 17,241	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ 423,046	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	1.5	0.5	5.5	$ 524,139	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 49,173	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ 74,116	
3. (3) GRADUATE STUDENTS				$ 202,783	
4. ( ) UNDERGRADUATE STUDENTS				$ 11,980	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ 3,661	
6. ( ) OTHER				$ 82,595	
TOTAL SALARIES AND WAGES (A+B)				$ 948,447	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 205,563	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 1,154,010	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000) 65101					
TOTAL EQUIPMENT				$ 65,101	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 59,432	
2. FOREIGN				$ 5,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 42300					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 42,300	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 40,346	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 7,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ 10,000	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ 60,000	
TOTAL OTHER DIRECT COSTS				$ 117,346	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 1,443,189	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 41% Base = $1,335,788					
TOTAL INDIRECT COSTS (F&A)				$ 547,673	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 1,990,862	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 1,990,862	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Sergiu Dascalu	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 5**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Reno		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Sergiu Dascalu	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Sergiu Dascalu Salary: $ -			2	$ 28,865	
2. Franco Biondi Salary: $ -			1.5	$ 16,363	
3. Janet Usinger Salary: $ -	1.5			$ 16,253	
4. Mehdi Etazadi Salary: $ -		0.5	1	$ 22,937	
5. Graham Kent Salary: $ -			1	$ 17,241	
6. (X) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ 430,099	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	1.5	0.5	5.5	$ 531,758	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (X) POST DOCTORAL ASSOCIATES Salary: $ -				$ 49,173	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ 74,116	
3. (X) GRADUATE STUDENTS				$ 204,948	
4. ( ) UNDERGRADUATE STUDENTS				$ 11,980	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ 3,661	
6. ( ) OTHER				$ 82,595	
TOTAL SALARIES AND WAGES (A+B)				$ 958,231	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 206,813	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 1,165,044	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000) 65101					
TOTAL EQUIPMENT				$ 65,101	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 59,432	
2. FOREIGN				$ 5,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 42300					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 42,300	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 40,346	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 7,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ 10,000	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ 50,000	
TOTAL OTHER DIRECT COSTS				$ 107,346	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 1,444,223	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 41% Base = $1,336,822					
TOTAL INDIRECT COSTS (F&A)				$ 548,097	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 1,992,320	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 1,992,320	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Sergiu Dascalu	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY

PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Reno		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Sergiu Dascalu	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Sergiu Dascalu				$138,775	
2. Franco Biondi				$75,259	
3. Janet Usinger	7.5			$81,265	
4. Mehdi Etazadi				$114,685	
5. Graham Kent				$84,713	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$1,857,819	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	7.5			$2,352,516	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES				$241,610	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$335,998	
3. (3.5) GRADUATE STUDENTS				$984,432	
4. ( ) UNDERGRADUATE STUDENTS				$53,540	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$17,987	
6. ( ) OTHER				$337,318	
TOTAL SALARIES AND WAGES (A+B)				$4,323,401	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$915,770	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$5,239,171	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT				$1,245,729	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$292,153	
2. FOREIGN				$25,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS #REF!					
2. TRAVEL #REF!					
3. SUBSISTENCE #REF!					
4. OTHER #REF!					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$211,500	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$232,130	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$32,000	
3. CONSULTANT SERVICES					
4. COMPUTER SERVICES				$50,000	
5. SUBAWARDS					
6. OTHER				$180,000	
TOTAL OTHER DIRECT COSTS				$494,130	
H. TOTAL DIRECT COSTS (A THROUGH G)				$7,507,683	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 41 Base = $6,050,454					
TOTAL INDIRECT COSTS (F&A)				$2,480,686	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$9,988,369	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$9,988,369	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Sergiu Dascalu	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

UNR BUDGET JUSTIFICATION

CYBER INFRASTRUCTURE COMPONENT

Salaries:

- **Sergiu Dascalu** requests 2.0 months salary support per year for five years as the PI. He will be responsible for project management and integration and research.
- Support is requested for Frederick C Harris, Jr for 1 month per year for 5 years.
- Research Team members request support for (1 month each for years 1 and 2 and 0.5 months support for years 3, 4, and 5) Sushil Louis, Yaakov Varol, Memet Gunes, and Bobby Bryant
- Assistant Professor in Intelligent Data Mining – This position will be hired in year 3. Support is requested for 3 years (years 3,4, and 5) for 9 months per year of academic salary and 1 month per summer each year.
- Database Manager and Systems Administrator [Michael McMahon] – support is requested for 12 months per year for 5 years – Year 1 Base $82,000
- Database Designer and Software Developer [Eric Fritzinger] – support is requested for 12 months per year for 5 years. – Year 1 Base $77,000
- Support is requested for Graduate Research assistants – 12 months per year for 5 years (50% academic and 100% summer support) – 4 RAs per year. - $1700 per month (for academic months)
- Note: 2% inflation and merit each year.
- *Depending on the success of other NSF proposals, if awarded, this project may result in Drs. Dascalu's, Harris's, and Bryant's total commitment for all NSF supported projects exceeding the two-month limitation for Senior Personnel. The proposed level of commitment for the proposal is appropriate to the scope of work and is required in order to fulfill the objectives of this project within the proposed timeframe.*

Equipment: We request support for Data Storage, Compute nodes, and Interconnect equipment. Year 1 and 2 $300,000 each.

Travel: Trips to conferences to present research work. One trip per team member is requested at 1200 each trip (covering transportation, lodging, and per-diem).

Tuition: Tuition for RA positions $260 per credit plus $100 per credit differential tuition [CoE]. 9 credits per semester.

Startup Package: A startup package for the Assistant Professor in Intelligent Data Mining is requested. $70,000 in year 3, and $60,000 in year 4 and $50,000 in year 5.

Materials and Supplies: We are requesting $800 per team member per year to cover conference registration fees as well lab supplies and repairs for computers (hard drives, monitors,…). Year 1 we are also requesting $2000 per team member for new computers.

Other Direct Costs:

- $10,000 per year for software licenses.
- Nevada Seismological Laboratory Networking - approximately $140,500 per year to cover salary for 2 faculty, technician salary, networking equipment, and travel [This makes about $200,000 per year for the NSL CI/Communications subgroup].

EDUCATION AND OUTREACH COMPONENT

Salaries:

- **Janet Usinger** requests 1.5 months salary support per year for five years.
- **Donica Mensing** requests 1.5 months salary support per year for five years
- Support is requested for 2 Graduate Research assistants – 12 months per year for 5 years $18,000 per year each

Equipment:

Travel: Trips to conferences to present research work. $12,000 per year

Tuition: Tuition for RA positions $260 per credit, 9 credits per semester.

Materials and Supplies: We are requesting $10,226 per year

Publication Costs: We are requesting $4,000 per year.

WATER AND ENVIRONMENT COMPONENT

Salaries:

- **Franco Biondi** and **Scott Mensing** will lead the compilation of instrumental and proxy data, supervise both the postdoctoral researcher and the PhD student, maintain close ties with the NSF-EPSCoR transect network research groups, and interface with other senior scientists. They request 1 month year 1 and 1.5 months salary support per year for years 2,3,4, and 5.
- **Scotty Strachan** will be the Transect Manager and will (a) supervise operations, maintenance, data communications, and personnel assisting him, and (b) test, deploy, and maintain electronic sensors as well as field and laboratory equipment, and (c) help the senior investigators, post-doctoral fellow and graduate students in their activities.
- **Postdoctoral Research Associate (TBD)** will be selected among a pool of applicants gathered after publicly announcing the availability of the posts. We ask for 12 months of funding per year to support the postdoctoral researcher.
- **PhD Student (TBD)** will be selected among a pool of applicants gathered after publicly announcing the availability of the posts.
- **Undergraduate Student (TBD)**

Equipment:

- Major equipment for $120,000 to purchase the "Lignostation" densitometer for state-of-the-art precision measurement of wood density. It should be emphasized that wood density measurements performed with the "Lignostation" system are critical to distinguish variation in early season and late season growth, a key distinction if we are to better understand the controls of tree growth and influence of snow cover in Nevada mountain ecosystems. Additional equipment is requested for the instrumented transects to maintain and expand the instrumental network

Travel:

- Rates for airfare, per diem, and auto rental have been based upon experience with similar type projects as well as the Federal Travel Regulations. Travel support is requested for field work and for project personnel to attend one-two national and international meetings per year.

