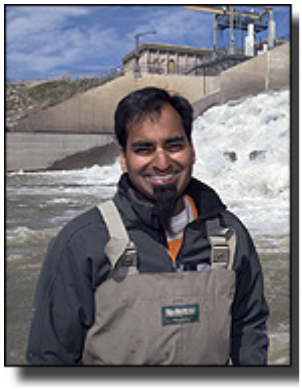
Research Mentors for the NSF-REU 2010 Summer Program

From Tahoe to Pyramid Lake: Natural Resource Issues in the Sierra Nevada and Great Basin Region

University of Nevada, Reno Academy for the Environment and Great Basin Institute

Sudeep Chandra – Natural Resources and Environmental Science Department, UNR



Past recipient of Teacher of the Year for his college, Dr. Chandra has had extensive experience teaching undergraduates in the field. He has classical training in limnology evaluating the impact of land use change on freshwater ecosystems. Taking an ecosystem-based approach, he has evaluated the impact of historical nonnative species introductions and nutrient loading on the food web structure of the lake. An advocate of the conservation of freshwater resources, Dr. Chandra became an advisor to the Paiute tribe of Pyramid Lake (USA) as they try to restore the cutthroat trout and the endangered Cuiui. Dr. Chandra has been studying the Lake Tahoe-Truckee watershed for the last 5 years. His research with REU students will focus on understanding aquatic invasive species in Lake Tahoe and the role they play in controlling native organisms.

Mike Collopy – Academy for the Environment, UNR

As Director of the Office of Undergraduate Research and Executive Director of the Academy for the Environment, Dr. Collopy is responsible for strengthening the interdisciplinary research and education focus of environmental programs throughout the university. Throughout his career, Dr. Collopy has directed research on the behavior, habitat requirements, and ecology of a variety of avian species, particularly birds of prey. Dr. Collopy is particularly interested in helping both undergraduate and graduate students develop the technical and interpersonal skills necessary to successfully compete for positions in academia and natural resource management/conservation.

Peter Goin – Art Department, UNR

As a research artist, Dr. Goin is involved in many book publications and projects. He is author of Tracing the Line: A Photographic Survey of the Mexican-American Border, Nuclear Landscapes, Stopping Time: A Rephotographic Survey of Lake Tahoe, Humanature and Lake Tahoe. Peter's photographs have been exhibited in more than 50 museums nationally and internationally, and he is the recipient of two National Endowment for the Arts Fellowships. REU students will participate in rephotography of fire affected landscapes, a continuing visual analysis of the Angora Fire region in South Lake Tahoe. This project involves archive research and image management across the spectrum of historical landscape photographs and also producing contemporary views of spectacular Lake Tahoe.

Mae Gustin – Natural Resources and Environmental Science Department, UNR

Dr. Gustin's primary research interests are the study of the fate and transport of contaminants in the environment. Specific research topics include investigation of natural sources of atmospheric mercury, the role of plants in biogeochemical cycling of mercury, mercury pollution in the Steamboat Creek-Truckee River Watershed, and arsenic in the Humboldt River and in ground waters in Fallon, NV. She is especially interested in the role that atmosphere and vegetation play as sources, sinks and pathways for the cycling of environmental contaminants. REU students will assist Dr. Gustin in field studies and lab analyses of the role of macroinvertebrates in transferring mercury to higher trophic levels in the Truckee River, and using tree rings to understand changes in airborne mercury concentrations over time.

Derek Kauneckis – Political Science Department, UNR

Dr. Kauneckis specializes in policy analysis, program evaluation, institutional analysis and policy design. His research examines the evolution of governance arrangements and the development of decision-making structures as they relate to environmental policy outcomes. Dr. Kauneckis works closely with multiple natural resource management agencies in the region and is currently involved with private sector businesses in the Lake Tahoe basin in developing community sustainability indicators, and is revising the Social Science chapter for the Lake Tahoe Science Plan. He recently completed a survey of private landowners at Tahoe and an assessment of social science data needs among policy-makers and stakeholders, which closely involved undergraduate research assistants. REU students will aid Dr. Kauneckis in environmental policy analysis and evaluation, research on implementation strategies, and working with both public and private decision-makers in the Lake Tahoe basin.

Jerry Keir – Great Basin Institute

Co-founder and Executive Director of the Great Basin Institute, Keir has taught and directed interdisciplinary environmental field studies courses throughout the Intermountain West and Mexico, and has extensive experience managing diverse research and monitoring initiatives, leading collaborative planning projects, and overseeing natural resource projects across Nevada wilderness, parks and public lands. Keir will support the REU program through the institute's Research Associate Program, utilizing the program's infrastructure for training, and field operations to support REU participants.

Glenn Miller – Natural Resources and Environmental Science Department, UNR

The transport and transformation of organic and inorganic compounds is the focus of Dr. Miller's research. His laboratory has a long-term interest in the environmental photochemistry of organic compounds, and is focusing on the photolysis of pesticides on soil surfaces and in the gas phase. Dr. Miller and his lab are also working on projects related to contamination from mining sites, both from current precious metals mining sites and historic mines. REU students will assist Dr. Miller in a field study of herbicide control of a widespread invasive plant that has impacted the ecology and economy of the watershed. The study will investigate the efficacy of combinations of alternative control methods, and may include assessment of herbicide residues.

