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Institute of  
Arctic and  
Alpine Research

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2001–2002 Biennial Report

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Susan Solomon, National Oceanic and Atmospheric Administration, Boulder

### **Cover Picture**

Susitna Glacier, Alaska—a “textbook example” of folded moraines caused by repeated surges. Glacier surges not only are extremely rapid transformations of glacier flow and geometry but also provide vital clues to the basal sliding mechanism of glacier flow. Painting by M. F. Meier, acrylic on canvas, 18 × 24”, 2003.



This publication is printed on recycled stock.

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Biennial

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Report

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2001–2002

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*Institute of Arctic and Alpine Research*  
*University of Colorado at Boulder*

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# Institute of Arctic and Alpine Research

## University of Colorado at Boulder

The Institute of Arctic and Alpine Research (INSTAAR) strives for excellence in research, education, and societal outreach. The Institute facilitates and accomplishes interdisciplinary studies offering special expertise in high-altitude and high-latitude regions of the world. INSTAAR also offers excellence in global and environmental research, including non-cold-region Quaternary studies and geochronology, earth-system dynamics, landscape and seascape evolution, and climate dynamics. INSTAAR aims to understand how the varied regions of the world are affected by natural and human-induced physical and biogeochemical processes at local, regional, and global scales. Research initiatives are interlinked with our educational and societal outreach missions. By encouraging the use of our facilities and the expertise of our personnel, INSTAAR provides excellent educational opportunities to graduate and undergraduate students. Our outreach to the wider community, both locally and farther afield, includes aspects of research and education. INSTAAR provides leadership in setting regional, national, and international science priorities and agendas, with particular emphasis on societally relevant issues.

INSTAAR's *Research Activities* integrate field studies, state-of-the-art laboratory experiments, field and laboratory data analysis, and numerical and laboratory modeling. INSTAAR emphasizes three themes of research.

The *Ecosystems Group* focuses on the biological components of alpine and polar systems, global carbon and nitrogen cycling, the dynamics of biodiversity, and ecosystem disturbance and recovery. *Long-Term Ecological Research (LTER)* studies in alpine and polar regions are emphasized, involving populations and communities, biogeochemistry, and ecophysiology. Modern tools include geographic information systems (GIS), remote sensing, and ecosystem modeling. The *Mountain Research Station* offers a world-class complex of laboratory and field facilities to support these year-round research efforts.

The *Geophysics Group* applies quantitative field and numerical methods to discover the properties and dynamics of snow, ice, water, and sediments in the world's oceans, glaciers, and land areas. Methods of analysis include theoretical and numerical development, remote sensing, and land and ship-borne field experiments, all applied to problems in hydrology, glaciology, frozen-ground studies, paleoclimatology, physical oceanography, and marine geology. To facilitate these interests, the *Environmental Computation and Imaging Facility* provides researchers with supercomputational power and global connections to geophysical databases.

The *Past Global Change Group* focuses on the reconstruction of the dynamics of paleoenvironments and past climate variability to enhance our understanding of the interactions between all components of the earth system, including atmosphere, ocean, land, ice, and the biosphere. Integration of a variety of records from a global network of sites, from the polar ice caps to continental alpine regions and to the world's oceans, provides the capability to test conceptual and predictive global change models and to facilitate the differentiation between natural and human-induced change. To facilitate these interests, the *Center for Geochronological Research (CGR)* provides scientists with state-of-the-art analytical facilities to address the cause, timing, and rates of environmental change in recent Earth history. The CGR fosters synergistic relationships across traditional disciplinary boundaries in order to understand the global circulation system.

INSTAAR's *Teaching Mission* is directed toward fostering an appreciation and understanding of the biological, chemical, and physical processes operating in continental and ocean environments. Education efforts are aided by the Mountain Research Station and other study sites in the mountains of Colorado. INSTAAR supports the University of Colorado's educational mission and provides interdisciplinary graduate and undergraduate classes and research opportunities. Our teaching mission includes international educational experiences for University of Colorado students, training of foreign students, and volunteer outreach to community schools and various other external constituencies.

INSTAAR's *Societal Mission* consists of activities in research, education, and science leadership. These activities address critical concerns involving issues such as ecosystem stability, biodiversity, water resources, agriculture, national security, and resources in sites ranging from the alpine areas of the Rocky Mountains to the remote regions of the world. Our expertise is applied to predictive understanding of environmental processes, including the maintenance of water quality and anticipating and responding to long-term environmental alterations. Changes and disturbance in high-latitude regions not only affect the lives of the indigenous residents but also have a bearing on the lives of people everywhere, through global teleconnections.

The purpose of this report is to inform the University administration, granting agencies, researchers, students, and the general public of INSTAAR's activities during 2001 and 2002.



Information regarding the Institute of Arctic and Alpine Research, the Niwot Ridge Long-Term Ecological Research (LTER) Program, the Mountain Research Station, and the journal *Arctic, Antarctic, and Alpine Research* is available on the World Wide Web at, respectively:

[instaar.colorado.edu](http://instaar.colorado.edu)  
[culter.colorado.edu/1030/](http://culter.colorado.edu/1030/)  
[www.colorado.edu/mrs/](http://www.colorado.edu/mrs/)  
[www.colorado.edu/INSTAAR/arcticalpine](http://www.colorado.edu/INSTAAR/arcticalpine)

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# The State of the Institute

## A Message from the Director

**W**hat are we? The Institute of Arctic and Alpine Research (INSTAAR) facilitates interdisciplinary research in earth system dynamics with a special focus on high-altitude and high-latitude regions. We investigate how sensitive or high-energy environments affect, and are affected by, natural and human-induced processes on the local, regional, and global scales. Our research activities are designed to support initiatives at the state, national, and international levels. Our interdisciplinary scientists integrate this understanding into the educational fabric of the University of Colorado.

*Who are we?* At the beginning of 2003, the governing body (Directorate) comprised 33 Fellows and Research Scientists led by the Director, an Associate Director, and an Executive Committee. The Directorate consisted of 13 teaching faculty (EPO Biology: 3, Geography: 2, Geological Sciences: 4, Civil, Architectural, and Environmental Engineering: 2, Environmental Studies: 1, Anthropology: 1); 2 Fellow-Emeriti; 3 Research Professors; 2 Fellows-Adjoint; 3 federal Research Scientists (NOAA, USGS); and 10 Research Faculty. The Directorate receives representation from 31 professional scientists, 15 postdoctoral scientists, and 54 graduate students. Other PhD-level Institute scientists include 31 Research Affiliates and 12 Visiting Scientists. In 2002 the Institute supported 54 undergraduate student research assistants. Institute members are loosely subdivided into three research groups: Ecosystem Science, Geophysics, and Past Global Change. Staff and faculty within our Center for Geochronological Research are included in these groups. Our Mountain Research Station has a staff of 13, including instructors. The administrative staff of 10 includes an Information Librarian; Managing Editor of *Arctic, Antarctic, and Alpine Research*; Chief Finance Officer; Assistant to the Director; Systems Administrator; and 5 accountant technicians and clerks to support the activities of our 254-member institute (for details, see <http://instaar.colorado.edu/people/index.html>).

*Setting agendas:* Researchers at INSTAAR collaborate with investigators from 22 countries and 67 U.S. institutions, attesting to the international and national prominence of our Institute. INSTAAR Fellows and Scientists convened or chaired dozens of sessions and symposia at the national and international level, presented over 70 keynote talks to scientific and government assemblies, sat on 19 editorial boards of various research journals, and edited or coedited 15 science journals.

*Research is expensive:* The majority of our research revenue for 2001–2002 came from federal agencies (71%), followed by the state of Colorado (CU: 14%), auxiliary lab operations (9%), and nonfederal sources (6%). Of the federal agencies, NSF remains the largest source of revenue,

followed by the Department of Defense. INSTAAR research involved 220 contracts and grants. With gifts and other CU funds, the Institute had a total operating budget of about \$8.5M.

### *Honors, awards, and recognition:*

- Professor Alan Townsend was awarded the Ecological Society of America Aldo Leopold Leadership Fellow.
- Professor James Syvitski was promoted to the Executive of the IGBP Science Steering Committee for Land-Ocean Interactions in the Coastal Zone (LOICZ).
- Professor Vera Markgraf became chair of the IGBP Science Steering Committee for PAGES: Past Climate Changes.
- Professor Tim Seastedt was honored by Congressman Mark Udall in the U.S. Congressional Record for his research on invasive species (weeds).
- Professor John Andrews was honored with a day and half of lectures and posters in his honor at the Geological Society of America meeting (Denver, 2002).
- Professor Mark Meier received the 2002 Goldthwait Polar Medal (Ohio State).
- Dr. Astrid Ogilvie rubbed shoulders with Scandinavian royalty on a number of occasions in her capacity as a recognized expert on Vikings and was elected as Board Member of the Arctic Research Consortium of the United States.
- Dr. David Anderson received the Department of Commerce Sustained Superior Performance Award.
- Dr. John Behrendt was elected as Fellow of the American Association for the Advancement of Science.
- Dr. Robert Stallard received the Meritorious Service Award for the Department of the Interior (2002) "in recognition of exceptional contributions to the development of new and innovative research programs in the U.S. Geological Survey."

*Books:* With great effort and dedication, INSTAARS published many well-reviewed books and special issues over the past couple of years. These include:

- Bowman, W. D., and Seastedt, T. R. (eds.), 2001: *Structure and Function of an Alpine Ecosystem*. Oxford University Press, 338 pp.
- Elias, S. A., and Brigham-Grette, J. (eds.), 2001: Beringian Paleoenvironments. *Quaternary Science Reviews*, 574 pp.
- Elias, S. A., 2002: *The Natural History of the Rocky Mountains*. Smithsonian Institution Press, 192 pp.
- Hoffecker, J. F., 2001: *Desolate Landscapes: Ice Age Settlement in Eastern Europe*. Rutgers University Press, 298 pp.
- Jensen, M. E., and Bourgeron, P. S. (eds.), 2001: *A Guidebook for Integrated Ecological Assessments*. Springer-Verlag, 536 pp.
- Markgraf, V. (ed.), 2001: *Interhemispheric Climate Linkages*. Academic Press, 454 pp.

- Ogilvie, A. E. J., and Jonsson, T. (eds.), 2001: *The Iceberg in the Mist: Northern Research in Pursuit of a "Little Ice Age."* Kluwer Academic Publishers, 263 pp.
- Syvitski, J. P. M., and Bahr, D. B. (eds.), 2001. Numerical Models of Marine Sediment Transport and Deposition. *Computers and Geosciences*, 136 pp.

*Interesting 2001–2002 research headlines:*

- Daniel Grossman launched his *The Ends of the Earth* documentary series on the science of climate change, aired on over 70 FM stations on the radio program *Soundprint*.
- The journal *Arctic, Antarctic, and Alpine Research* became the number-one cited (ISI) geography journal in the world under Managing Editor Kathleen Salzberg and Senior Editor James Syvitski.
- Tim Seastedt continued to make regional headlines on alternatives to the widespread use of pesticides to control invasive species.
- Mark Williams publicly called the Kyoto Protocol on Global Warming a flawed document but also called President Bush's new climate study a stalling tactic.
- James White discovered a 4°C temperature spike across a decade some 19,000 years ago through analysis of Antarctic ice core, and cautioned against some popular doomsday global warming scenarios (CNN).
- Sun Microsystems and the Office of Naval Research dedicated a new INSTAAR facility in conducting environmental and computation and imaging science.
- Mark Meier and Mark Dyurgerov predicted increased sea-level rise from melting glaciers (Intergovernmental Panel Report; *Science*).
- James Dixon and William Manley collaborated to build a computer model that predicts where archaeological artifacts may materialize from melting glaciers.
- Tad Pfeffer and Mark Meier offered contrasting views of Institute research through photography and visual art (show in honor of the Institute's 50th anniversary).
- Diane McKnight tied thinner ice on lakes and fewer ice days to a response to regional warming that results in changes in the ecology of alpine lakes. When tied to increased pollution from Front Range cities, regional alpine ecology is seen to be changing rapidly (*AGU news*).
- Former INSTAAR Misha Plam was elected to the Russian Academy of Engineering.
- Connie Woodhouse (NOAA/INSTAAR) put the southwest drought of 2002 into perspective through her analysis of ancient tree rings (United Press).
- John Hoffecker uncovered an ancient site where *Homo sapiens*, some 30,000 to 40,000 years ago, trapped animals for their fur to outcompete Neanderthals (United Press).
- Mark Williams noted a link between early snow and increased forest fires through competition in moisture between large and small vegetation.
- Bob Stallard, in Costa Rica, helped to develop a new NSF network to monitor a global amphibian die-off in tropical montane regions (Research and Analysis Network for

Neotropical Amphibians: <http://rana.biologia.ucr.ac.cr/>). Bob will be a "Host Researcher" for JASON XV, "Rainforests at the Crossroads." The JASON Foundation for Education (<http://www.jasonproject.org/>), founded by Dr. Bob Ballard, is dedicated to inspiring in students a lifelong passion to pursue learning in science, math, and technology through exploration and discovery by bringing real science to classrooms, real time.