Materials and Supplies:

- We are requesting $11,850 (yr 1), $14,600 (yr 2), 25,600 (yr 3), $14,700 (yrs 4 and 5)

Publication Costs:

- We are requesting $3,000 per year. (except year 2)

ENERGY COMPONENT

Salaries:

- Mehdi Etezadi-Amoli and Andy Trzynadlowski are requesting 0.5 academic months and 1 summer month each per year for 5 years.
- Because of the state budget shortages, no salary raises in the consecutive years have been assumed.
- Funding for 2 RAs per year is requested at $20,000 per RA
- Funding for 2 Undergraduate students is requested at $10 per hour 290 hr/yr.
- Starting in Year 2, an experienced engineer will be hired on the letter-of-appointment (LOA) basis to run the day-to-day activities of the Energy group. Estimated salary: $75,000/yr.
- *Depending on the success of other NSF proposals, if awarded, this project may result in Drs. Etezadi-Amoli's and Trzynadlowski's total commitment for all NSF supported projects exceeding the two-month limitation for Senior Personnel. The proposed level of commitment for the proposal is appropriate to the scope of work and is required in order to fulfill the objectives of this project within the proposed timeframe.*

Equipment:

- We request support for Phasor Measurement Units and Associated Devices ($100,000 in year 1)
- We request support for Megger's PA9-Plus Monitoring Systems ($20,000 in year 1)

Travel:

- Yearly travels of two participant to scientific conferences are envisioned.

Tuition: Tuition for RA positions $260 per credit plus $100 per credit differential tuition [CoE]. 9 credits per semester.

Fringe Benefits:

- Faculty and Postdocs academic month fringe rate is 27%,
- Faculty summer salary fringe rate is 4%,
- LOA's fringe rate is 10%
- Graduate Assistants fringe rate is 15%, and
- Undergraduates fringe rate is 2%

Facilities and Administrative Costs:

UNR's indirect cost rate is 41% for on campus research. This rate is effective July 1, 2009 through June 30, 2012 as approved by the Department of Health and Human Services.

SUMMARY **Year 1**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
Desert Research Institute		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Nick Lancaster, Lynn Fenstermaker	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Nick Lancaster Salary: $ -	2			$ 24,398	
2. Lynn Fenstermaker Salary: $ -	2			$ 19,268	
3. Jay Arnone Salary: $ -	2			$ 22,164	
4. Guoping Tang Salary: $ -	3			$ 19,950	
5. Salary: $ -				$ -	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	2			$ 12,996	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	11			$ 98,776	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 48,000	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3) GRADUATE STUDENTS				$ 75,000	
4. ( ) UNDERGRADUATE STUDENTS				$ -	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 221,776	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 77,041	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 298,817	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT				$ 43,472	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 47,200	
2. FOREIGN				$ -	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ -	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 4,001	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ -	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 4,001	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 393,490	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 59% Base = $350,018					
TOTAL INDIRECT COSTS (F&A)				$ 206,511	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 600,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 600,000	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Nick Lancaster, Lynn Fenstermaker	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

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SUMMARY **Year 2**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
Desert Research Institute		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Nick Lancaster, Lynn Fenstermaker	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Nick Lancaster Salary: $ -	2			$ 25,618	
2. Lynn Fenstermaker Salary: $ -	2			$ 20,231	
3. Jay Arnone Salary: $ -	2			$ 23,272	
4. Guoping Tang Salary: $ -	3			$ 20,948	
5. Salary: $ -				$ -	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	2			$ 13,646	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	11			$ 103,715	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 50,400	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3.5) GRADUATE STUDENTS				$ 88,500	
4. ( ) UNDERGRADUATE STUDENTS				$ -	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 242,615	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 82,853	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 325,468	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT				$ 30,000	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 28,960	
2. FOREIGN				$ -	
F. PARTICIPANT SUPPORT COSTS 1. STIPENDS 2. TRAVEL 3. SUBSISTENCE 4. OTHER					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ -	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 4,062	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ -	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 4,062	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 388,490	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 59% Base = $358,490					
TOTAL INDIRECT COSTS (F&A)				$ 211,509	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 600,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 600,000	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Nick Lancaster, Lynn Fenstermaker	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 3**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
Desert Research Institute		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Nick Lancaster, Lynn Fenstermaker	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Nick Lancaster Salary: $ -	2			$ 26,838	
2. Lynn Fenstermaker Salary: $ -	2.5			$ 26,494	
3. Jay Arnone Salary: $ -	2			$ 24,380	
4. Guoping Tang Salary: $ -	3			$ 21,945	
5. Salary: $ -				$ -	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	2			$ 14,296	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	11.5			$ 113,953	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 52,920	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3.5) GRADUATE STUDENTS				$ 88,500	
4. ( ) UNDERGRADUATE STUDENTS				$ -	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 255,373	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 88,375	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 343,748	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 28,960	
2. FOREIGN				$ -	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ -	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 4,650	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ -	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 4,650	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 377,358	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 59% Base = $377,358					
TOTAL INDIRECT COSTS (F&A)				$ 222,641	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 600,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 600,000	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Nick Lancaster, Lynn Fenstermaker	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 4**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
Desert Research Institute		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Nick Lancaster, Lynn Fenstermaker	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Nick Lancaster Salary: $ -	2			$ 28,058	
2. Lynn Fenstermaker Salary: $ -	2.5			$ 27,698	
3. Jay Arnone Salary: $ -	2			$ 25,489	
4. Guoping Tang Salary: $ -	3			$ 22,943	
5. Salary: $ -				$ -	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	2.5			$ 18,682	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	12			$ 122,870	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 55,566	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3) GRADUATE STUDENTS				$ 75,000	
4. ( ) UNDERGRADUATE STUDENTS				$ -	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 253,436	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 90,636	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 344,072	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 28,960	
2. FOREIGN				$ -	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ -	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 4,326	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ -	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 4,326	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 377,358	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 59% Base = $377,358					
TOTAL INDIRECT COSTS (F&A)				$ 222,641	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 600,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 600,000	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Nick Lancaster, Lynn Fenstermaker	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Year 5**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
Desert Research Institute		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Nick Lancaster, Lynn Fenstermaker	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Nick Lancaster Salary: $ -	2			$ 29,278	
2. Lynn Fenstermaker Salary: $ -	2			$ 23,122	
3. Jay Arnone Salary: $ -	2			$ 26,597	
4. Guoping Tang Salary: $ -	3			$ 23,940	
5. Salary: $ -				$ -	
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	2			$ 15,595	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	11			$ 118,532	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ 58,344	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3) GRADUATE STUDENTS				$ 75,000	
4. ( ) UNDERGRADUATE STUDENTS				$ -	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 251,876	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 89,708	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 341,584	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 28,960	
2. FOREIGN				$ -	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ -	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 3,150	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 3,665	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER				$ -	
TOTAL OTHER DIRECT COSTS				$ 6,815	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 377,359	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 59% Base = $377,359					
TOTAL INDIRECT COSTS (F&A)				$ 222,642	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 600,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 600,000	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Nick Lancaster, Lynn Fenstermaker	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY **Cumulative**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
Desert Research Institute		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Nick Lancaster, Lynn Fenstermaker	AWARD NO.		

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			Funds Requested By	Funds Granted by NSF
	CAL	ACAD	SUMR	Proposer	(If Different)
1. Nick Lancaster	10			$134,190	
2. Lynn Fenstermaker	11			$116,813	
3. Jay Arnone	10			$121,902	
4. Guoping Tang	15			$109,726	
5.					
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	10.5			$75,215	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)	56.5			$557,846	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES				$265,230	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)					
3. (3.5) GRADUATE STUDENTS				$402,000	
4. ( ) UNDERGRADUATE STUDENTS					
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					
6. ( ) OTHER					
TOTAL SALARIES AND WAGES (A+B)				$1,225,076	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$428,613	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$1,653,689	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT				$73,472	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$163,040	
2. FOREIGN					
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS #REF!					
2. TRAVEL #REF!					
3. SUBSISTENCE #REF!					
4. OTHER #REF!					
( ) TOTAL PARTICIPANT SUPPORT COSTS					
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$20,189	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$3,665	
3. CONSULTANT SERVICES					
4. COMPUTER SERVICES					
5. SUBAWARDS					
6. OTHER					
TOTAL OTHER DIRECT COSTS				$23,854	
H. TOTAL DIRECT COSTS (A THROUGH G)				$1,914,055	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC Base = $1,840,583					
TOTAL INDIRECT COSTS (F&A)				$1,085,944	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$3,000,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$3,000,000	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Nick Lancaster, Lynn Fenstermaker	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

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DRI BUDGET JUSTIFICATION

Salaries and Fringe Benefits
The Desert Research Institute (DRI) is a nonprofit research institution of higher education (as opposed to a degree granting entity). As such, DRI faculty salaries are funded solely from grants and contracts with no ability to obtain tenure. We have been informed by an NSF senior policy specialist that soft money institutions, such as DRI, are exempt from the new guidance (Chapter II – Section C.2g(i), Salaries and Wages in the October 2008 NSF Proposal and Award Policies and Procedures Guide) which limits salary support.