Laurel Saito – Natural Resources and Environmental Science Department, UNR.

In collaboration with the US Geological Survey, Dr. Saito has been studying anthropogenic impacts on the Truckee River aquatic ecosystem which headwaters in the Sierras and at Lake Tahoe. Dr. Saito has worked with the Agricultural Research Service to understand how land management affects runoff and erosion from small watersheds in Nevada, and how to enhance the sparse precipitation network in the Great Basin, including in the Truckee River watershed. An REU student will assist in assessing the effectiveness of watershed cooperation regarding water quality issues in interstate watersheds to provide recommendations for interstate cooperation in the Truckee River basin.

Lynn Zimmerman – Great Basin Institute; Ecology, Evolution and Conservation Biology Program, UNR

Dr. Zimmerman has extensive field experience working with students on the physiological ecology and conservation biology of reptiles in the Great Basin and Mojave region, with particular emphasis on thermal and nutritional ecology. She also participated in collaborative research on abiotic factors associated with the distribution and abundance of fish and plankton in Walker Lake, a terminal saline lake in central Nevada. Her REU contribution will provide students with the opportunity to study diversity, distribution and densities of small mammals and other vertebrates in the Tahoe Basin as part of restoration monitoring.

Overview of Research Projects for the NSF-REU 2010 Summer Program

From Tahoe to Pyramid Lake: Natural Resource Issues in the Sierra Nevada and Great Basin Region

Sponsored by the University of Nevada, Reno Academy for the Environment and Great Basin Institute

The REU program of the Academy for the Environment and the Great Basin Institute links nationally recruited undergraduate students with accomplished academic scientists to further our scientific understanding of the Lake Tahoe-Truckee River-Pyramid Lake watershed within the eastern Sierra Nevada bioregion. This program encompasses a wide range of research experiences in socioeconomic and natural resource science. Participants will be exposed to diverse scientific inquiries and technologies to gain insight into the manner in which science informs land use policy, management and conservation initiatives. The overarching goal of this program is to explore the interdisciplinary intersections of the various subfields in the sciences that are required for adaptively managing watersheds.

Our research projects are situated within a biologically diverse watershed, a unique ecological system that provides varied and compelling research opportunities in mountain, desert, and riparian communities. The desired outcome of our collaborative research will bridge students, faculty, and natural resource managers in a collective effort towards enhancing our scientific understanding of regional conservation issues in an applied context.

Research Projects

Research on aquatic invasive species in Lake Tahoe and the role they play in controlling native organisms. Specifically, the student will assist in field collections and, possibly, experiments to determine the impacts of invasive species on Lake Tahoe's ecology. (Sudeep Chandra, Natural Resources and Environmental Science Department, UNR)

Research on environmental policy has increasingly looked toward the importance of how different recipients of policy tools are embedded in social networks. This project will examine the characteristics that define various types of landowners and their social networks and how these factors impact voluntary program participation. Using an existing dataset the student research assistant will conduct statistical analysis toward understanding program participation. (Derek Kauneckis, Political Science Department, UNR)

Rephotography of fire affected landscapes: A continuing visual analysis of the Angora Fire region in South Lake Tahoe, photographing historical images of fire affected areas within the Tahoe Basin, and establishing new fire rephotography points. This project involves archive research and image management across the spectrum of historical landscape photographs and also producing contemporary views of spectacular Lake Tahoe. (Peter Goin, Department of Art, UNR)

Investigation of macroinvertebrate populations, mercury concentrations and the role of these organisms in the transfer of mercury to higher trophic levels in the upper and lower Truckee River. This project will entail collection, identification and measurement of mercury in invertebrate populations of the Truckee River, and will involve both field and lab data collection. (Mae Gustin, Natural Resources and Environmental Science Department, UNR)

Use of mercury concentrations in tree rings from the Truckee River basin to understand changes in airborne concentrations of mercury over time. This project will entail collection of tree ring samples, developing chronologies and analyzing rings for mercury within the Tahoe Basin. (Mae Gustin, Natural Resources and Environmental Science Department, UNR)

Assessment of the use of herbicides for control of tall whitetop, an invasive weed: Test herbicides registered for use in wetlands, and determine the efficacy of weed removal, as well as a combination of mowing and herbicide application. If the student has sufficient interest and has a chemical background, we may conduct some residue studies on these pesticides. (Glenn Miller, Natural Resources and Environmental Science Department, UNR)

Assessing the effectiveness of watershed cooperation regarding water quality issues in interstate watersheds to provide recommendations for interstate cooperation in the Truckee River basin. The student will assist with analysis of survey results from interstate watersheds in the western United States. (Laurel Saito, Natural Resources and Environmental Science Department, UNR)

Sampling wildlife diversity and distribution in the Tahoe Basin as part of restoration monitoring. (Lynn Zimmerman, Great Basin Institute, and Ecology, Evolution and Conservation Biology Program, UNR).

Sand Harbor Recreational Capacity: Participate in a study of resource condition and use at a scenic and very popular state park on the shores of Lake Tahoe. The study will include surveys of visitor expectations and experience in the park, facilities and resource assessments, and review of historical documents.