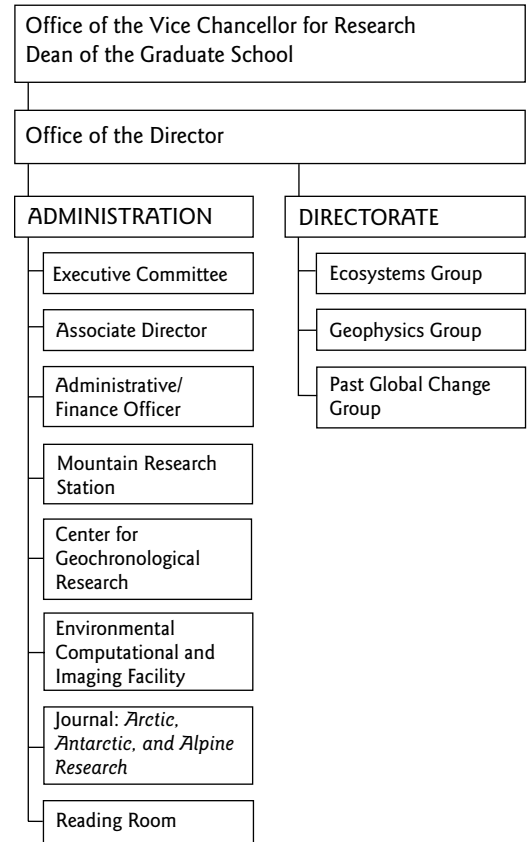
*Institute turns 50!* On 14–16 September 2001 the Institute celebrated its 50th Anniversary. The celebrations were in part dampened by the tragedy of September 11 and the complications of travel at that time. Despite shock, sorrow, and fear, recognized by a beautiful candlelight vigil, the celebration of INSTAAR's wonderful history carried on. New web pages were published ([http://instaar.colorado.edu/meetings/50th\\_anniv/index.html](http://instaar.colorado.edu/meetings/50th_anniv/index.html)) as well as a 94-page book that provides a history (through the eyes of the Directors), a series of memories and vignettes, INSTAAR news, and a complete list of 50 years of graduate theses.

*Fond farewells:* Dr. Alex Wolfe left INSTAAR in 2001 to join the Faculty of the University of Alberta (Edmonton, Canada). His research while at INSTAAR was paleolimnology, primarily the use of freshwater diatoms preserved in sediments to infer patterns of lake evolution. Dr. Elise Pendall left in 2001 to join the Faculty of the University of Wyoming. Her research included the study of carbon cycling, paleoecology and paleoclimatology reconstructions from stable isotopes of organic materials, and isotope hydrology. Dr. Robin Webb left the INSTAAR Directorate in 2002, following his move to the Climate Diagnostic Center (NOAA/CIRES) from the National Geophysical Data Center (NOAA). His research while at INSTAAR included (1) quantitative estimation of past climate from fossil pollen data and paleo lake-level records, (2) modeling of past changes in vegetation distributions, (3) assessment of the hydrologic cycle in general circulation models (GCMs), and (4) GCM simulations to test hypotheses of past climate change. Although it is sad to see good colleagues leave, we enjoyed interacting with them and wish them the very best in their new careers.

Two long-time Directorate members retired recently. Kathleen Salzberg retired as premier Managing Editor of the Institute's journal *Arctic, Antarctic, and Alpine Research*. Kathleen saw the journal through six senior Editors. During her tenure, the journal achieved status as the number-one geography journal and one of the top environmental science journals published today. Martha Andrews, librarian and institute historian, also retired after an illustrious career in polar science information. Martha is already missed by polar librarians, both in the United States and around the world. The entire Institute salutes the lifetime achievements of both Kathleen and Martha and wishes them the very best in their new lives as free agents.

*Hearty hellos:* While we say good-bye to old friends, we welcome new members to the institute with equal enthusiasm. Connie Oehring joined the Institute as the new Managing Editor of the *AAR* journal. Tom Marchitto joined the Directorate as an Assistant Professor in Geological Sciences. Tom received his PhD in 1999 from the MIT/WHOI Joint Program and joined the institute from Lamont Doherty Earth Observatory. Tom's specialties include Quaternary paleoclimate, paleoceanography, and past ocean chemistry. Scott Peckham joined the Directorate as a Research Scientist II in 2001. Scott received his PhD in 1995 in Geophysics (hydrology) from CU and subsequently worked on a postdoctoral fellowship at the U.S. Geological Survey (Boulder WRD). His specialties include surface water hydrology, geomorphology, scaling analysis, and mathematical modeling. Detlev Helmig joined INSTAAR as a Fellow and Associate Research Professor coupled to the Program in Atmospheric and Oceanic Sciences (PAOS). Detlev received his PhD in 1989 from the University of Duisburg, Germany. His specialties include surface-atmosphere interactions and atmospheric measurements, such as organic compounds from vegetation.

Recent applications to join INSTAAR suggest that our family will continue to grow in both quality and quantity. We wish them all the best success while at INSTAAR.





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# INSTAAR Directorate Members



**David M. Anderson**  
Research Scientist of  
INSTAAR; Adjoint Assistant  
Professor of Geological  
Sciences, University of  
Colorado at Boulder; Physical  
Scientist of Paleoclimatology  
Branch of the National  
Climatic Data Center, U.S.  
Department of Commerce,  
National Oceanographic and

Atmospheric Administration. PhD: 1991, Brown University.  
**Specialty:** Paleoceanography, marine geology, quantitative  
paleoenvironmental reconstruction.

**Research Interests:** Research on the marine geologic  
record of climate change, with emphasis on quantitative  
estimates of past ocean temperature and ocean upwelling/  
productivity. Projects include reconstructions of ocean car-  
bonate ion concentration related to the ocean's role in the  
global carbon cycle, reconstruction of long-term trends in  
the Asian summer monsoon, and projects to reconstruct  
the coastal ocean currents in the eastern Pacific and their  
influence on the climates of North and South America.



**John T. Andrews**  
Fellow of INSTAAR; Professor  
of Geological Sciences,  
University of Colorado at  
Boulder; Fellow of Norwegian  
Academy of Science and  
Letters. PhD: 1965; DSc  
1978, University of  
Nottingham, UK.  
**Specialty:** Glacial and  
marine sedimentology and

chronologies, high-resolution marine studies.

**Research Interests:** Late Quaternary history of ice sheet/  
ocean interactions and abrupt climate change during the  
last 10,000 to 40,000 years. Identification of iceberg rafting  
events. Detailed study of the paleoceanography of the East  
Greenland and Iceland margins on Holocene time scales.

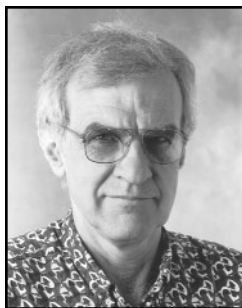


**Martha Andrews**  
Librarian (retired 2003).  
MA: 1964, McGill University;  
MA, 1973, University of  
Denver.

**Specialty:** Organization and  
dissemination of polar  
regions information.

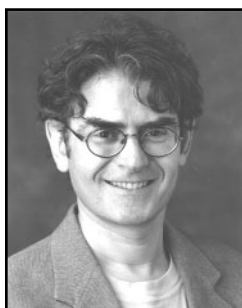
**Research Interests:**  
Networking polar regions  
information; conversion of

print information to electronic format; development of elec-  
tronic databases.



**John C. Behrendt**  
Fellow of INSTAAR.  
PhD: 1961, University of  
Wisconsin, Madison.  
**Specialty:** Antarctic and  
marine geophysics, glaciology.  
**Research Interests:**  
Presently studying lithospher-  
ic controls on the behavior of  
the West Antarctic Ice Sheet.  
Also investigating the tecton-

ics of the West Antarctic rift system, including the conti-  
nental margin. Deep-crustal seismic investigations of conti-  
nental rifts and rifted continental margins. Charleston, SC,  
earthquake studies. Atlantic continental margins of United  
States and West Africa. Use of gravity and aeromagnetic  
surveys to investigate continental tectonics.



**Patrick S. Bourgeron**  
Fellow of INSTAAR. PhD:  
1978, University Denis  
Diderot (formerly Paris 7),  
Paris, France.

**Specialty:** Ecosystem, land-  
scape, and plant ecology;  
statistical and numerical  
modeling; biological diversity.

**Research Interests:**  
Structure of hierarchically  
organized ecosystems; analysis and modeling of species dis-  
tributions; multiscale mapping of biophysical and biotic pat-  
terns; selection of regional systems of conservation net-  
works; land-use change; integration of new technologies for  
ecological studies, ecological assessments, and conserva-  
tion; development of tools to communicate research results  
to decision-makers and the public.



**William D. Bowman**  
Fellow and Director of the  
Mountain Research Station of  
INSTAAR; Associate  
Professor of Environmental,  
Population, and Organismic  
Biology, University of  
Colorado at Boulder.  
PhD: 1987, Duke University.

**Specialty:** Plant ecology.  
**Research Interests:** Biotic  
control over community and ecosystem properties, resource  
use by plants, alpine ecology.



**T. Nelson Caine**

Fellow of INSTAAR; Professor of Geography, University of Colorado at Boulder. PhD: 1966, Australian National University.

**Specialty:** Geomorphology and hydrology.

**Research Interests:**

Present-day processes of erosion and sedimentation in mountain environments, including studies of snow hydrology, streamflow generation, and sediment transport. Incorporates work on periglacial processes, mountain permafrost, and hill-slope processes.



**Scott A. Elias**

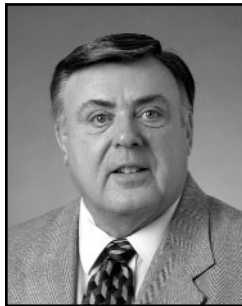
Fellow Adjoint of INSTAAR; Reader of Geography, Royal Holloway–University of London.

PhD: 1980, University of Colorado at Boulder.

**Specialty:** Quaternary insect fossils, paleoecology, paleoclimatology.

**Research Interests:**

The paleoecological, paleoclimatic, zoogeographic, and evolutionary implications of insect fossil assemblages from the Quaternary period. Studies of insect fossil assemblages from more than 200 sites in North America and Europe, deriving data for use in paleoecological and paleoclimatic reconstructions. Presently investigating late Pleistocene environments of Beringia (unglaciated regions of eastern Siberia, Alaska, the Yukon, and the Bering Land Bridge), Colorado, the Great Basin, and Britain.



**E. James Dixon**

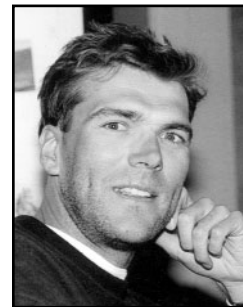
Fellow of INSTAAR; Professor of Anthropology; Curator of Museum and Field Studies, University of Colorado at Boulder.

PhD: 1979, Brown University.

**Specialty:** Archaeology.

**Research Interests:**

High-latitude/high-altitude human adaptations, circum-polar and Paleoindian archaeology, Quaternary science and geoarchaeology.



**Detlev Helmig**

Fellow of INSTAAR; Associate Research Professor of INSTAAR and the Program in Atmospheric and Oceanic Sciences (PAOS), University of Colorado at Boulder.

PhD 1989, University of Duisburg, Germany.

**Specialty:** Surface-atmosphere interactions,

atmospheric measurements.