Nick Lancaster requests 2.0 months salary support per year for five years as the environment component PI. He will be responsible for DRI project management and integration. He will also participate in the research effort to assess changes in environmental parameters with time and to detect any significant trends that may occur.

Jay Arnone requests 2.0 months salary support per year for five years to provide graduate student training, supervision and analysis of transpiration measurements (using sap flow) and understory plant community ET (using static chamber), quantifying plant source water using 18O stable isotopes, assist with isotopic tracking of upslope water to basins, and assist with reporting and publication of peer review articles. . He also will work closely with Tang on the LPJ-GUESS and RHESSys modeling research.

Lynn Fenstermaker requests 2.0 or 2.5 months salary support per year for five years to coordinate the water component activities and oversee acquisition and analysis of satellite remote sensing data and images for all transect sites and regions that will be used in LPJ-GUESS and RHESSys modeling. She will also assist with monitoring of phenology, LAI, the National Vegetation Classification System plots, will work closely with Tang on the modeling effort and will participate in the preparation of reports and peer review journal publications.

Guoping Tang requests 3.0 months salary support per year for five years to parameterize LPJ-GUESS and RHESSys models for the Great Basin Desert and then perform modeling runs to evaluate the performance of these models and make predictions about hydrologic and environmental response based on measured climate variability and projected regional climate, renewable energy and other human change. He will work with the team to document results in peer review publications.

Richard Jasoni requests 2.0 or 2.5 months salary support per year for five years to supervise quantification of ET of phreatophytic (northern transect) and nonphreatophytic (southern transect) basin ecosystems (particularly eddy covariance), surface runoff and streamflow, canopy interception, and assist with understory ET measurements, measurement of woody plant sap flow and plant canopy phenology, LAI, and understory communities.

Support (12.0 months/year for five years) is requested for one **Postdoctoral Fellow** (to be hired) who has relevant experience in modeling renewable energy/population growth water needs and potential future feedbacks.

Support is request for **two M.S. Graduate Research Assistants** (12.0 months/year for five years; to be hired) and **one Ph.D Graduate Research Assistant** (12.0 months/year for five years; to be hired) and **one/half of a Ph.D. Graduate Research Assistant** each year in years 2 and 3.

Salary rates are listed at the Jan 1, 2012 rate. The outyears include a 5% cost of living and merit. DRI's fringe benefits are calculated annually based on the fringe benefits record from the prior year. The rates

are subject to Department of Health and Human Services (DHHS) audit. The rates effective July 1, 2010 are 44.9% for professional employees, 36.7% for PostDocs,
55.8% for Technologists, 20.1% for graduate students, and 2.8% for undergraduate students. Fringe benefits for professional and technical employees include retirement, health insurance, Medicare, Workman's Compensation Insurance, unemployment taxes, and accruals for sick and annual leave.

Equipment
We request support for sapflow, soil moisture and precipitation sensors to assess variability within vegetation zones for a total of $43,472 in year 1 and $30,000 in year 2.

Travel
Field visits: We request funds to allow 5 people to make 8 trips in year one and 5 trips in the subsequent 4 years to the NevCAN monitoring station sites and adjacent areas. We are therefore requesting $47,200 in year 1 and $28,960 per year in the remaining 4 years.

Materials and Supplies
We are requesting approximately $4000 in years 1 and 2, and approximately $4500 per year in years 3-5 to cover the cost of field and laboratory supplies. We also request $3679 in year 5 for publication costs.

Facilities and Administrative Costs
DRI's indirect cost rate is 59% for federal agencies that do not allow independent research and development (NSF). This rate is effective July 1, 2010 through June 30, 2013 as approved by the Department of Health and Human Services. The indirect costs are based on salaries, benefits, expenses, and equipment used for Institute operations and maintenance of offices, laboratories and buildings; providing administrative support for grant and contract activities, human resources, accounting, budgeting and regulatory compliance as stated in OMB Circular A122.

SUMMARY **Year 1**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Las Vegas		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Shahram Latifi	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Shahram Latifi Salary: $ -			1.5	$ 22,231	
2. Yahia Baghzouz Salary: $ -			1	$ 14,534	
3. Haroon Stephen Salary: $ -			1.5	$ 12,875	
4. Salary: $ -					
5. Salary: $ -					
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ -	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)			4	$ 49,640	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ -	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3) GRADUATE STUDENTS				$ 122,000	
4. ( ) UNDERGRADUATE STUDENTS				$ 30,000	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 201,640	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 9,160	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 210,800	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000) Power Recorder and accessories $ 18,000 Sensor Development $ 30,000					
TOTAL EQUIPMENT				$ 48,000	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 8,500	
2. FOREIGN				$ 2,000	
F. PARTICIPANT SUPPORT COSTS 1. STIPENDS 2. TRAVEL 3. SUBSISTENCE 4. OTHER Tuition 12100					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 12,100	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 4,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 1,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER Vehicle Renting for field testing				$ 1,500	
TOTAL OTHER DIRECT COSTS				$ 7,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 288,400	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 48% Base = $228,300					
TOTAL INDIRECT COSTS (F&A)				$ 109,584	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 397,984	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 397,984	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Shahram Latifi	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

SUMMARY **Year 2**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Las Vegas		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Shahram Latifi	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Shahram Latifi Salary: $ -			1.5	$ 22,231	
2. Yahia Baghzouz Salary: $ -			1.5	$ 22,456	
3. Haroon Stephen Salary: $ -			1.5	$ 13,261	
4. Salary: $ -					
5. Salary: $ -					
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ -	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)			4.5	$ 57,948	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ -	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3.5) GRADUATE STUDENTS				$ 138,440	
4. ( ) UNDERGRADUATE STUDENTS				$ 24,000	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 220,388	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 10,582	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 230,970	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000) Sensor Development 10000					
TOTAL EQUIPMENT				$ 10,000	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 11,500	
2. FOREIGN				$ 2,000	
F. PARTICIPANT SUPPORT COSTS 1. STIPENDS 2. TRAVEL 3. SUBSISTENCE 4. OTHER Tuition 12100					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 12,100	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 4,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 1,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER Vehicle Rental for fieldwork (80 days $50 per day)				$ 4,000	
TOTAL OTHER DIRECT COSTS				$ 9,500	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 276,070	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 41% Base = $253,970					
TOTAL INDIRECT COSTS (F&A)				$ 104,128	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 380,198	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 380,198	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Shahram Latifi	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

SUMMARY **Year 3**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Las Vegas		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Shahram Latifi	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Shahram Latifi Salary: $ -			1.5	$ 22,231	
2. Yahia Baghzouz Salary: $ -			1.5	$ 23,129	
3. Haroon Stephen Salary: $ -			1.5	$ 13,659	
4. Salary: $ -					
5. Salary: $ -					
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ -	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)			4.5	$ 59,019	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ -	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3.5) GRADUATE STUDENTS				$ 154,923	
4. ( ) UNDERGRADUATE STUDENTS				$ 16,000	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 229,942	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 10,818	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 240,760	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 10,000	
2. FOREIGN				$ 2,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 12100					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 12,100	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 3,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 1,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER Vehicle Rental for fieldwork (80 days $50 per day)				$ 4,000	
TOTAL OTHER DIRECT COSTS				$ 8,500	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 273,360	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 41% Base = $261,260					
TOTAL INDIRECT COSTS (F&A)				$ 107,117	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 380,477	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 380,477	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Shahram Latifi	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

SUMMARY **Year 4**

PROPOSAL BUDGET **FOR NSF USE ONLY**

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Las Vegas		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Shahram Latifi	AWARD NO.		