**Research Interests:** Biosphere-atmosphere trace gas fluxes and their environmental controls, in particular emissions of organic compounds from vegetation; atmospheric transport; deposition processes and atmospheric chemistry; Arctic snow-atmosphere gas exchange. Research relies on the development, testing, and application of analytical tools for field measurements. Current capabilities include GC, GC/MS, direct-inlet ion trap MS, eddy correlation techniques, and meteorological and chemical instrumentation for boundary layer profiling from light aircraft and tethered balloons.



**Mark B. Dyurgerov**

Fellow of INSTAAR; Senior Scientist and Professor of Institute of Geography, Russian Academy of Science. PhD: 1974, Moscow State University; Doctor of Science, 1990, Institute of Geography, Russian Academy of Sciences.

**Specialty:** Glaciology and terrestrial hydrology.

**Research Interests:** Mountain glaciers and ice caps in relation to climate change and the global-water cycle, glacier mass balance monitoring, spatial and temporal distribution of glacier properties, measurement methods for glacier mass balance and runoff, all aspects of glacier regime and melt-water production worldwide, with particular emphasis in the Arctic, Alaska, and Central Asia.



**Ute C. Herzfeld**

Fellow Adjoint of INSTAAR; Affiliate Professor of Applied Mathematics, University of Colorado at Boulder; Heisenberg Fellow, German Science Foundation.

PhD: 1986, Johannes Gutenberg–Universität, Mainz, Germany.

**Specialty:** Geomathematics,

glaciology, marine geophysics, remote sensing.

**Research Interests:** Geomathematics, satellite geophysics, glaciology (antarctic ice streams, arctic calving glaciers,

surging glaciers), marine geology and geophysics (midocean ridge systems, Antarctic continental margin), oceanography (global primary productivity and global changes), geostatistics, nonlinear processes in geophysics, automated surface classification.



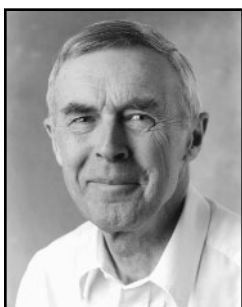
**John F. Hoffecker**

Research Scientist of INSTAAR. PhD: 1986, University of Chicago.

**Specialty:** Archaeology and human paleoecology

**Research Interests:** The evolution of human adaptations to cold environments during the Quaternary period. Studies of archaeological

sites in Eastern Europe and Alaska. Currently investigating the earliest modern human sites in Russia and the dispersal of modern humans into Eastern Europe (and related disappearance of local Neanderthals). Special focus on the role of technology in the dispersal process. Current research also includes interdisciplinary study of coastal middens in northern Alaska and the origins of modern Inuit culture with a focus on technological innovation.



**John T. Hollin**

Fellow of INSTAAR; Research Scientist Emeritus of University of Colorado. PhD: 1972, Princeton University.

**Specialty:** Glaciology, Quaternary, especially last interglacial history.

**Research Interests:** Glacier and ice-sheet profiles, empirical

and theoretical. Sea-level evidence for Antarctic melting and/or surging. Gondwana ice surges and Carboniferous coal cyclotherms.



**Anne E. Jennings**

Fellow of INSTAAR; Assistant Professor Attendant Rank of Geological Sciences, University of Colorado. PhD: 1989, University of Colorado at Boulder.

**Specialty:** Paleoceanography, glacial history, foraminifera.

**Research Interests:**

Paleoceanography, glacial history, and climate change in high-latitude regions, specifically Greenland, Baffin Island, Iceland, and Antarctica. Specializes in using foraminifera for interpreting paleoenvironments and chronology on high-latitude continental shelves.



**Scott J. Lehman**

Fellow and Research Professor of INSTAAR. PhD: 1989, University of Colorado at Boulder.

**Specialty:** Paleoclimatology, paleoceanography, radiocarbon research.

**Research Interests:** The role of the oceans in climate change, cycling of heat, fresh

water, and carbon by the oceans, paleotemperature applications of marine biomarkers and amino acids, dynamics and consequences of abrupt climate change, radiocarbon calibration, bomb  $^{14}\text{C}$  as a tracer in the recent carbon cycle.



**David J. Lubinski**

Research Scientist of INSTAAR.

PhD: 1998, University of Colorado at Boulder.

**Specialty:** Glacial geology, paleoceanography, and paleoclimatology of high northern latitudes.

**Research Interests:**

Presently investigating (1)

the Last Glacial Maximum to present glacier history of the Severnaya Zemlya Archipelago, Russian Arctic,  $79^\circ\text{N}$ , (2) late Quaternary glacial history of Vaygatch Island, Russian Arctic,  $69^\circ\text{N}$ , (3) foraminiferal and stable isotopic records in the northern Barents and Kara Seas, and (4) modern benthic foraminiferal and environmental relationships in the Barents and Kara Seas. Completing studies of (5) late Quaternary glacial and environmental conditions on Franz Josef Land and Novaya Zemlya.



**William F. Manley**

Research Scientist of INSTAAR. PhD: 1995, University of Colorado at Boulder.

**Specialty:** Quaternary geology, GIS, paleoclimatology, and high-latitude paleoenvironments.

**Research Interests:**

Pleistocene glacier fluctua-

tions and paleoclimate forcing for Alaska, through field research and data analysis, including spatial analysis with GIS. Spatial analysis of modern Alaskan glaciers, including links between equilibrium line altitudes and climate. Ice-field archaeology and remote sensing. Arctic coastal erosion and flooding.

**Tom Marchitto**

Research Associate of INSTAAR; Assistant Professor of Geological Sciences, University of Colorado at Boulder (joined INSTAAR in January 2003). PhD: 1999, MIT/WHOI Joint Program.

**Specialty:** Quaternary paleoclimate, paleoceanography, and past ocean chemistry.

**Research Interests:** Rapid climate change during the late Quaternary, particularly large-scale changes in ocean circulation and chemistry. Specializing in the use of calcitic foraminifera as recorders of physical and chemical properties of seawater, including temperature, salinity, the isotopic composition of dissolved inorganic carbon, and the concentrations of various nutrients.

**Vera Markgraf**

Fellow of INSTAAR; Research Professor of Geography, University of Colorado at Boulder. PhD: 1968, Bern, Switzerland.

**Specialty:** South America and Southern Hemisphere paleoclimates and inter-hemispheric paleoclimate correlations.

**Research Interests:** High-resolution, multiproxy paleoclimate analysis, using pollen (vegetation history), charcoal (fire history), and stable isotopes (temperature history) from late Quaternary lake and bog sediments in southern South America, in collaboration with J. W. C. White and E. Pendall (both INSTAAR) and INSTAAR graduate students. International cooperative research: Patagonian Lake Drilling Project (PATO), focusing on recovery and multiproxy analysis of sediment cores from large, extra-Andean lakes. Editor of volume *Interhemispheric Climate Linkages* (Academic Press, 2000) representing the outcome of the "Pole-Equator-Pole Paleoclimates of the Americas" (PEP 1) IGBP-PAGES research initiative that she previously chaired. Coeditor with H. F. Diaz of the volume *El Niño and the Southern Oscillation: Multiscale Variability and Global and Regional Impacts* (Cambridge University Press, 2000).

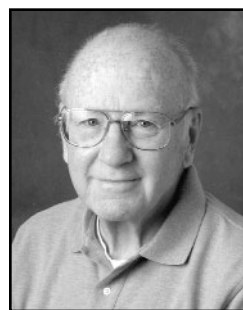
**Diane M. McKnight**

Fellow and Associate Director of Mountain Research Station of INSTAAR; Professor of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder.

PhD: 1979, Massachusetts Institute of Technology.

**Specialty:** Limnology, biogeochemistry of lakes and streams.

**Research Interests:** Research focuses on interactions between hydrologic, chemical, and biological processes in controlling the dynamics in aquatic ecosystems. This research is carried out through field-scale experiments, modeling, and laboratory characterization of natural substrates. Main field sites are located in the Rocky Mountains and in the Transantarctic Mountains and include pristine and stressed ecosystems, such as acid mine drainage influences on mountain streams. Conducts research focusing on interactions between freshwater biota, trace metals, and natural organic material in diverse freshwater environments, including lakes and streams in the Colorado Rocky Mountains, and in the McMurdo Dry Valleys in Antarctica. Develops interactions with state and local groups involved in mine drainage and watershed issues in the Rocky Mountains. A co-principal investigator in the McMurdo Dry Valley LTER and in the Niwot Ridge LTER.

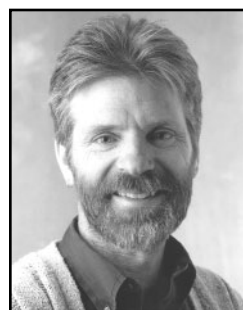
**Mark F. Meier**

Fellow of INSTAAR; Professor Emeritus of Geological Sciences, University of Colorado at Boulder. PhD: 1957, California Institute of Technology.

**Specialty:** Glaciology, global change.

**Research Interests:**

Glaciers in the Earth system, glacier dynamics, snow and glacier hydrology, causes and projections of sea-level change, mechanics of iceberg calving, flow of fast surging and calving glaciers, climate change, and global change in general.

**Gifford H. Miller**

Fellow of INSTAAR; Professor of Geological Sciences, University of Colorado at Boulder. PhD: 1975, University of Colorado at Boulder.

**Specialty:** Quaternary stratigraphy, geochronology, and paleoclimatology.

**Research Interests:**

Primary scholarly interests focus on gaining an improved understanding of how the physical earth system operates. Toward this end, specifically interested in using the Quaternary as a means to reconstruct the coupled ocean/atmospheric/ice climate system. By reconstructing past environmental changes it is possible to get a better understanding of the rates and magnitude of natural climate variability and the various feedback mechanisms in the global climate system. Also interested in the role of humans in the modification of landscapes and ecosystem on Quaternary time scales.



**Astrid E. J. Ogilvie**  
Fellow of INSTAAR.  
PhD: 1982, University of East Anglia, Norwich, UK.  
**Specialty:** Historical climatology and environmental history.  
**Research Interests:** Main areas of interest are the use of historical records to reconstruct past climate, in partic-

ular the past climate and sea-ice record of Iceland; the human dimensions of climatic and environmental changes; and the comparison and integration of different proxy climate records. Interests include the general environmental and human history of countries bordering the North Atlantic regions, in particular Iceland, Greenland, Norway, and the United Kingdom, and North Atlantic fisheries history. Working closely with colleagues in the fields of archaeology and anthropology, in particular through the North Atlantic Biocultural Organization (NABO) and also in the general field of climate history, especially in connection with European and Atlantic Climate Historians (EACH).



**Scott D. Peckham**  
Research Scientist of INSTAAR.  
PhD: 1995, University of Colorado.  
**Specialty:** Surface water hydrology, geomorphology, scaling analysis, and mathematical modeling.  
**Research Interests:**

Physically based mathematical and numerical modeling of watershed-scale hydrologic systems, source-to-sink sediment transport, scaling analysis, river networks, theoretical geomorphology, grid-based computational methods, efficient computer algorithms, and fluvial landscape evolution models.



**Elise Pendall**  
Former Research Scientist of INSTAAR; now Assistant Professor, Department of Botany, University of Wyoming (left INSTAAR in 2002).  
PhD: 1997, University of Arizona.  
**Specialty:** Stable isotope geochemistry.

**Research Interests:** Carbon cycling, especially in the terrestrial environment; paleoecology and paleoclimatology reconstructed from stable isotopes of organic materials; isotope hydrology.



**W. Tad Pfeffer**  
Fellow and Associate Director of INSTAAR; Associate Professor of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder.  
PhD: 1987, University of Washington.  
**Specialty:** Glaciology, con-

tinuum mechanics, heat transfer.  
**Research Interests:** Dynamics of present and past glaciers and ice sheets, through field observational methods and numerical modeling, with emphasis on analysis of stress, deformation and defrature, and iceberg calving and ice/ocean interaction. Also heat and mass transfer in seasonal and perennial snowpacks and atmospheric and snowpack temperature measurement methods.



**Kathleen A. Salzberg**  
Managing Editor, *Arctic, Antarctic, and Alpine Research* (retired 2002).  
MA: 1964, University of Edinburgh.  
**Specialty:** Publication and dissemination of scientific research.



**Tim R. Seastedt**  
Fellow of INSTAAR; Professor of Environmental, Population, and Organismic Biology, University of Colorado at Boulder.  
PhD: 1979, University of Georgia.  
**Specialty:** Terrestrial ecosystems and biogeochemistry.  
**Research Interests:** Biotic

interactions with physical and chemical properties of the environment to control patterns of energy flow and material cycling. Emphasis placed on soil phenomena, particularly those of grassland and tundra ecosystems.



**Robert F. Stallard**  
Fellow of INSTAAR; Research Hydrologist of U.S. Geological Survey.  
PhD: 1980, MIT-WHOI.  
**Specialty:** Biogeochemistry, hydrology, and geomorphology.  
**Research Interests:** Principal interest earth-surface

environment and how it changes on human and geologic time scales. Current focus is the study of climate and land-use changes and how these affect processes that control the composition and dispersal of dissolved and solid phases in rivers and trace gases in the atmosphere.



**James P. M. Syvitski**

Fellow and Director of INSTAAR; Professor of Geological Sciences, University of Colorado at Boulder. PhD: 1978. University of British Columbia (1) Geological Sciences, 1st class, (2) Oceanography, 1st Class.

**Specialty:** Sedimentology, oceanography, hydrology, numerical modeling (climate-ice-water-sediment interactions), marine geophysics, slope instabilities, sea-floor acoustics.

**Research Interests:** Presently investigating (1) the discharge dynamics of global rivers and the sediment load they carry, (2) the morphology and deposits of continental margins, (3) the impact of high-energy weather events on our coastline, and (4) the impact of ice sheets on high-latitude shelves and slopes.

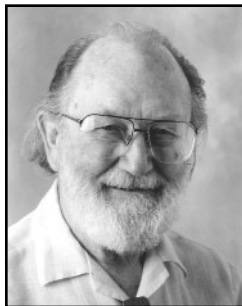


**Alan R. Townsend**

Research Associate of INSTAAR; Assistant Professor of Environmental, Population, and Organismic Biology, University of Colorado at Boulder. PhD: 1994, Stanford University.

**Specialty:** Terrestrial biogeochemistry/ecosystem ecology.

**Research Interests:** Carbon and nitrogen dynamics at regional to global scales; phosphorus controls over C and N in moist tropical systems; nutrient controls over soil carbon storage; human health effects of a changing N cycle.



**Mort D. Turner**

Fellow Emeritus of INSTAAR. PhD: 1972, University of Kansas.

**Specialty:** Glacial and archaeological geology.

**Research Interests:** Active research interests are (1) glacial geology and archaeological geology of southwestern Montana, (2) environment

and archaeological geology of late Pleistocene ice-sheet margins in the United States, (3) geology and mineral resources of Antarctica, (4) tectonic development of the Caribbean region, and (5) archaeological geology of early man in the Americas, China, and Russia.



**Robert S. Webb**

Former INSTAAR Fellow, now INSTAAR Affiliate; Physical Scientist, NOAA Climate Diagnostics Center, Boulder, Colorado (left INSTAAR in 2002). PhD: 1981, Brown University.

**Specialty:** Paleoclimate research, past and future global change. Recon-

structing late Quaternary climate change from the geologic record and using numerical models to investigate the mechanisms of the past climate and environmental change.

**Research Interests:** Include (1) generating quantitative estimates of past climate from fossil pollen data and paleo-lake level records, (2) modeling of past changes in vegetation distributions, (3) developing hydrologic models for evaluating the dynamics of past changes in regional moisture balances, (4) assessment and improvement of the hydrologic cycle in general circulation models (GCMs), and (5) the design and implementation of GCM paleoclimate simulations to test hypotheses of past climate change.

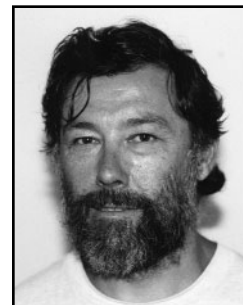


**James W. C. White**

Fellow of INSTAAR; Professor of Geological Sciences; Director of the Environmental Studies Program, University of Colorado at Boulder. PhD: 1983, Columbia University.

**Specialty:** Global change, paleoclimate dynamics, biogeochemistry.

**Research Interests:** Stable isotope laboratory: global scale climate and environmental dynamics, carbon dioxide concentrations and climate from stable hydrogen isotopes peats and other organics, climate from deuterium excess and hydrogen isotopes in ice cores; isotopes in general circulation models; modern carbon cycle dynamics via isotopes of carbon dioxide and methane.



**Mark W. Williams**

Fellow of INSTAAR; Associate Professor of Geography, University of Colorado at Boulder. PhD: 1991, University of California-Santa Barbara.

**Specialty:** Alpine biogeochemistry, hydrology, and snow hydrology.

**Research Interests:** The processes that determine the hydrochemistry and biogeochemistry of high-elevation basins, including the storage and release of solutes from the snowpack, biogeochemical modifications of snowpack runoff, nutrient cycling and

hydrologic pathways and residence time. Current projects include the Rocky Mountains; Ecuadorian and Bolivian Andes; and Central Asian areas of Kazakhstan, Kirghizia, and China.



**Alexander P. Wolfe**

Former INSTAAR Research Scientist, now INSTAAR Affiliate; Associate Professor of Earth and Atmospheric Sciences, University of Alberta (left INSTAAR in 2001). PhD: 1994, Queen's University.

**Specialty:** Paleolimnology, freshwater diatoms, environ-

mental change as registered in the sediments of arctic and alpine lakes.

**Research Interests:** Focus is paleolimnology, primarily the use of freshwater diatoms preserved in sediments to infer patterns of lake evolution. The geographical focus is both arctic (Baffin Island) and alpine (Rocky Mountains, Andes), whereas the time scales investigated range from anthropogenic disturbances in recent decades to glacial-interglacial cycles.



**Connie A. Woodhouse**

Associate of INSTAAR; Physical Scientist of Paleoclimatology Branch of the National Climatic Data Center, U.S. Department of Commerce, National Oceanographic and Atmospheric Administration. PhD: 1996, University of Arizona.

**Specialty:** Paleoclimatology, dendrochronology, climatology.

**Research Interests:** Research has focused on the generation and interpretation of high-resolution records of climate for the past 2,000 years. Current research projects concern tree-ring reconstructions of drought for the Great Plains and Rocky Mountains as well as investigations into the mechanisms of long-term drought and impacts on ecosystems and disturbance regimes. Other work addresses millennial-length reconstructions of temperature and atmospheric circulation for the northern Rockies and western United States. Recent projects target ways to generate dendrohydrologic reconstructions that are more useful to water resource managers.

**Other Directorate Members**

**Jason Briner**

Representative, Graduate Students

**Michael Gooseff**

Representative, Graduate Students

**Julie Hughes**

Chief Financial Officer

**David Kinner**

Representative, Graduate Students

**Jeff Lukas**

Representative, Professional Scientists

**Vicky Nelson**

Assistant to the Director

**Connie Oehring**

Managing Editor of *Arctic, Antarctic, and Alpine Research*

**J. Scott Stewart**

Representative, Postdoctoral Scientists

**Ryan Vachon**

Representative, Graduate Students

**Bruce Vaughn**

Laboratory Facilities



A group of INSTAAR Directorate members

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# INSTAAR Visiting Scientists



**Dr. Inge Aarseth**  
Department of Geology,  
University of Bergen.  
Host: James Syvitski.



**Dr. Kevin Bishop**  
Swedish University of  
Agricultural Sciences.  
Host: Diane McKnight.



**Dr. Robert Anderson**  
Earth Sciences, University of  
California, Santa Cruz.  
Host: Tad Pfeffer.



**Dr. Aslaug  
Geirsdottir**  
University of Iceland.  
Host: John Andrews.



**Dr. Suzanne  
Anderson**  
Earth Sciences, University of  
California, Santa Cruz.  
Host: Tad Pfeffer.



**Dr. Vladimir G.  
Konovalov**  
Tashkent, Uzbekistan,  
Fulbright Scholar.  
Hosts: Mark Meier and  
Mark Dyurgerov.



**Dr. Tim Barrows**  
Research School of Physical  
Sciences, Australian National  
University.  
Host: Scott Lehman.



**Dr. Jon Landvik**  
Agricultural University  
of Norway.  
Host: Gifford Miller.





**Dr. Ida Lønne**

The University Courses on Svalbard (UNIS), Norway.  
Host: Gifford Miller.



**Dr. Lothar Schrott**

Geomorphological Research Unit, Department of Geography, University of Bonn.  
Host: Nel Caine.



**Dr. Meredith Newman**

Chemistry and Geology, Hartwick College, Oneonta, New York.  
Host: Mark Williams.



**Dr. Sarah Spaulding**

California Academy of Sciences.  
Host: Diane McKnight.

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## INSTAAR Affiliates

### Ecosystems

**Richard Boyce**

Department of Biological Sciences, Northern Kentucky University. PhD: 1990, Yale University.  
Plant physiological ecology.

**Paul Brooks**

Assistant Professor, Hydrology and Water Resources, University of Arizona. PhD: 1995, University of Colorado at Boulder.

Biogeochemical cycling of carbon and nutrients, hydrological linkages between terrestrial and aquatic systems, effects of disturbance on natural systems.

**Hector Galbraith**

CEO, Galbraith Environmental Sciences, Newfane, VT. PhD: 1986, Glasgow University.  
Anthropogenic disturbances and arctic/alpine bird and plant communities.

**Stephen Jackson**

Assistant Professor, Botany, University of Wyoming. PhD: 1983, Indiana University.

Verification of the range of vegetation responses to environmental changes and delineation of the relationships between modes of response and the magnitudes and rates of environmental forcing.

**Timothy Kittel**

Natural Resource Ecology Laboratory, Colorado State University. PhD: 1986, University of California, Davis.

Ecological response to climate variability at interannual through centennial time scales.

**Herman Sievering**

Professor, Environmental Science Program and Physics Department, University of Colorado at Denver. PhD: 1971, University of Illinois.

Atmospheric physics and chemistry.

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### **Sarah Spaulding**

Research Associate, California Academy of Sciences. PhD: 1996, Colorado State University.

Environmental, geologic, and evolutionary change through paleoecology, systematics, and biogeography of freshwater diatoms.

### **Heidi Steltzer**

Postdoctoral Research Scientist, Department of Forest Sciences, Colorado State University. PhD: 1999, University of Colorado at Boulder.

Ecosystem development, nutrient retention, and scaling plant effects.

### **Cathy Tate**

Research Biologist, Water Resources Division, U.S. Geological Survey, Denver Federal Center. PhD: 1985, Kansas State University.

Ecology and biogeochemistry of temperate and antarctic streams.

### **Howard E. Taylor**

Research Chemist and Project Chief, Environmental Analytical Chemistry and Water Quality Project, National Research Program, Water Resources Division, U.S. Geological Survey, Boulder, CO. PhD: 1970, Colorado State University.

Water chemistry and trace-element analysis.

## **Geophysics**

### **Edmund Andrews**

Chief River Mechanics Project, National Research Program, U.S. Geological Survey, Denver Federal Center. PhD: 1977, University of California–Berkeley.

Sedimentation in alluvial rivers.

### **David Bahr**

Regis University, Denver, Colorado. PhD: 1993, University of Colorado at Boulder.

Glaciology and computer science.

### **Gary Clow**

U.S. Geological Survey, Climate History Program, Denver Federal Center.

Borehole paleothermometry in polar regions, climate monitoring, climate modeling.

### **Andrew G. Fountain**

Professor, Department of Geology, Portland State University. PhD: 1992, University of Washington.

Glacier hydrology.

### **Pierre Julien**

Professor, Department of Civil Engineering, Colorado State University. PhD: 1983, Laval University.

Hydrology and sediment transport modeling.

### **Vladimir G. Konovalov**

Chief, Department of Regional Projects, Central Asian Regional Research, Hydrometeorological Institute, Republic of Uzbekistan. PhD: 1964, Leningrad State University, USSR; 1983, USSR Academy of Sciences, Irkutsk, USSR.

Glaciology and hydrometeorology.

### **Wesley E. LeMasurier**

Professor of Geology, Department of Geology, University of Colorado at Denver. PhD: 1964, Stanford University.

Igneous petrology and volcanology. Cenozoic volcanoes of Antarctica (petrology, geochemistry, and tectonic relationships) and the record of glacial history preserved in hydrovolcanic deposits.

### **John Pitlick**

Assistant Professor, Department of Geography, University of Colorado at Boulder. PhD: 1988, Colorado State University.