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			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Shahram Latifi Salary: $ -			1.5	$ 22,231	
2. Yahia Baghzouz Salary: $ -			1.5	$ 23,129	
3. Haroon Stephen Salary: $ -			1.5	$ 13,659	
4. Salary: $ -					
5. Salary: $ -					
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ -	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)			4.5	$ 59,019	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES Salary: $ -				$ -	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (3) GRADUATE STUDENTS				$ 154,923	
4. ( ) UNDERGRADUATE STUDENTS				$ 16,000	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 229,942	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 10,818	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 240,760	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 11,500	
2. FOREIGN				$ 2,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 12100					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 12,100	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 3,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 1,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER Vehicle Rental for fieldwork (50 days $50 per day)				$ 2,500	
TOTAL OTHER DIRECT COSTS				$ 7,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 273,360	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
off campus % of MTDC Base =					
on campus % of MTDC 41% Base = $261,260					
TOTAL INDIRECT COSTS (F&A)				$ 107,117	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 380,477	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 380,477	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Shahram Latifi	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

SUMMARY **Year 5**

PROPOSAL BUDGET

FOR NSF USE ONLY

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS) PROPOSED	GRANTED
University of Nevada, Las Vegas			
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Shahram Latifi	AWARD NO.		

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. Shahram Latifi Salary: $ -			1.5	$ 22,231	
2. Yahia Baghzouz Salary: $ -			1.5	$ 23,129	
3. Haroon Stephen Salary: $ -			1.5	$ 13,659	
4. Salary: $ -					
5. Salary: $ -					
6. (X) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				$ -	
7. ( ) TOTAL SENIOR PERSONNEL (1-6)			4.5	$ 59,019	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (X) POST DOCTORAL ASSOCIATES Salary: $ -				$ -	
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				$ -	
3. (X) GRADUATE STUDENTS				$ 154,923	
4. ( ) UNDERGRADUATE STUDENTS				$ 16,000	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				$ -	
6. ( ) OTHER				$ -	
TOTAL SALARIES AND WAGES (A+B)				$ 229,942	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$ 10,818	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$ 240,760	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$ 10,000	
2. FOREIGN				$ 2,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER Tuition 12100					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$ 12,100	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$ 3,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$ 2,000	
3. CONSULTANT SERVICES				$ -	
4. COMPUTER SERVICES				$ -	
5. SUBAWARDS Number of subawardees:				$ -	
6. OTHER Vehicle Rental for fieldwork (50 days $50 per day)				$ 2,500	
TOTAL OTHER DIRECT COSTS				$ 8,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				$ 272,860	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 41% Base = $260,760					
TOTAL INDIRECT COSTS (F&A)				$ 106,912	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$ 379,772	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 379,772	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $			
PI/PD TYPED NAME & SIGNATURE* Shahram Latifi	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

SUMMARY

PROPOSAL BUDGET

Cumulative

FOR NSF USE ONLY

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)	
University of Nevada, Las Vegas		PROPOSED	GRANTED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Shahram Latifi	AWARD NO.		

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			Funds Requested By	Funds Granted by NSF
	CAL	ACAD	SUMR	Proposer	(If Different)
1. Shahram Latifi				$111,155	
2. Yahia Baghzouz				$106,377	
3. Haroon Stephen				$67,113	
4.					
5.					
6. (1) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)					
7. ( ) TOTAL SENIOR PERSONNEL (1-6)				$284,645	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES					
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)					
3. (3.5) GRADUATE STUDENTS				$725,209	
4. ( ) UNDERGRADUATE STUDENTS				$102,000	
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					
6. ( ) OTHER					
TOTAL SALARIES AND WAGES (A+B)				$1,111,854	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$52,196	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$1,164,050	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000)					
TOTAL EQUIPMENT				$58,000	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				$51,500	
2. FOREIGN				$10,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS #REF!					
2. TRAVEL #REF!					
3. SUBSISTENCE #REF!					
4. OTHER #REF!					
( ) TOTAL PARTICIPANT SUPPORT COSTS				$60,500	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				$19,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				$6,000	
3. CONSULTANT SERVICES					
4. COMPUTER SERVICES					
5. SUBAWARDS					
6. OTHER				$14,500	
TOTAL OTHER DIRECT COSTS				$40,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				$1,384,050	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE) off campus % of MTDC Base = on campus % of MTDC 41 Base = $1,265,550					
TOTAL INDIRECT COSTS (F&A)				$534,858	
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)				$1,918,908	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$1,918,908	

M. COST-SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT $

PI/PD TYPED NAME & SIGNATURE* Shahram Latifi	DATE	**FOR NSF USE ONLY** INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF FORM 1030

UNLV BUDGET JUSTIFICATION

CYBER INFRASTRUCTURE COMPONENT

Salaries:

- **Shahram Latifi** Dr. Latifi is a Co-PI and the person responsible for the project at the UNLV campus. Even though, he will supervise the project all year round, support is requested only for one and a half months (1.5) of Summer each year. No cost of living adjustment is included for subsequent year.
- **Graduate Students** Support is requested for two PhD students who will participate in all phases of the project. These students who should have background in software design and communications & networking. They will help with automation of data management and collection and transferring of scientific data to the appropriate modules.
- **Undergraduate Students** Support is requested for an undergraduate student (Junior/Senior) to help with surveys, scientific searches, and collection of articles.

Equipment:

- No Equipment is requested. Existing equipment in the PI's lab (7 state of the art computers with visual studio software) will be used for this project.

Travel:

- We are requesting funds to cover 4 professional conferences per year- one international and the others national.

Tuition:

- Tuition is considered part of a graduate assistant's overall compensation package. We have calculated these costs based on 9 credits per semester for each of Fall and Spring and 3 credits in Summer + semester fees. Our current rates are Spring 12 (222); Summer 12 (244); Fall 12 – end of project estimates a 5% increase per year.

Materials and Supplies:

- We are requesting $2000 per year to cover conference lab supplies and repairs for computers (hard drives, monitors).

WATER AND ENVIRONMENT COMPONENT

Salaries:

- **Haroon Stephen** will manage and develop the project and is requesting 1.5 summer months per year. This time will be spent in equipment acquisition, graduate student mentoring, undergraduate student supervising, and field data recording system development. He will develop partnerships with the potential user and city planning community. He will also spend time in integrating the program into the city planning. He will also develop one research papers for publication and present preliminary results at conferences.
- Two PhD and one MS degree student will be engaged in this project. First Phd, second PhD, and MS students will be engaged during years 1-3, 2-4, and 4-5, respectively. Graduate activities will include development of field data recording system and model development for scientific research of energy-water-environment nexus. This would include, setting up the field data equipment, development of deployment strategy, and development of data archival and management system. They will also develop models to perform scientific research on the field data.

- **Undergraduate Student:** Undergraduate students will be engaged in supporting the activities of faculty and graduate students. They will be trained to perform several tasks that require repeat executions such as equipment calibration and testing. They will also support testing of the equipment in the field and field data recorder deployment.

Equipment:

- All the equipment will be purchased in the first two years. The equipment will include hardware and software for developing sensors. Low cost sensors will be developed using sensors, microprocessors, and data storage chips. The equipment to test and calibrate sensors will also be purchased.

Travel:

- Travel money will be used by faculty and graduate students to present research at conferences.

Other Direct Costs

- This includes materials and supplies and cost of publications. Moreover, vehicle rental cost is added for field equipment testing and field data collection

ENERGY COMPONENT

Salaries:

- Y. Baghzouz is requesting 1.5 summer months each per year for 5 years.
- Funding for 2 RAs per year. During the first year, the salary of each student is $1,500/month (for 12 months) and a yearly tuition fee of $6,000/student.

Equipment:

- An amount of $18,000 is allocated to purchase a power analyzer/recorder and its accessories including current and voltage probes. The instrument will be used thought the project to measure and record various powers and power quality events.

Travel:

- A budget of $2,000-$3,500 is needed to cover the cost of attending conferences (an average of two per year) and present technical papers.