Geomorphology and sediment transport modeling.

### **Lincoln Pratson**

Assistant Professor, Division of Earth and Ocean Sciences, Duke University. PhD: 1993, Columbia University.

Marine geology and geophysics.

## **Past Global Change**

### **Larry Benson**

U.S. Geological Survey, Denver Federal Center. PhD: 1974, Brown University.

Quaternary fluctuations of closed-basin lakes.

### **William Briggs**

PhD: 1974, Victoria University of Wellington, New Zealand.

Paleoceanography, paleoclimatology, paleoecology; late Quaternary high-latitude marine ostracodes.

### **Parker E. Calkin**

Emeritus Professor of Geology, State University of New York at Buffalo. PhD: 1963, The Ohio State University.

Glacial geology, geomorphology, Quaternary geology.

### **Julia Cole**

Assistant Professor, Department of Geosciences, University of Arizona. PhD: 1992, Columbia University.

Recent tropical climate variability, coral geochemical records, hydrologic cycle stable isotopes, North American drought.

### **P. Thompson Davis**

Professor, Natural Sciences Department, Bentley College. PhD: 1980, University of Colorado at Boulder.

Glacial and Quaternary stratigraphy, cosmogenic exposure dating, lacustrine sedimentology, tephrochronology, palynology.

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**Daniel Grossman**

Freelance Journalist. PhD: 1993, Massachusetts Institute of Technology.

Radio stories and magazine articles; working on climate change trade book.

**Richard F. Madole**

Scientist Emeritus, Earth Surface Processes Team, U.S. Geological Survey. PhD: 1963, Ohio State University.

Surficial geology, geomorphology, Quaternary stratigraphy and dating techniques, and the application of these disciplines to determining recurrence intervals of natural hazards.

**Gregory McCabe**

Physical Scientist, U.S. Geological Survey, Denver, CO. PhD: 1986, Louisiana State University.

Hydroclimatic processes and hazards.

**Daniel R. Muhs**

Research Geologist, Earth Surface Processes Team, U.S. Geological Survey. PhD: 1980, University of Colorado.

Quaternary geology and paleoclimatology, soils, geomorphology, geochronology.

**Alan R. Nelson**

Geologic Hazards Team, U.S. Geological Survey, Golden, CO. PhD: 1978, University of Colorado at Boulder.

Paleoseismology and active faulting of U.S. Pacific Northwest, Holocene sea-level history applied to neotectonics, earthquake, and tsunami hazards.

**Mel Reasoner**

Mountain Research Initiative Coordination Office, Bern. PhD: University of Alberta.

Paleoecology of alpine environments, pollen and macrofossil analysis, and lake-coring techniques; target preparation for AMS dating.

**Richard Reynolds**

U.S. Geological Survey, Denver Federal Center. PhD: 1975, University of Colorado at Boulder.

Geologic records of climate change; environmental magnetic studies.

**Eric J. Steig**

Assistant Professor, Geophysics/Quaternary Research Center, University of Washington, Seattle. PhD: 1996, University of Washington.

Isotope geochemistry, glaciology.

**Robert S. Thompson**

Team Chief Scientist, Earth Surface Processes Team, U.S. Geological Survey. PhD: 1984, University of Arizona.

Paleoclimatology, palynology, plant macrofossil studies, plant-climate relations, vegetation change, and paleohydrology.

**Robert S. Webb**

Physical Scientist, NOAA Climate Diagnostics Center, Boulder, Colorado. PhD: 1981, Brown University.

Paleoclimate research, past and future global change. Reconstructing Late Quaternary climate change from the geologic record and using numerical models to investigate the mechanisms of the past climate and environmental change.

**Alexander P. Wolfe**

Associate Professor, Department of Earth and Atmospheric Sciences, University of Alberta. PhD: 1994, Queen's University.

Paleolimnology, freshwater diatoms, environmental change as registered in the sediments of arctic and alpine lakes.

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# Postdoctoral Research Scientists

**Lisa Barlow**

PhD: 1994, University of Colorado at Boulder. High-resolution paleoclimatology, climate/societal interactions.

**Cory Cleveland**

PhD: 2001, University of Colorado at Boulder. Terrestrial biogeochemistry and microbial ecology.

**Dominic Ferretti**

PhD: 1999, Victoria University of Wellington, New Zealand. Experimental technique development and isotopic analysis of atmospheric trace gases as indicators of climate change.

**Jennifer Robin Fulton**

PhD: 2000, University of California–Berkeley. Biogeochemistry of humic acids in marine and lacustrine sediments.

**Joel Harper**

PhD: 1997, University of Wyoming. Glacier dynamics, glacier hydrology, thermodynamic processes in snow.

**Hope Humphries**

PhD: 1993, Colorado State University. Landscape ecology, ecological modeling, conservation planning.

**Michael Kerwin**

PhD: 2000, University of Colorado at Boulder. Evaluating the impacts of climate change and land use in the western United States.

**Yusuke Kubo**

PhD: 2000, Kyoto University, Japan. Sedimentology, sediment transport processes in the deep sea.

**Tian Lide**

PhD: 1999, Lanzhou Institute of Glaciology and Geocryology, Chinese Academy of Sciences. Stable isotopes in precipitation from the Tibetan Plateau.

**Helmut Mayer**

PhD: 1996, Eberhard-Karls-Universität, Tübingen, Germany. Quantitative stratigraphy, paleomagnetism, structural geology, glaciology, marine geology, geomathematics, and geophysics

**John Miller**

PhD: 1999, University of Colorado at Boulder. Isotopic composition of radiative trace gases and biosphere atmosphere interactions.

**Scott Peckham**

PhD: 1995, University of Colorado at Boulder. Mathematical modeling, fluid dynamics, hydrology, and geomorphology (joined INSTAAR Directorate in 2001).

**Katherine Nash Suding**

PhD: 1999, University of Michigan. Plant community ecology, plant species effects on ecosystem function.

**Damian O’Grady**

PhD: 2001, University of Colorado at Boulder. Continental margin sedimentation.

**Irina Overeem**

PhD: 2002, Department of Civil Engineering and Applied Earth Sciences, Delft University of Technology, the Netherlands. Stratigraphy, numerical modeling of fluvio-deltaic processes, uncertainty prediction in sedimentary modeling.

**J. Scott Stewart**

PhD: 2000, University of Colorado at Boulder. Three-dimensional sediment modeling.

**Joseph Stoner**

PhD: 1995, Université du Québec à Montréal (UQAM). Quaternary paleoceanography, paleoclimatology, and paleomagnetism; magnetic methods (paleo- and environmental magnetism) to date and interpret the earth’s past from Quaternary sediments.



Three of INSTAAR’s Postdoctoral Research Scientists: Y. Kubo, I. Overeem, J. Stoner

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# Senior Research and Professional Scientists and Research Support Personnel

## Senior Research Scientists

### Chris Jenkins

PhD, Cambridge, UK. Research interests: Marine geosciences, seabed information processing and mapping, development of Geographic Information System (GIS) visualizations and rule-based GIS expert systems.

## Professional Scientists and Research Support Personnel

### Todd Ackerman

Primary duties: LTER data and information management. Research interests: Data management and information technology. Supervisor: Tim Seastedt.

### Kathy Anderson

Primary duties: Paleoclimatological studies on a continental scale in North America, using pollen, plant macrofossils, and modern vegetation to look at past and future climate and vegetation changes. Supervisor: Vera Markgraf.

### Nancy Auerbach

Primary duties: Landscape-scale vegetation ecology statistical analysis for the Columbia River Basin. Research interests: Vegetation ecology analysis using GIS and remote sensing, Arctic ecology. Supervisor: Patrick Bourgeron.

### Heather Bechtold

Primary duties: Lab and field management. Research interests: Plant-soil interactions, competitive strategy, and community dynamics. Supervisors: Tim Seastedt and Bill Bowman.

### Sarah Billmeier

Supervisor: C. Seibold.

### Gary Bolton

Primary duties: Drought reconstructions from the Central Plains region using tree-ring data. Supervisor: Connie Woodhouse.

### Peter Brown

Primary duties: Drought reconstructions from the Central Plains region using tree-ring data. Research interests: Using tree-ring data to reconstruct climate and forest dynamics. Supervisor: Connie Woodhouse.

### Evan Burgess

Primary duties: Data management and processing within GIS for analysis of modern and past glacier-climate relationships. Supervisor: William Manley.

### Florence Bocquet

Primary duties: Assistant laboratory manager of the Atmospheric Research Laboratory. Development, testing, and application of analytical tools for field measurements. Research interests: Arctic/antarctic snow-atmosphere gas exchange. Supervisor: Detlev Helmig.

### Mariah Carbone

Primary duties: Field, lab, and information processing for several LTER and USDA projects. Supervisor: Tim Seastedt.

### Kurt Chowanski

Primary duties: Maintaining and operating instruments measuring total dissolved nitrogen and carbon. Research interests: Dissolved organic matter. Supervisor: Mark Williams.

### Peter Conovitz

Supervisor: Diane McKnight.

### Briana Christine Constance

Primary duties: Managing Terrestrial Biogeochemistry lab. Research interests: Soil biogeochemistry. Supervisor: Alan Townsend.

### Travis Cornwell

Primary duties: Radiocarbon-dating technician. Research interests: Method development for radiocarbon dating. Supervisor: Jocelyn Turnbull.

### Andrew Crowell

Primary duties: Laboratory manager, Sediment Geochemistry Lab. Research interests: Climate reconstruction using alkenone-derived sea-surface temperatures. Supervisor: Scott Lehman.

### Mark Dreier

Primary duties: Assistant laboratory manager in Stable Isotope Laboratory. Provide technical expertise with the hardware, develop new systems, maintain old systems, and rebuild mass spectrometers and vacuum pumps. Supervisor: Bruce Vaughn.

### Denise Dundon

Primary duties: Data management and processing within GIS for analysis of modern and past glacier-climate relationships. Supervisor: William Manley.

### Nanette Elias

Primary duties: Assistant to the Managing Editor of *Arctic, Antarctic, and Alpine Research* journal and library assistant for the INSTAAR Reading Room. Supervisors: Kathleen Salzberg and Martha Andrews.

### Karen Erbe

Primary duties: Core splitting and sediment analysis for an Iceland project. Research interests: sedimentology. Supervisor: John Andrews.

### Joseph Flaherty

Supervisor: Wendy Roth.

### Charles Hart

Primary duties: Data collection and information management for the Amino Acid Geochronology Laboratory, Center for Geochronological Research. Supervisor: Giff Miller.

### John Gartner

Supervisor: Mark Williams.

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**Michael Hartman**

Primary duties: Data and information management.  
Research interests: Data management and information technology. Supervisor: Tim Seastedt.

**Chanda Herring**

Primary duties: Prepare samples for <sup>14</sup>C dating from a Cariaco core. Research interests: Generate high-resolution <sup>14</sup>C plot to correlate with tree-ring and coral plots.  
Supervisor: Scott Lehman.

**Rachael Hilberman**

Primary duties: Geographic Information System (GIS), database, and programming assistance. Supervisor: James Syvitski.

**Jennifer Horsman**

Primary duties: Data manager for long-term ecological research conducted in McMurdo Dry Valleys, Antarctica.  
Research interests: Ecology, ice core glaciochemistry, climate change, data management and visualization, and scientific applications of GIS. Supervisor: Diane McKnight.

**Zhengjun Hu**

Primary duties: Data manager/analyst and computer programmer for the NSF Konza soil biodiversity research project. Develop a database-driven, web-based information management system and write statistical programs to analyze research data. Research interests: Scientific computer programming, development of information management systems, and dynamic simulation modeling in applied sciences. Supervisor: Tim Seastedt.

**Eric Hutton**

Primary duties: Maintain and develop numerical models that predict the spatial and temporal distribution of marine sediments. Research interests: Sediment transport, computational fluid dynamics, and geophysics. Supervisor: Scott Peckham.

**Katie Hyland**

Primary duties: Field technician on Niwot LTER project, maintaining the automatic weather stations and collecting stream and soil solution samples for chemical analysis.  
Supervisor: Mark Williams.

**Margot Kaye**

Supervisor: Connie Woodhouse.

**Albert Kettner**

Primary duties: Develop numerical code of hydrological process model HYDROTREND, develop and maintain web-based GIS applications, collect paleoclimate data for scenario modeling (Geo clutter project). Research interests: Programming and GIS applied to earth science issues.  
Supervisor: James Syvitski.

**Maggie Lefer**

Supervisor: Alan Townsend.

**Mark Losleben**

Primary duties: Long-term climatic database management, atmospheric and precipitation measurements. Research interests: Long-term climatic trends and related processes affecting Niwot Ridge. Supervisor: Bill Bowman.

**Jeff Lukas**

Primary duties: Tree-ring sample collection, dating, measuring, and data analysis. Research interests: Climate variability in the interior West and its effects on human activities and ecosystems. Supervisor: Connie Woodhouse.

**Heidi Manger**

Supervisor: E. James Dixon.

**Erick Mattson**

Supervisor: James White.

**Amy Miller**

Supervisor: Mark Williams.

**David Mixon**

Primary duties: Develop terrain analysis techniques to calculate and visualize long-term coastal sedimentation trends using existing numerical models. Research interests: Application of geographic information systems (GIS) to problems relating to erosion and sediment movement, specifically sedimentation in man-made reservoirs, post-wildfire erosion processes, and the effects of climate and land-use change on erosion and sedimentation. Supervisor: James Syvitski.

**Valerie Morris**

Primary duties: Operating and maintaining mass spectrometers, analyzing air samples for stable isotopes in collaboration with NOAA. Research interests: Carbon cycling through all systems. Supervisor: Bruce Vaughn.

**Curtis Nepstad-Thornberry**

Primary duties: Tree-ring preparation, dating, measuring, and chronology compilation. Research interests: Settlement ecology, New World paleobotany, Geographic Information Systems, quantitative methods. Supervisor: Connie Woodhouse.

**Shad O'Neel**

Supervisor: Tad Pfeffer.

**Andy O'Reilly**

Primary duties: LTER field technician. Research interests: Snow science, mountain climatology, structural geology, glaciology, DC power systems. Supervisor: Tim Seastedt.

**Eric Parrish**

Primary duties: Create graphics and GIS-based products, information and image management, scientific illustration, and support. Research interests: Scientific illustration, ArcGIS, remote-sensing and graphic software applications.  
Supervisor: E. James Dixon.

**Trevor Popp**

Primary duties: Analysis of ice-core samples for H/D, <sup>18</sup>O/<sup>16</sup>O, and deuterium excess; processing of Antarctic and Greenland ice cores for NICL; deep drill operator at North-GRIP camp, Greenland. Research interests: Paleoclimate via ice cores. Supervisor: Jim White.

**Christine Seibold**

Primary duties: Environmental Chemistry Laboratory manager. Research interests: Long-term ecological research chemistries. Supervisor: Tim Seastedt.

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**Steve Seibold**

Primary duties: Manager Mountain Research Station.  
Supervisor: Bill Bowman.

**Charles Steele**

Primary duties: Radiocarbon-dating technician. Research interests: Method development for radiocarbon dating. Supervisor: Jocelyn Turnbull.

**Jocelyn Turnbull**

Primary duties: Manage Laboratory for AMS Radiocarbon Preparation and Research, which provides radiocarbon-dating services to the NSF-ESH community as well as in-house researchers. Research interests: Improved radiocarbon-dating techniques. Supervisor: Scott Lehman.

**Joanne Turner**

Primary duties: Geoarchaeological assistant. Research interests: Earliest peopling of the Americas and sources of raw materials for stone tools. Supervisor: James Syvitski.

**Frank Urban**

Primary duties: Operates mass spectrometers for analysis of greenhouse gases and carbonates, prepares samples, and manages data storage and quality assurance. Supervisor: Jim White.

**Bruce Vaughn**

Primary duties: Oversees the operation of the Stable Isotope Lab that performs isotopic analyses on atmospheric CO<sub>2</sub>, CH<sub>4</sub>, polar ice cores, water, and organic materials. The facility comprises several labs and houses multiple prep systems, off-line extraction systems and computing facilities as well as six mass spectrometers. Research interests: Collaborative isotopic studies in ice cores, glaciers, atmospheric gases, and global change in general. Supervisor: Jim White.

**Megan Walsh**

Supervisor: Tim Seastedt.

**Nancy Weiner**

Primary duties: Micropaleontology laboratory technician, supervises students and conducts foraminiferal analysis. Research interests: Micropaleontology. Supervisor: Anne Jennings.

**Kevin Wheeler**

Primary duties: Database manager for McMurdo Dry Valleys Long-Term Ecological Research (MCMLTER) project and participation in field research in the Dry Valleys, Antarctica, and Alaska. Supervisor: Diane McKnight.

**Kris White**

Primary duties: Research assistant providing support for the Carbon, Climate, and Society Initiative IGERT Program. Supervisor: Alan Townsend.

**Dana Witwicki**

Supervisor: Bill Bowman.

**Chad Wolak**

Primary duties: Laboratory manager, Sediment Geochemistry Lab. Research interests: Climate reconstruction using alkenone-derived sea-surface temperatures. Supervisor: Scott Lehman.

**Chi Yang**

Primary duties: Data manager for McMurdo Dry Valleys Long-Term Ecological Research (MCMLTER) project. Supervisor: Diane McKnight.



A group of INSTAAR Professional Scientists and Research Support Personnel

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# Administrative and Classified Staff

**Margaret Ahlbrandt**

Accounting Technician III, grants and contract management.

**Cynthia Beers**

Administrative Assistant II, administrative support for the Institute.

**Kathryn Clegg**

Accounting Technician III, grants and contract management.

**DeLynna Dari**

Administrative Assistant II, administrative support for the Institute.

**Mary Fentress**

Accounting Technician III, grants and contract management.

**Sedrick Frazier**

Accounting Technician III, grants and contract management.

**Jenifer Hall-Bowman**

Administrative Assistant II, administrative support for journal and library.

**Julie Hughes**

Chief Financial Officer, main financial officer for the Institute and its faculty.

**Wesley Mendez**

Accounting Technician III, grants and contract management.

**Vicky Nelson**

Assistant to the Director, administrative support to the Director of the Institute, Institute committees, and Institute members.

**Wendy (Freeman) Roth**

Sediment Lab Coordinator.

**Chad Stoffel**

System/Network Administrator.

**James Syvitski**

Director.



A group of INSTAAR  
Administrative and Classified Staff



# Students

**G**raduate and undergraduate students are an integral part of INSTAAR, and they play important roles in the research conducted by the institute and its members. INSTAAR students are registered for degree programs in an appropriate department and college. Financial support is available for INSTAAR graduate students as research assistants employed on research grants. Undergraduate support is available through special programs sponsored by INSTAAR, the university, industry, and agencies such as the National Science Foundation and are designed to encourage undergraduate participation in research. They include Summer Undergraduate Research Program (SURE), Summer Undergraduate Research Fellowships (SURF), Summer Minority Access Research Training (SMART), Undergraduate Research Opportunities (UROP), University Mentoring Program (UMP), and Research Experience for Undergraduates (REU). Undergraduate research may lead to honors theses and internships. These programs have contributed greatly to the feasibility of including undergraduate students in INSTAAR research and to encouraging undergraduate students to continue to advanced degrees.

Prospective graduate students should contact the department that they wish to enter and apply for admission to the University of Colorado. Suitable departments include CEA Engineering, EPO Biology, Geography, Geological Sciences, and Program in Atmospheric and Oceanic Sciences (PAOS). Applications forms are available from the Graduate School, 30 UCB, University of Colorado, Boulder, CO 80309-0030. For specific INSTAAR-related questions, send e-mail to [instaar-info@instaar.colorado.edu](mailto:instaar-info@instaar.colorado.edu) or contact individual INSTAAR professors directly (see the INSTAAR website, <http://instaar.colorado.edu>).

## Some Visiting Graduate Students

*Student Name—Supervisor*

Simon Clarke—Gifford Miller

Jacques Hueber—Detlev Helmig.

Oliver Kaltschmidt—Detlev Helmig

Saedis Olafsdottir—John Andrews

Jan Pollmann—Detlev Helmig.

Frank Rytter—Anne Jennings and John Andrews.

A group of INSTAAR graduate students



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## INSTAAR Graduate Students

*Student Name, Degree, Department, Adviser. Approximate thesis topic or title.*

Craig Anderson, MS, Geography, Mark Williams. Thesis combines snow hydrology, GIS, and remote sensing.

Marcella Appel, MS, Civil, Environmental, and Architectural Engineering, Diane McKnight. "The Influence of Climate-Induced Alterations in Dissolved Organic Matter on Metal Toxicity and UV Radiation in Rocky Mountain Streams."

Nataly Ascarrunz, PhD, EPO Biology, Tim Seastedt. Dissertation relates to carbon cycling and changes in land use.

Yarrow Axford, PhD, Geological Sciences, Gifford Miller. "Lacustrine Oxygen-Isotopic Records of Climate Change in Northern Iceland."

Donald Barber, PhD, John Andrews. "Laurentide Ice Sheet Dynamics from 35 to 7 ka: Sr-Nd-Pb Isotopic Provenance of NW North Atlantic Margin Sediments."

Laura Belanger, MS, Diane McKnight. "Source and Effect of Acid Rock Drainage in the Snake River Watershed, Summit County, Colorado."

Carl Bern, PhD, EPO Biology, Alan Townsend. Dissertation focuses on nutrient cation cycling in tropical forests.

Jessica Black, PhD, Geological Sciences, Gifford Miller. "Investigating the Holocene Thermal Maximum at Hvitarvatn, Iceland."

Florence Bocquet, PhD, Program in Atmospheric and Oceanic Sciences (PAOS), Detlev Helmig. "Ozone Fluxes through the Antarctica Boundary Layer."

Andrew Borden, MS, GIS (UC Denver), William Manley.

Jason Briner, PhD, Geological Sciences, Gifford Miller. "Laurentide Ice Sheet Dynamics and Chronology on Northeastern Baffin Island, Eastern Canadian Arctic."

Isla Castañeda, MS, Geological Sciences, John Andrews. "Holocene Paleooceanographic and Climatic Variations of the Inner North Iceland Continental Shelf, Reykjarfjordur Area."

Cory Cleveland, PhD, EPO Biology, Alan Townsend. "Soil Microbial Dynamics and Biogeochemical Cycling in Moist Tropical Forests."

Daniel Cordalis, MS, Geography, Mark Williams. Thesis relates to alpine hydrology and flowpaths.

Rose Cory, PhD, Civil, Environmental, and Architectural Engineering, Diane McKnight. "Effect of Dissolved Organic Matter on the Photolysis of Persistent Organic Pollutants in Arctic Surface Waters."

Elizabeth Costello, EPO Biology, Bill Bowman.

Roy Coulthard, MS, Geological Sciences, Gifford Miller. "Glacial and Sea-Level History of the Outer Cape Aston Peninsula, Baffin Island, Eastern Canadian Arctic."

Karen Cozzetto, PhD, Civil, Environmental, and Architectural Engineering, Diane McKnight. Dissertation relates to hydrology in the Dry Valleys, Antarctica.

Noah Daniels, MS, Geological Sciences, Gifford Miller. "Diatom-Inferred Salinity Changes and Drought History of the Last 3000 Years from Round Lake, Nebraska."

Stephen DeVogel, MS, Geological Sciences, Gifford Miller. "Reconstructing the Australian Paleo-Monsoon Using GIS and the Racemization of Amino Acids in Charophyte Oogonia."

Lisa Doner, PhD, Geological Sciences, John Andrews. "Late Holocene paleolimnology and paleoclimatology from subarctic lakes in Nunavut, Canada, and Iceland."

Gita Dunhill, PhD, Geological Sciences, James Syvitski and Anne Jennings. "Greenland and Iceland Margins: A Comparison of Depositional Processes under Different Glaciologic and Oceanographic Settings."

Sabre Duren, MS, Civil, Environmental, and Architectural Engineering, Diane McKnight. "Spatial and Temporal Variation of Iron and Zinc in a Mountain Stream Receiving Multiple Sources of Acid Rock Drainage."

Tyler Erickson, PhD, Geography, Mark Williams. "Spatial Variability of Meltwater Flowpaths in Alpine Snowpacks."

Rose Cory (INSTAAR) tries to avoid mosquitoes while collecting 600 liters of water from Island Lake near the Brooks Range and the Toolik LTER, Alaska, June 2002. Dissolved organic matter was extracted to study its reactivity with persistent organic pollutants (POPs) and sunlight. Photo: Y. Chin (Ohio State University).