Materials:

- $2,000 per year is requested to cover office and lab supplies (Xerox paper, printer ink, posters, etc…) for the faculty member and the two graduate students

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Fringe Benefits:

- UNLV charges the actual cost of benefits to sponsored projects; however, we use a benefit rate when estimating benefits for cost proposals. The appropriate current rates have been used as follows: Professional Staff @ 32% and Graduate Assistants @ 17%.

Facilities and Administrative Costs:

- UNLV F&A cost is calculated by predetermined rate as stipulated by DHHS Rate Agreement dated 05/01/08 (DHHS Audit Agency, San Francisco). The following rates are effective beginning 07/01/08: Research (on-campus)= 43.5% MTDC; Research/Instruction (off-campus) = 26% MTDC; Instruction (on-campus) = 56.5% MTDC; Other Sponsored Activities (on-campus) = 31.6% MTDC and Other Sponsored Activities (off-campus) 23.6%

OVERALL BUDGET ALLOCATION

The overall budget allocation for the project has been:

$3,000,000/year distributed as**: $2,000,000/year UNR**; **$600,000/year DRI** and **$400,000/year UNLV**

Total for the 5-year duration of the project is:

$15,000,000 total project distributed as: **$10,000,000 UNR**; **$3,000,000 DRI**; and **$2,000,000 UNLV**

The actual detailed budgets have resulted as:

$14,907,377 total project with **$9,988,369 UNR**; **$3,000,000 DRI**; and **$1,918,908 UNLV**

CURRENT AND PENDING SUPPORT

Current and Pending Support

Investigator: **Sergiu Dascalu**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2008 – 08/13/2013

Location of Project: Nevada, USA

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Large Scale Biologically Realistic Models of Brain Dynamics**

Source of Support: ONR

Total Award Amount: $ 827,000 Total Award Period Covered: 10/01/2009 – 09/30/2012

Location of Project: CSE Dept, UNR, USA

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.4 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Cyberinfrastructure Developments for the Western Consortium of ID, NV, and NM**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 554,000 Total Award Period Covered: 09/15/2009 – 08/31/2012

Location of Project: CSE Dept, UNR, USA

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

	Academic Year	Summer
Person-Months Per Calendar Year Committed to the Project:		2.0

Current and Pending Support

Investigator: **John "Jay" Arnone III**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **NSF EPSCoR Task 3 ECO**

Source of Support: NSHE

Total Award Amount: $ 209,990 Total Award Period Covered: 10/02/2009 - 08/31/2012

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project: 0.50 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Heterotrophic respiration as affected by dew and water vapor**

Source of Support: Bi-National Science Foundation

Total Award Amount: $ 75,670 Total Award Period Covered: 10/01/2011 - 09/30/2015

Location of Project: DRI and Israel

Person-Months Per Calendar Year Committed to the Project: 0.0 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Desert Terminal Lakes-Water Resources Evaluation Program**

Source of Support: DOI-Bureau of Reclamation

Total Award Amount: $ 3,300,000 Total Award Period Covered: 09/18/2009 - 12/31/2013

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support:	☒ Current	☐ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Walker Basin Project, Phase 2**

Source of Support: UNR

Total Award Amount: $ 1,706,317 Total Award Period Covered: 01/01/2010 - 12/31/2013

Location of Project: Walker Basin

Person-Months Per Calendar Year Committed to the Project:	2.25	2.0 Academic Year	Summer

Support:	☒ Current	☐ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Developing Thermal Conversion Options for Biorefinery Residues**

Source of Support: Gas Technology Institute (GTI)

Total Award Amount: $ 1,629,728 Total Award Period Covered: 09/01/2007 - 01/31/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	2.0	Academic Year	Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Assessing Climate Change-Associated Species Dynamics and Forest Management Strategies in the Lake Tahoe Basin**

Source of Support: USDA

Total Award Amount: $ 200,956 Total Award Period Covered: 09/01/2012 - 08/31/2014

Location of Project: Lake Tahoe

Person-Months Per Calendar Year Committed to the Project:	0.25	Academic Year	Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	2.0	Academic Year	Summer

Current and Pending Support

Investigator: **Yahia Baghzouz**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Performance Evaluation of Bifacial Photovoltaic Array**

Source of Support: NREL

Total Award Amount: $ 130k Total Award Period Covered: 11/30/2010 – 7/31/2012

Location of Project:

Person-Months Per Calendar Year Committed to the Project: 2.0 Academic Year 1.0 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **A Method to reduce Voltage Fluctuations in Distribution Feeders with High PV Penetration**

Source of Support: California Energy Commission

Total Award Amount: $ 85k Total Award Period Covered: 6/30/2012 - 5/31/2013

Location of Project:

Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year 1.0 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.5 Summer

Current and Pending Support

Investigator: **Franco Biondi**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **From intra-seasonal wood anatomy to remote sensing measurements for calibrating millennia-long regional climate reconstructions**

Source of Support: NSF

Total Award Amount: $ 515,837 Total Award Period Covered: 05/01/2012 – 04/30/2015

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.5 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **P2C2 Multi-century Streamflow Derived from Watershed Modeling and Tree-ring Data**

Source of Support: NSF

Total Award Amount: $ 291,801 Total Award Period Covered: 08/01/2008 – 07/31/2012

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.5 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **EPSCoR-TASK 3 of the Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 322,722 Total Award Period Covered: 08/01/2008 – 08/31/2013

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.5 Summer

Current and Pending Support

Investigator: **Bobby Bryant**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **CAREER: Inductive Agent Modeling**

Source of Support: NSF / ENG / EPAS
Total Award Amount: $ 512,365 Total Award Period Covered: 07/01/2012 – 06/30/2017
Location of Project: Nevada, USA
Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Collaborative Research: Large-Scale Modeling and Real-Time Simulation of Brain Dynamics and Interaction**

Source of Support: NSF
Total Award Amount: $ 622,986 Total Award Period Covered: 07/01/2012 – 06/30/2015
Location of Project: CSE Dept, UNR, USA
Person-Months Per Calendar Year Committed to the Project: Academic Year 0.5 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Co-evolving Competent Strategies for Training and Decision Support**

Source of Support: DOD-DON (DEPSCoR)
Total Award Amount: $ 620,709 Total Award Period Covered: 04/01/2011 – 3/31/2012
Location of Project: CSE Dept, UNR, USA
Person-Months Per Calendar Year Committed to the Project: Academic Year 0.5 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

	Academic Year	Summer
Person-Months Per Calendar Year Committed to the Project:		1.0

Current and Pending Support

Investigator: **Mehdi Etezadi-Amoli**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Development of a Workforce Training Certificate Program in Renewable Energy System**

Source of Support: NV Renewable Energy Center

Total Award Amount: $ 19,994 Total Award Period Covered: 10/01/2010 – 09/30/2011

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.34 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Smart Grid-Balancing Intermittent Renewable Generation with Controllable HVAC Load**

Source of Support: NV Renewable Energy Center

Total Award Amount: $ 163,500 Total Award Period Covered: 10/01/2010 – 09/30/2011

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: 0.54 Academic Year 0.78 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Smart Meter Testing**

Source of Support: NV Energy

Total Award Amount: $ 136,875 Total Award Period Covered: 07/26/2010 – 08/31/2011

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.52 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Sub-synchronous Resonance Study for Power Systems with Large Integration of Wind**

Source of Support: NSF

Total Award Amount: $ 216,969 Total Award Period Covered: 06/01/2012 – 05/31/2014

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project:	0.23 Academic Year	0.78 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.5 Summer

Current and Pending Support

Investigator: **Lynn Fenstermaker**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Assessing the Envelope of Interannual Variation in Vegetation**

Source of Support: NSF EPSCoR
Total Award Amount: $ 25,000 Total Award Period Covered: 07/31/2010 – 03/31/2012
Location of Project: DRI
Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Desert Terminal Lakes - Water Resources Evaluation Program**

Source of Support: DOI – Bureau of Reclamation
Total Award Amount: $ 3,300,000 Total Award Period Covered: 09/30/2009 – 12/31/2013
Location of Project: Nevada
Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Update Estimation of Annual Phreatophytic Evapotranspiration for White River, Spring and Snake Valleys**

Source of Support: Southern Nevada Water Authority
Total Award Amount: $ 95,000 Total Award Period Covered: 07/31/2010 – 02/28/2012
Location of Project: S. Nevada
Person-Months Per Calendar Year Committed to the Project: 3.30 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Co-evolution Planning Phase**

Source of Support: USDA – Forest Service

Total Award Amount: $ 300,000 Total Award Period Covered: 05/31/2010 – 09/30/2013

Location of Project: Southwestern U.S.