- Tara Ann Forbis, PhD, EPO Biology, Bill Bowman. "Seedling Establishment on Alpine Tundra: Community Patterns, Population Demography, and Disturbance Effects."
- Eileen Gardner, MS, EPOB, Diane McKnight and William Lewis. "Effects of Atmospheric Nitrogen Deposition on the Seasonal Dynamics of Phytoplankton in an Alpine Lake."
- Nancy Golubiewski, EPO Biology, Alan Townsend.
- Michael N. Gooseff, PhD, Civil Engineering, Diane M. McKnight. "Modeling Hyporheic Exchange Influences on Biogeochemical Processes in Dry Valley Streams, Antarctica."
- Hillary Hamann, PhD, Geography, Nel Caine. "The Ionic Pulse, Snowmelt Flowpaths, and Surface Water Chemistry in Two Alpine Basins, Colorado Rocky Mountains, USA."
- Anne Hickey, PhD, Environmental Studies, Diane McKnight. Dissertation relates to remote sensing and Alaskan North Slope hydrology and climate change.
- Nancy Hoalst-Pullen, PhD, Geography, Robert Stallard. "Effects of Soil-Borne Resources on the Structure and Dynamics of Lowland Tropical Forests."
- Keri Holland, PhD, EPO Biology, Alan Townsend. "The Fate of Excess Nitrogen in Alpine Tundra."
- Eran Hood, PhD, Geography, Mark Williams. "Ecological Controls on the Source and Character of Dissolved Organic Matter in an Alpine/Subalpine Watershed, Green Lakes Valley, Colorado Front Range."
- Ulrike Huber, PhD, Geography, Vera Markgraf. "Linkages among Climate, Vegetation, and Fire in Fuego-Patagonia during the Late Glacial and Holocene."
- Eric W. H. Hutton, PhD, Geophysics, James Syvitski. "Modeling Sediment Delivery and Dispersion within the Coastal Ocean: Scaling across Space and Time."
- Jason Janke, PhD, Nel Caine, Geography. "Rock Glaciers in the Front Range: An Analysis of Topoclimatic Variables, Permafrost Distribution, and Long-Term Flow Rates."
- Chris Jaros, MS, Civil, Environmental, and Architectural Engineering, Diane McKnight. "Determining the Effect of Surface Area Distribution in Elevation for Glacial Meltwater Generation, McMurdo Dry Valleys, Antarctica."
- David Kinner, PhD, Geological Sciences, James Syvitski. "Estimating Carbon Storage in an Agricultural River Basin."
- Lisa Klapper, MS, Civil, Environmental, and Architectural Engineering, Diane McKnight. "Humic Substance Redox Detection Using Fluorescence Spectroscopy."
- Meredith Knauf, MS, Geography, Mark Williams. Thesis relates to water quality and supply for ski-resort resource management.
- Greta Bjork Kristjansdottir, PhD, Geological Sciences, John T. Andrews. Dissertation relates to reconstructing late Quaternary paleoclimatic variations on the Iceland shelf with Mg/Ca and  $d^{18}O$  in foraminifera.
- Anthony Lane, Environmental Sciences, James White.
- Julia Larson, PhD, EPO Biology, Bill Bowman. Dissertation relates to plant/soil interactions in alpine tundra.
- Brian Lazar, MS, Civil, Environmental, and Architectural Engineering, Tad Pfeffer. Thesis investigates the relationship between englacial water storage and movement.
- Craig Lee, PhD, Anthropology, James Dixon. Dissertation topic relates to the early human occupation of southeastern Alaska.
- Kate Lejeune, PhD, EPO Biology, Tim Seastedt. Dissertation topic relates to soil biogeochemistry associated with invasive plant species.
- Karen Lewis, PhD, Geophysics (Geological Sciences), Tad Pfeffer. "Solar-Forced Roughening of Antarctic Glaciers and the Martian Icecaps: How Surficial Debris and Roughness Affects Glacial Melting in Taylor Valley, Antarctica, and How This Can Be Applied to the Martian Icecaps."
- Dan Liptzin, PhD, EPO Biology, Tim Seastedt. "Biotic Constraints on Regional Biogeochemistry at the Forest-Tundra Ecotone."
- Fengjing Liu, PhD, Geography, Mark Williams. "Coupling Hydrologic and Hydrochemical Models."
- Nathaniel Logar, PhD, Environmental Sciences, Jim White. Dissertation topic relates to stable isotopes, the carbon cycle, and climate change.
- Alejandro Enrique Machado, MS, Geological Sciences, Tad Pfeffer. "Spatial and Temporal Variability of Meltwater Pathways in a Continental Subalpine Snowpack."
- Ken Mack, PhD, Geological Sciences, Jim White. "System Construction and Method Development for High Spatial and Temporal Resolution Measurements of the Deuterium of Atmospheric Methane."

Jennifer Mangan, PhD, Geological Sciences, Gifford Miller. "An Integrative Study Using Landsat TM Data, CENTURY Model Output, and a Digital Elevation Model to Quantify Climatic Effects on High Plains Vegetation Related to Sand Dune Stability."

David Manthorne, MS, Geography, Mark Williams. "An Inventory of Atmospheric Mercury Enrichment to Alpine Lakes in Colorado."

Hans-Peter Marshall, PhD, Civil, Environmental, and Architectural Engineering, Tad Pfeffer. "Snow Slope Stability: Modeling and Investigations Using FMCW Radar and Finite Elements."

Courtney Meier, PhD, EPO Biology, Bill Bowman. Dissertation relates to feedbacks between plant secondary chemicals and soil microbial communities.

Eric Metzger, MA, Anthropology (UC Denver), James Dixon. Thesis topic involves analysis of lithic debitage from archaeological site 49-PET-408 in Southeast Alaska.

Allen Meyer, PhD, EPO Biology, Bill Bowman. Dissertation relates to alpine eukaryotic microbial diversity and role in biogeochemistry.

Amy Miller, PhD, EPO Biology, Bill Bowman. "Uptake of Organic and Inorganic Nitrogen by Alpine Tundra Plants."

Elisa Miller, PhD, EPO Biology, Tim Seastedt and Steve Schmidt. Dissertation relates to the interactions between mycorrhizae and invasive *Centaurea* species.

Matthew P. Miller, MS, Civil, Environmental, and Architectural Engineering, Diane McKnight. Thesis relates to the quantification of humic redox states in hyporheic zones of alpine streams.

David Mixon, MS, Geological Sciences, Robert Stallard. "Automatic Watershed Location and Characterization with GIS for an Analysis of Reservoir Sedimentation Patterns."

Natalie Mladenov, PhD, Civil, Environmental, and Architectural Engineering, Diane McKnight. "Science and Tourism in the Okavango Delta of Botswana: Aquatic Organic Matter Dynamics and Ecosystem Valuation of a Southern African Wetland."

Heather Mrzlack, MA, Anthropology (UC Denver), James Dixon. Thesis topic involves PIXE analysis of ocher recovered from archaeological site 49-PET-408 in Southeast Alaska.

Laura Mujica-Crapanzano, PhD, EPO Biology, Tom Ranker and Patrick Bourgeron. "Landscape Analysis of Vegetation and Diversity Patterns on Niwot Ridge, Colorado."

Damian O'Grady, PhD, Geological Sciences, James Syvitski. "Sedimentary Geomorphology of Siliciclastic Continental Slopes."

John Ortega, PhD, Program in Atmospheric and Oceanic Sciences, Detlev Helmig. "Flux Measurements of Biogenic Volatile Organic Compounds Using Disjunct Eddy Sampling and Ion Trap Mass Spectrometry."

Trevor Popp, PhD, Geological Sciences, James White. Dissertation relates to paleoclimate via stable isotopes in ice cores.

Sarah Principato, PhD, Geological Sciences, John Andrews. "The Late Quaternary History of the Eastern Isafjardardjup and Strandir Areas of the Northwest Peninsula, Iceland, Using Terrestrial and Marine Evidence."

Kim Raby, MS, Environmental Studies, Mark Williams. Thesis relates to evaluating water quality and sensitive areas in high alpine catchments.

Adina Racoviteanu, MS, Geography, Mark Williams. "GIS for High-Altitude Inca Sanctuaries in the Peruvian Andes."

Heather Reed, PhD, EPO Biology, Tim Seastedt. "Soil Biodiversity and Ecosystem Function."

Sasha Reed, PhD, EPO Biology, Alan Townsend and Steve Schmidt. "Biogeochemical Cycling and Microbiological Communities of Soils."

Bruce Rueger, PhD, Geological Sciences, Vera Markgraf. "Holocene Environments of Bermuda."

Manish Salián, Civil Engineering, Diane McKnight.

Annalisa Schilla, Environmental Sciences, James White.

John Ortega (INSTAAR) preparing equipment to sample volatile organic compound emissions from the Prophet research tower (Program for Research on Oxidants: Photochemistry, Emissions and Transport) at the University of Michigan Biological Station near Pellston, Michigan, in summer 2002.  
Photo: D. Helmig.





Brian Clarke, Michael Robinson, and Jason Briner (left to right, INSTAAR, CU-Boulder) pose in front of a waterfall emanating from a hanging glacier in upper Clyde Inlet, Baffin Island, August 2001. The cliff beyond the waterfall projects to at least 4000 feet above the fiord waters. The group was studying the deglaciation history of the fiord. Photo: J. Briner.

Alexis Scott, MS, EPO Biology, Tim Seastedt. "Effects of Cattle Grazing on Diffuse Knapweed (*Centaurea diffusa*) and Other Exotic Plant Species in Boulder County, Colorado Grasslands."

Durelle Scott, PhD, Civil Engineering, Diane McKnight. "Redox Sensitive Metal Cycling in Mountain Streams: Manganese and Iron Transport."

Francesca Smith, PhD (Univ. of Chicago), Jim White. "The Record of Ancient Grasslands Held in the Carbon Isotope Signature of Fossil Phytoliths (Silica Bodies Made by Grasses)."

L. Micaela "Mikie" Smith, PhD, Geological Sciences, John T. Andrews and Anne E. Jennings. "Holocene Paleoceanography of the East Greenland and Iceland Continental Shelves Adjacent to the Denmark Strait."

Andrew Todd, PhD, IGERT-Civil, Environmental, and Architectural Engineering, Diane McKnight. "Mining Legacies in the Snake River Basin: Implications for River Restoration."

Andreas Torrizo, MS, Geography, Mark Williams. "Landscape Controls on Chemical Export, Rocky Mountain National Park."

Michael Trudeau, Geological Sciences, James White.

Paul Lee Turner, PhD, EPO Biology, Bill Bowman. "Effects of Augmented Snow on Phenology, Reproduction, Community Structure, and Spatial Distribution of Alpine Plants."

Ryan Vachon, PhD, Geological Sciences, James White. "The Distribution of Stable Isotopes of Precipitation across the United States."

Erin van Matre, MS, Civil, Environmental, and Architectural Engineering, Diane McKnight. "Local Climate Influences on Phytoplankton Species Distribution in Lake Fryxell, Antarctica."

Chi Yang, Civil, Environmental, and Architectural Engineering, Diane McKnight.

## INSTAAR Undergraduate Students 2001–2002

*Student Name—Adviser*

Paul Abood—Seastedt

Kaylee Acuff—Woodhouse

Joe Aussem—Lehman

Eva Marie Backgren—Seastedt

Valerie Bakeman—Miller

Kurt P. Barnes—Vaughn

Ray Batley—S. Seibold

Monique G. Belanger—Miller

Brian Bencivengo—Jennings

Sam Booth—Seastedt

Nichol Bronson—Dixon

Evan W. Burgess—Manley

Paul Carpenter—Seastedt

Kristina Charnecki—Seastedt

Tara Chesley—Andrews

Adrian L. Clark—Roth

Steve Cottrell—Buttenfield

Dawn De Vries—McKnight

Sara Jo Dickens—Andrews

Field assistant Rebecca Harrison (Lancaster University, UK) helps Roy Coulthard (INSTAAR, not pictured) study a glacial erratic boulder, Aston Delta, east-central Baffin Island, August 2002. New evidence from cosmogenic exposure dating suggests the delta may have been glacierized during the Last Glacial Maximum, delivering boulders with younger ages to the delta. Photo: R. Coulthard.