Person-Months Per Calendar Year Committed to the Project: 0.50

	Academic Year	Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 08/31/2008 – 08/31/2013

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 1.5

	Academic Year	Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Organization of a Climate Change Adaptation Workshop for NASA/DFRC**

Source of Support: NASA

Total Award Amount: $ 32,497 Total Award Period Covered: 07/31/2011 – 09/30/2011

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project: 0.5

	Academic Year	Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Hot Spring Micobial Spectra: Pilot Study with S. Cady, Portland State Univ.**

Source of Support:

Total Award Amount: $ 9,910 Total Award Period Covered: 06/30/2009 – 06/30/2012

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Abiotic and Microbial Mechanisms of Soil Carbon Flux and Storage in Arid Ecosystems**

Source of Support: DOE TES

Total Award Amount: $ 950,646 Total Award Period Covered: 03/31/2012 – 03/31/2015

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project: 2.0 Academic Year Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Strategies for Climate Change Adaptation at the Dryden Flight Research Center and within the Mojave Desert Region**

Source of Support: NASA-AMES Research Center

Total Award Amount: $ 347,179 Total Award Period Covered: 01/31/2012 – 12/31/2014

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.50 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Abiotic and Microbial Mechanisms of Soil Carbon Flux and Storage in Arid Ecosystems**

Source of Support: DOE TES

Total Award Amount: $ 587,378 Total Award Period Covered: 03/31/2012 – 03/31/2015

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer
	1.0		

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer
	2.0		

Current and Pending Support

Investigator: **Eric Fritzinger**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support:	☒ Current	☐ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2008 – 08/13/2013

Location of Project: Nevada, USA

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer
	12.0		

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer
	12.0		

Current and Pending Support

Investigator: **Mehmet H. Gunes**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Forensic and Investigative tools and technologies to investigate criminal use of Intrernet Anonymizers**

Source of Support: National Institute of Justice

Total Award Amount: $ 107,792 Total Award Period Covered: 01/01/2009 – 12/31/2011

Location of Project: Vere Software & University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Extension: Forensic and Investigative tools and technologies to investigate criminal use of Internet Anonymizers**

Source of Support: National Institute of Justice

Total Award Amount: $ 147,575 Total Award Period Covered: 01/01/2012 – 12/31/2012

Location of Project: Vere Software & University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.5 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Current and Pending Support

Investigator: **Frederick C Harris, Jr.**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2008 - 08/31/2013

Location of Project:

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.5 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Large Scale Biologically Realistic Models of Brain Dynamics**

Source of Support: ONR

Total Award Amount: $ 827,000 Total Award Period Covered: 10/01/2009 - 09/30/2012

Location of Project:

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Cyberinfrastructure Developments for the Western Consortium of ID, NV, and NM**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 6,000,000 Total Award Period Covered: 09/15/2009 - 08/31/2012

Location of Project:

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Collaborative Research: Large-Scale Modeling and Real-Time Simulation of Brain**

Source of Support: NSF

Total Award Amount: $ 622,986 Total Award Period Covered: 06/01/2012 - 05/31/2015

Location of Project:

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.0 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.0 Summer

Current and Pending Support

Investigator: **Graham Kent**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **CHIRP Paleoseismic Investigation of Lake Elsinore**

Source of Support: Southern California Earthquake Center

Total Award Amount: $ 8,300 Total Award Period Covered: 02/01/2010 – 01/31/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.15 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **A Reconnaissance CHIRP Survey of Pyramid Lake**

Source of Support: Southern California Earthquake Center

Total Award Amount: $ 60,220 Total Award Period Covered: 05/20/2010 - 11/30/2011

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.3 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Marine Seismic Reflection and Refraction Survey of the Salton Trough**

Source of Support: National Science Foundation

Total Award Amount: $ 903,928 Total Award Period Covered: 08/01/2009 - 07/31/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Collaborative Research: Developing and Improving Scripps Shallow Water Mapping**

Source of Support: NSF

Total Award Amount: $ 1,316 Total Award Period Covered: 09/15/2009 - 08/31/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.6 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Western Great Basin Seismic Network Operations**

Source of Support: USGS

Total Award Amount: $ 440,664 Total Award Period Covered: 02/02/2011 - 02/01/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.0 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Western Great Basin Geodetic Network**

Source of Support: USGS

Total Award Amount: $ 62,598.40 Total Award Period Covered: 03/01/2011 - 02/28/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.0 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Fault distribution, slip-rate determination and a focused seismicity study of the Pyramid Lake basin**

Source of Support: USGS-NEHRP

Total Award Amount: $ 38,147 Total Award Period Covered:

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.0 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **An Open-Access, open participation, 3D survey of the Cascadia Margin, WS**

Source of Support: NSF-RAPID

Total Award Amount: $ 14,430 Total Award Period Covered:

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.3 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Defining Subaerial Fault Distribution and Offset in the Tahoe Basinusing Airborne and Terrestrial LIDAR data**

Source of Support: USGS-NEHRP

Total Award Amount: $ 37,809 Total Award Period Covered:

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 0.3 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	Summer
	1.5	

Current and Pending Support

Investigator: **Nicholas Lancaster**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Global Expansion of Scientific Bases in Dry Areas FY12**

Source of Support: Tottori University/Arid Land Research Center
Total Award Amount: $ 230,000 Total Award Period Covered: 04/01/2011 - 03/20/2012
Location of Project: DRI
Person-Months Per Calendar Year Committed to the Project: 0.20 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Keeler Dunes**

Source of Support: Great Basin Unified Air Pollution Control District
Total Award Amount: $ 99,916 Total Award Period Covered: 07/01/2011 - 06/30/2012
Location of Project: CA
Person-Months Per Calendar Year Committed to the Project: 2.0 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **NSF EPSCoR MGT Yr 4**

Source of Support: NSHE
Total Award Amount: $ 88,242 Total Award Period Covered: 09/01/2009 - 08/31/2012
Location of Project: DRI
Person-Months Per Calendar Year Committed to the Project: 1.5 Academic Year Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	2.0	Academic Year	Summer

Current and Pending Support

Investigator: **Shahram Latifi**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 261,000 Total Award Period Covered: 09/01/2008 - 08/31/2013

Location of Project: UNLV, Las Vegas

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.5 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **CAPTURE- Creating a Pedagogical Tool for Understanding Renewable Energy**

Source of Support: NSF-TUES

Total Award Amount: $ 199,998 Total Award Period Covered: 01/01/2012 - 12/31/2013

Location of Project: UNLV, Las Vegas

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Remote Detection of WMD using Hyperspectral Data Processing**

Source of Support: DTRA

Total Award Amount: $ 794,716 Total Award Period Covered: 09/01/2011 - 8/30/2014

Location of Project: UNLV/RS, Las Vegas

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **A Vital Signs' Simulator Package for NASA's Crewed Space Missions**

Source of Support: Nevada NASA EPSCoR

Total Award Amount: $ 25,433 Total Award Period Covered: 07/01/2011 - 04/30/2012

Location of Project: UNLV, Las Vegas

Person-Months Per Calendar Year Committed to the Project:	Academic Year	0.75 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.5 Summer

Current and Pending Support

Investigator: **Sushil J. Louis**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Co-evolving tactics and strategies for virtual at sea training**

Source of Support: ONR
Total Award Amount: $ 910,000 Total Award Period Covered: 2008 - 2011
Location of Project: UNR
Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Air Support for Intelligent Aggressor**

Source of Support:
Total Award Amount: $ 499,900 Total Award Period Covered: 2010 - 2011
Location of Project: UNR
Person-Months Per Calendar Year Committed to the Project: Academic Year 3.0 Summer 2.0

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR
Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018
Location of Project: Nevada
Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Current and Pending Support

Investigator: **Michael McMahon**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support:	☒ Current	☐ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2008 – 08/13/2013

Location of Project: Nevada, USA

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer
	12.0		

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer
	12.0		

Current and Pending Support

Investigator: **Donica Mensing**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.5 Summer

Current and Pending Support

Investigator: **Scott Mensing**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Did Native Americans significantly alter forest structure in California? A paleoecologic reconstruction of vegetation and fire history from two different ecosystems**

Source of Support: National Science Foundation – BSC Geography and Spatial Science

Total Award Amount: $ 350,000 Total Award Period Covered: 05/01/2010 - 04/30/2013

Location of Project: California

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.0 Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education, and Outreach**

Source of Support: NSF – EPSCOR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2008 - 08/31/2013

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.5 Summer

Support: ☐ Current ☐ Pending ☒ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Reconstructing 2500 years of environmental change at the periphery of Rome: Societal response and adaptation to climate**

Source of Support: National Science Foundation – BSC - GSS

Total Award Amount: $ 550,000 Total Award Period Covered: 05/31/2012 – 04/30/2015

Location of Project: Italy

Person-Months Per Calendar Year Committed to the Project: Academic Year 0.5 Summer

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	1.5 Summer

Current and Pending Support

Investigator: **Ken Smith**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Rock Valley Deployment and Data Compilation**

Source of Support: DOE: National Security Technologies
Total Award Amount: $ 141,333 Total Award Period Covered: 10/01/2011 - 09/30/2012
Location of Project: Nevada Test Site

Person-Months Per Calendar Year Committed to the Project:	Academic Year	Summer
	9.0	1.0

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR
Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018
Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	Summer
	1.5	

Current and Pending Support

Investigator: **Haroon Stephen**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Update and Develop Information to Conduct Vulnerability Assessments and Waivers for Nevada Public Water Systems**

Source of Support: Nevada Division of Environmental Protection, Bureau of Safe Drinking Water
Total Award Amount: $ 298,094 Total Award Period Covered: 01/01/2010 - 12/31/2012
Location of Project: Nevada
Person-Months Per Calendar Year Committed to the Project: 1.2 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Spring Mountains Butterfly Life History and Autecology Studies**

Source of Support: U.S. Forest Services
Total Award Amount: $ 454,229 Total Award Period Covered: 01/01/2010 - 01/31/2013
Location of Project: Nevada
Person-Months Per Calendar Year Committed to the Project: 1.2 Academic Year Summer

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Supplemental Interlocal Agreement for Conducting the Community Facilities Energy Education Program**

Source of Support: City of Las Vegas
Total Award Amount: $ 91,863 Total Award Period Covered: 05/01/2010 - 10/25/2012
Location of Project: Nevada
Person-Months Per Calendar Year Committed to the Project: 1.2 Academic Year Summer

Support:	☒ Current	☐ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **Mapping of Landcover Classes for the Las Vegas Urban Canopy Study CityGreen analysis**

Source of Support: Nevada Division of Forestry

Total Award Amount: $ 144,284 Total Award Period Covered: 12/01/2010 - 12/31/2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	Summer
	1.0	

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:	Academic Year	Summer
		1.5

Current and Pending Support

Investigator: **Scotty Strachan**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2008 – 08/13/2013

Location of Project: Nevada, USA

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project:		Academic Year	Summer

Current and Pending Support

Investigator: **Guoping Tang**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **NSF EPSCoR: Nevada Infrastructure for Climate Change Science, Education and Outreach**

Source of Support: NSHE

Total Award Amount: $ Total Award Period Covered: 09/01/2011 - 08/31/2013

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project: 10.0 Academic Year Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Abiotic and Microbial Mechanisms of Soil Carbon Flux and Storage in Arid Ecosystems**

Source of Support: DOE EPSCoR

Total Award Amount: $ 587,378 Total Award Period Covered: 03/01/2012 - 03/01/2015

Location of Project: DRI

Person-Months Per Calendar Year Committed to the Project: 1.0 Academic Year Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 3.0 Academic Year Summer

Current and Pending Support

Investigator: **Andrzej M. Trzynadlowski**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Collaborative Research: Investigation of Fundamental Aerodynamic and Power Electronic Issues of Rooftop Wind Panels**

Source of Support: NSF

Total Award Amount: $ 216,375 Total Award Period Covered: 06/01/2009 – 05/31/2012

Location of Project: University of Nevada, Reno & California State University Long Beach

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.0 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Flexible-Bus Autonomous Microgrids with Tandem Power Converters**

Source of Support: NSF

Total Award Amount: $ 382,868 Total Award Period Covered: 06/01/2012 – 05/31/2015

Location of Project: University of Nevada, Reno

Person-Months Per Calendar Year Committed to the Project: 0.5 Academic Year 1.5 Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.5 Summer

Current and Pending Support

Investigator: **Janet Usinger**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada State Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP)**

Source of Support: U.S. Department of Education

Total Award Amount: $ 36,000,000 Total Award Period Covered: 2006 - 2012

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 6.0 Academic Year Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **Nevada State GEAR UP**

Source of Support: U.S. Department of Education

Total Award Amount: $ 42,000,000 Total Award Period Covered: 2012 - 2019

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: 6.0 Academic Year Summer

Support: ☐ Current ☒ Pending ☐ Submission planned in near future ☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

Person-Months Per Calendar Year Committed to the Project: Academic Year 1.5 Summer

Current and Pending Support

Investigator: **Yaakov Varol**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support:	☐ Current	☒ Pending	☐ Submission planned in near future	☐ *Transfer of support

Project/Proposal Title: **(This Proposal) From Climate Change Portal to Nevada Data Center for Research and Education on the Environment, Water, and Energy**

Source of Support: NSF-EPSCoR

Total Award Amount: $ 15,000,000 Total Award Period Covered: 09/01/2013 – 08/31/2018

Location of Project: Nevada

	Academic Year	Summer
Person-Months Per Calendar Year Committed to the Project:		1.0

FACILITIES, EQUIPMENT & OTHER RESOURCES

Include descriptions of any proposed institutional commitments regarding either personnel or facilities and other physical infrastructure. Most importantly, if an institution is required to make significant modifications to a building, acquire a new building or land, or make arrangements to use other facilities for the focal area to be successful, these requirements must be explained. For any pre-proposal requiring significant institutional resources, authors are strongly encouraged to initiate a discussion with the appropriate institutional authorities prior to submission of the pre-proposal.

Laboratories

University of Nevada, Reno

- UNR Grid Computing Cluster
  - Provides a central institutional infrastructure (i.e. physical space, power management, and network connectivity) for servers used for grid computing purposes (i.e. modeling and simulation).
- Software Engineering Laboratory (Sergiu Dascalu); 400 ft^2
  - Research and design of large software systems, software frameworks, software processes, and interactive systems.
- Evolutionary Computing Systems Lab (Sushil Louis); 500 ft^2
  - Development of computer processing methods that evolve without human intervention.
- High Performance Visualization Lab (Fred Harris); 400 ft^2
  - High parallel processing, advanced visualizations, virtual reality applications, distributing computing, simulation environments.
- Computer Networking Lab and Reconfigurable Network Lab (Mehmet Gunes); 600 ft^2
  - Both devoted to the research on communications and networking
- The Department of Geography hosts laboratories for dendrochronology (DendroLab), palynology (also used for packrat midden studies), spatial analysis (the G-lab), conservation biogeography, together with the State Climate Office and a computer laboratory for Geographic Information Science
- Mensing Pollen Lab (Scott Mensing)
- Engineering Computing Center of the College of Engineering is also available for usage
  - Contains five labs, each of which has many Linux and Windows machines for use by students as simulation and design workstations as well as for classroom experimentation

University of Nevada, Las Vegas

- There is a 1300-sqft laboratory housed in TBE (Engineering building) equipped with computers, and Peripheral devices.
- GIS and Remote Sensing Visualization Facility (anticipated to be operational by February of 2012)
  - Large projection system
  - Ability to seat 12-15 people
  - Equipped with software and hardware for 3D visualization, video conferencing, and wide frame display presentation
- GIS and Remote Sensing Core Lab
  - High-end processing capability to acquire, process, and visualize geographical information
  - Research-centered lab and continues to propose and conduct synergistic research activities for UNLV and the region

Desert Research Institute

- Soils and Water Laboratories
    - Supports broad areas of research including modeling simultaneous transport of mass and energy through porous media; soil leaching; and soil and water chemistry\
    - Equipped to determine physical soil parameters including saturated and unsaturated hydraulic conductivity, water diffusivity, porosity, water content, bulk density, particle size analysis, and moisture retention characteristics
    - Advanced and rapid tensiometer-pressure transducer system is available to study moisture movement under isothermal and non-isothermal conditions

Nevada Seismological Laboratory (UNR)

- Provides network infrastructure and management expertise that supports the managed and structured collection, acquisition, and dissemination of research data. This network forms a part of the existing SENSOR system developed under Track I.
- Staff members include a professional software developer and network systems specialist, three seismological technicians, and one record analyst.
- Five graduate research assistants in degree programs of the Dept. of Geological Sciences and Engineering, and the Graduate Program of Hydrologic Sciences, are supported.
- Maintains an extensive capability in geophysical imaging and computational resources
- NSL operates the Western Great Basin Seismic Network (a component of the USGS Advanced National Seismic Network), which consists of approximately 110 real-time seismograph stations, and all data is telemetered to the NSL Data Center
- The principle source of earthquake information for Nevada and eastern California
- Maintains digital data since 1984, when digital waveform recording began
- Recent enhancement to the microwave system are being conducted under FCC spectrum relocation; these programs will implement a wideband wire-less IP digital communications backbone between Reno and Las Vegas and into parts of central Nevada

Computer Equipment

University of Nevada, Reno

- NSF EPSCoR Track I Nevada Climate Change equipment
    - 33x SunFire x4140 servers – Used for the existing Track I NSF Nevada EPSCoR research, 2 of these servers are used as virtualization hosts for database, web, and other (8 total) infrastructure servers and services. The remaining 31 servers are available for modeling activities required by the project, and have been integrated into the UNR Grid Computing cluster for that purpose.
    - 3x SunFire x4540 storage servers – Used to support existing Track I NSF Nevada EPSCoR research, each server has a raw storage capacity of 24TB. One is configured in a RAID array for primary storage of research data and infrastructure support (e.g. storage of virtualized server images, database files, etc.); one is configured as a backup server (located on an opposing end of campus) for the primary storage server; one is a hot-spare that can quickly replace a failed server at any time.
- Department of Computer Science and Engineering
    - Computer Networking Lab
        - Contains a major server (Xeon 2.93GHz processor, 12GB RAM, RAID 5), 7 Linux machines, 4 Windows machines, 1 iMac, and 10 laptops for use in research and development
    - Reconfigurable Network Lab
        - 9 Linux machines, 12 Cisco 1811W routers, 12 Linksys switches, 30 wireless sensor nodes, and 1 HOKUYO laser sensor for use in research and education

    - The UNR Research Grid's cluster consists of 63 Sun Fire X4100 and X4200 servers as compute nodes, a Sun Fire X4600 computer as head-node, and a Sun Fire X4500 "thumper" as the cluster's disk array (24 TBytes total storage in network attached devices)
    - All research labs are equipped with networked personal computers, Sun workstations, printers, and scanners. Dell and Mac laptops are also available for research and development in the Computer Science and Engineering labs.
        - Software Engineering Laboratory also has 4 touch-screen displays as well as 2 Sony cameras and lightning equipment for video-recording of demos and presentations.
- Department of Geography
    - Computer Lab
        - 24 networked PCs
        - Runs ESRI software under a system-wide license, and has GPS receivers, a digital SLR camera, several dual-monitor geospatial computer workstations for GIS, digital image processing, and modeling
    - DendroLab
        - Analytical equipment consists of digital image analysis systems, tree-ring measuring devices, microtomes, stereo-zoom binocular and compound microscopes, and extraction lines for stable isotope analysis. In addition, they have a Trimble GeoExplorer3 Geographic Positioning Systems and lower-end GPS units
        - Two VELMEX systems interfaced with video cameras mounted on stereo-zoom binocular microscopes. Wood anatomical samples can be prepared using a sledge microtome with both reusable and disposable blades. A compound microscope interfaced with a digital camera is available for generating high-resolution images. Advanced statistical and graphical analyses are performed using programs running on DendroLab computers or the UNR Citrix server
- Mensing Pollen Lab
    - Four Nikon Labophot light microscopes with high quality (Plan-Apo) 40x and 100x objectives for pollen analysis, and two Nikon dissecting scope for dendrochronology, charcoal and macrofossil analysis
- Department of Electrical and Biomedical Engineering
    - High-performance Internet-connected personal computers with auxiliary equipment will be available for the Investigators at the EBME Department and the Engineering Computing Center. The installed software pertinent to the project includes PSIM for simulation of power electronic and other power conversion systems, Simulink and ACSL for dynamic simulations, Visual C++ and Code Warrior for software development, PSpice for circuit analysis, Matlab, MS Excel, and MS Word.

University of Nevada, Las Vegas

- There are six quad-core high performance DELL workstations in the lab equipped with standard educational software programs including Mathematica, Microsoft Visual Studio, MATLAB, and a suite of image processing/visualization programs. Application and code development packages for image and signal processing, multi- and hyper-spectral data analysis and visualization, network simulation and analysis tools are provided.
- 5 Servers, 15 workstations, 3 Toughbooks
- High-capacity network drive and several external hard drives
- GPS Receivers

Desert Research Institute

- Computational Facility
    - Used for modeling and simulations

- Numerous computers are available for running software packages including the LPJ GUESS and RHESSys ecosystem and ecohydrological models and the ENVI image processing software and ArcGIS needed for this project.

Office Equipment

University of Nevada, Reno

- Department of Electrical and Biomedical Engineering
    - Office space, equipped with personal computers, printers, Internet and local area network access, telephone, and furniture is available for the investigators at the EBME Department
- Department of Computer Science and Engineering
    - All faculty have office space, a desktop computer, a laptop computer, telephones, Internet and network access, and printer access
- Room 4066 of the William Raggio Building (College of Education) will be used to house one of the graduate students hired to support the Education and Outreach component of the project
    - Contains a relatively new (2010) desktop computer with a full suite of appropriate software for use by the graduate student and is fully equipped with appropriate office equipment, e.g. telephone, printer, calculators, etc.

University of Nevada, Las Vegas

- Faculty have offices, personal computers, and access to printers
- Mobile printer with carrying case

Desert Research Institute

- Office space and computers are provided for faculty, graduate students and post-doctoral scholars

Other

University of Nevada, Reno

- NSF EPSCoR Track I Nevada Climate Change equipment
    - 2x APC UPS systems – Refurbished as a part of the existing Track I project, these UPS systems provide data security to all hardware involved in the data collection and management process. Hardware is shielded from power disruptions and fluctuations; in the event of an extended power failure, systems are automatically gracefully and safely shut down.
- Mensing Pollen Lab
    - Water deionizer for purification, and a fume hood and Beckman centrifuge for pollen extraction
    - Laboratory oven for drying samples, a muffle furnace for LOI analysis, and a desiccators for the storage of samples during analysis
    - 6 by 8 walk-in cooler for the storage of sediment cores
- Department of Electrical and Biomedical Engineering
    - Digital storage oscilloscope TDS 1002 from Tektronix
    - Digital real time oscilloscope TDS 340A from Tektronix
    - Digitizing oscilloscope 54501A from Hewlett-Packard
    - Signal generator HP 8656B for Hewlett-Packard
    - Spectrum Analyzer HP 35665A from Hewlett Packard
    - Microcontroller and DSP development kits from Motorola (MPC565) and Texas Instruments (TMC320F243)
    - Power electronic inverters, VLT5032 (40 hp) and VLT5005 (5 hp), from Danfoss.

- Three-phase induction motor, 230 V, 40 hp, 60 Hz, 6 poles.
- DC generator, 240 V, 40 hp, 1750 r/min, with a 180 V, 5 A exciter and 1 hp cooling blower.
- A well-equipped Engineering Shop is available at the EBME Department. It can be used for development of electronic circuits and maintenance of experimental setups. The EBME Department Engineer will provide free technical advice regarding assembly of electronic circuits, and the EBME Department Secretary will provide free clerical help.

- The University of Nevada, Reno library system is a state-of-the-art facility that provides online full-text access to a large number of journals and books.

University of Nevada, Las Vegas

- The National Supercomputing Center for Energy and the Environment; A full-service supercomputing facility with national network accessibility. The center's advanced high performance computing systems are made available to educational and research centers, state and federal government agencies, and the private sector in Nevada
- Laminator
- Plotter (large format document printer)

Desert Research Institute

- Western Regional Climate Center
  - Repository of weather and climate data for the western United States

Major Equipment

- 13 Transects as part of the NSF EPSCoR project "Nevada Infrastructure for Climate Change Science, Education and Outreach," split between the Sheep and Snake ranges of southern and eastern Nevada.