Nancy Rivera, Garymar Rivera, and Detlev Helmig work on Summit Greenland data, summer 2002. Nancy and Garymar were summer students from the UCAR Significant Opportunities for Advancement in Research and Science (SOARS) program. Both students worked on archived data to further elucidate processes that determine the sources and sinks of ozone in the polar troposphere.

Andrew Brock Eader—Seastedt  
 Rhea Esposito—Spaulding  
 Daniel Poirot Fernandez—Pendall  
 Leandro Fernandez—McKnight  
 Allison Forrest—Roth  
 Kristy Freeman—Lehman  
 Bridget Gomes—Seastedt  
 Amy Katherine Gray—Roth  
 Robin Guiette—Hughes  
 Scott A. Hiller—Bowman  
 Doug Hultstrand—Helmig  
 Robert A. Ivan—Dixon  
 Kathryn R. Jahnke—C. Seibold  
 Jolie R. Johnson—Andrews  
 Kristen A. Kaufman—Jennings  
 Jessica Kelleher—Vaughn  
 Charles Allen Kennedy—Vaughn  
 John Kyzer—Manley  
 Carrie C. Lahr—Roth  
 Michael P. Lanahan—Jennings  
 Kristina M. Larson—Lehman  
 Patrick Lawler—Losleben  
 Colin Leibold—Seastedt  
 Michael Joseph Lewis—McKnight  
 April Shannon Lipinski—Dunhill  
 Benjamin Lowry—Losleben  
 Laura J. Manley—Hartman  
 Colin Mann—Seastedt  
 Erica Manteuffel—Hart  
 Julia Lynn Martinek—Andrews  
 Emily Mathis—Seastedt  
 Matt Mayernick—Spaulding  
 Matthew P. McCool—S. Seibold  
 Luke Meiser—S. Seibold  
 Wesley Mendez—J. Hughes  
 Keith M. Mitchell—Vaughn

Laurel A. Nelson—M. Andrews  
 Arie Opdahl—Pfeffer  
 Kenzi Lee Parton—Ackerman  
 Geoffrey M. Pierz—C. Seibold  
 Evan N. Piland—S. Seibold  
 Elizabeth Polling—Seastedt  
 Kimberly R. Portmess—McKnight  
 Matthew . Preston—Miller  
 Catherine J. Purtil—Turnbull  
 Ursula Quillmann—Andrews  
 Carrie Elizabeth Renaud—Seastedt  
 Jesse Jones Richter—Foley-Andrews  
 John N. Rose—Herzfeld  
 Ana Belen Ruiz—Seastedt  
 Erin L. Scherer—Pendall  
 Caleb Schiff—Vaughn  
 Ethan A. Shrago—White  
 Kirsten Storey—Seastedt  
 Rebecca Taillon—C. Seibold  
 Frances Cheston Thacher—Seastedt  
 Colin Lee Tucker—Bowman  
 Emily M. Utz—Bowman  
 Allison Claire Van Gorp—Wolfe  
 Zoya Voronovich—Helmig  
 Anna Wagner—Miller  
 Carly Webster—Andrews  
 Brenton Wonders—Seastedt  
 Warren Wonders—Seastedt  
 Whitney Zanos—Seastedt  
 Jacob A. Zyvicke—S. Seibold

## INSTAAR High School Student Employees 2001–2002

Harold B. Cooper—Peckham  
 Laurie Cornell—Seastedt  
 Krystle Fentress—Hughes  
 Caitlyn Florentine—White



Two of INSTAAR's undergraduate student researchers: U. Quillmann and B. Clarke.

# INSTAAR Celebrates 50 Years of Research and Education (1951–2001)



Icebreaker for the INSTAAR 50th Anniversary celebration, September 2001. Photo: W. Manley.

INSTAAR celebrated its 50th anniversary on 14–16 September 2001 with an icebreaker, slide show, lectures, tours, a dinner, and a trip to the Mountain Research Station. Alumni and friends of INSTAAR came from many U.S. states and from other countries to participate. INSTAAR held the celebration despite the tragic events of September 11 because many people traveling from distant places informed us that they intended to arrive as planned. Unfortunately, travel was impossible for many people, who were sorely missed.

In honor of the anniversary, many past and present INSTAARs contributed to a booklet about the institute and a digital photograph collection. The 94-page booklet discusses the history of the Institute as seen through the eyes of its directors; vignettes from students, faculty, and staff; alumni news; and 50 years of theses. A digital copy of the booklet in PDF format is available on the INSTAAR website [http://instaar.colorado.edu/meetings/50th\\_anniv/](http://instaar.colorado.edu/meetings/50th_anniv/). For a printed version, contact Vicky Nelson, Assistant to the Director. The digital photo collection consists of over 750 images and is available for viewing on the INSTAAR website.

In 1951 Professor John W. Marr and colleagues gained formal approval from the University Regents for the creation of the Institute of Arctic and Alpine Ecology. The Institute took on the new name Institute of Arctic and Alpine Research (IAAR) in 1953 and later changed its acronym to INSTAAR. In the 50 years since its founding, INSTAAR has expanded beyond its initial emphasis on biology and geology to include human dimensions, paleoenvironments, and hydrological research around the world.

The focus of research at INSTAAR has provided a better understanding of the influence of natural and human-induced changes on environmental systems. Ongoing studies include field and lab research and modeling. Currently three groups are addressing the research agenda of INSTAAR.

Members of the Ecosystems Group study questions of biogeochemical and ecological importance, including the influence of atmospheric pollution in the mountains near Boulder. The Geophysics Group uses applications of modern mathematical, physical, and chemical knowledge to increase its understanding of Earth-system processes, particularly glacial and ocean-sedimentary processes. Members of the Past Global Change Group are involved in reconstruction of past environmental and climate dynamics to better understand the current environment and possible changes facing people in a warming world.

INSTAAR has several world-class research facilities, including the Mountain Research Station, dedicated to the advancement of environmental science in mountain environments, which has its origins in a field station started in 1898 near Tolland, west of Boulder. Another facility is the Center for Geochronological Research, providing new tools and equipment to improve the understanding of processes controlling environmental change and the rates at which those processes act. INSTAAR also recently obtained one of CU's premier supercomputers, the Environmental Computation and Imaging Facility, which provides researchers with increased power and connections to global databases.

INSTAAR has served as an important focus for student education throughout its history. Nearly 300 students have received doctorates, master's degrees, or both through their association with the Institute. Together, these students with their supervisors and fellow scientists have contributed roughly 2,500 peer-reviewed scientific journal articles, books, and conference proceedings. The Mountain Research Station near Ward, Colorado, has provided field courses for 80 years in the Colorado Front Range, drawing students and researchers from around the world.



Heather Southwick and Ruby Marr at the icebreaker for the INSTAAR 50th Anniversary celebration, September 2001. Photo: J. Briner.

# Science Spotlights

Science Spotlights are examples of INSTAAR research, education, and societal outreach. Web links are available for each spotlight at [http://instaar.colorado.edu/research/science\\_spotlights\\_2001.html](http://instaar.colorado.edu/research/science_spotlights_2001.html).

## 2001

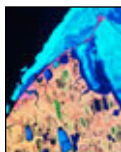
### **Artifacts Recovered from a Cave in Southeastern Alaska Support the Argument for the Late Pleistocene Coastal Migration of Humans to the New World.**

The work of E. James Dixon and colleagues on the cave was featured on the History Channel, NOVA, and National Geographic magazine. The data show that humans were utilizing marine resources and transporting exotic types of stone throughout the region 9,200 years ago.



### **Alaska North Slope Environmental Change.**

James Syvitski, William Manley, Mark Dyurgerov, and Scott Peckham are participating in an extensive research project titled Alaska North Slope Climate Impact Assessment (ANSCIA). The project is led by CU-Boulder's Amanda Lynch and is designed to better understand, support, and enhance local decision-making processes in the face of climate variability and potential environmental disasters.



### **University Consortium Formed for Hydrologic Sciences.**

Mark Williams is a co-Principal Investigator for the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), which was formed to assist development of infrastructure for hydrologic science research. Dozens of universities around the United States participate as CUAHSI members.



**Grad Student in Antarctica Works with Young Students.** INSTAAR graduate student H. P. Marshall communicated with Casey Middle School students through the

H. P. Marshall (INSTAAR) measuring density in a snowpit, West Antarctica, December 2001. Such measurements improve radar-based estimates of ice accumulation rates and spatial variability. Photo: H. Conway.



Web from Antarctica. Marshall discussed his and others' research projects and fielded questions from the students.

### **Scientist Honored in U.S. House of Representatives.**

Tim Seastedt was officially acknowledged for his important weed-control research by Representative Mark Udall of Colorado. Udall said, "Professor Seastedt's exciting and path-breaking research on using insects and soil chemistry to control the spread of noxious, non-native plants holds promise in addressing a vexing—and spreading—problem, especially on our western lands."



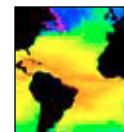
### **Environmental Computational and Imaging (ECI) Facility Dedicated.**



James Syvitski led the dedication of a new \$1.2 million computer facility that will help researchers and students study marine geophysics, ice-sheet changes, and natural disaster mitigation. The dedication team included Jerry Peterson (CU), Tad Pfeffer (INSTAAR), and executives from the U.S. Office of Naval Research and Sun Microsystems. ONR and Sun made extensive contributions to the project.

### **Glacial Surface Temperatures of the Southeast Atlantic Don't Mimic Those of High Latitudes.**

Julian Sachs (MIT, former INSTAAR), Robert Anderson (Lamont-Doherty), and Scott Lehman (INSTAAR) discovered an interval of substantial temperate ocean warming from 41 to 25 ky BP, a pattern that differs from that of higher latitudes. The paper is significant in revealing geographic variations in climate change in response to solar forcing. Published in 14 September issue of *Science*.



Scott tent at Deep Field Camp between Ice Streams A and B, West Antarctica, December 2001. These tents housed a four-person team from University of Washington and INSTAAR for two months while they studied ice dynamics. Photo: H. P. Marshall.

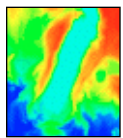




**New Codirector of Undergraduate Academy.** Mark Williams was named codirector of the CU Undergraduate Academy, which comprises approximately 200 undergraduate students from all majors across the campus and offers a lively intellectual community, targeted advising, and a range of enrichment activities for unusually talented and committed students.

**INSTAAR Celebrates 50 Years of Research and Education.**

INSTAAR celebrated its 50th anniversary on 14–16 September 2001 with an icebreaker, lectures, tours, a dinner, and a trip to the Mountain Research Station. Many alumni and friends of INSTAAR from throughout the United States and from other countries were able to participate. INSTAAR has served as an important focus for education throughout its history. Nearly 300 students have received advanced degrees through their association with INSTAAR, and the Mountain Research Station has provided field courses for 80 years.



**Student Wins Science Fair.** High school student Evan Burgess won the 2001 Colorado State Science Fair (Senior division) for his study of glacier moraines using a Geographic Information System (GIS). His mentor was the INSTAAR research scientist William Manley. Burgess will be attending the University of Colorado at Boulder and will continue working with Manley at INSTAAR.

**New Grant to Study Noxious Weed Infesting More Than 3.2 Million Acres in West.** Tim Seastedt, Kate LeJeune, and Katie Suding have received a \$280,000 USDA grant to help unlock the mystery of how diffuse knapweed—a noxious weed that has infested more than 3.2 million acres in the West—has become dominant in the prairies around Boulder.



**Student Open House.** Diane McKnight and other INSTAARs organized a science open house for 140 middle school students from Southern Hills. Activities included tours, lab exercises, lectures, and investigations at nearby Boulder Creek.

**Dan Muhs Elected President of the American Quaternary Association.**

Affiliate Dan Muhs was elected President of the American Quaternary Association (AMQUA). He assumed office at the Anchorage, Alaska, AMQUA meeting in August 2002. AMQUA was founded in 1970 to foster cooperation and communication among the broad array of disciplines engaged in studying the Quaternary period.



**Ecological Assessment Book Published.** Mark Jensen (USDA Forest Service) and Patrick Bourgeron edited a book that provides theoretical and practical advice for future ecological assessments. More than 40 authors contributed to the 35 chapters of *A Guidebook for Integrated Ecological Assessments* (Springer).

**Climate Implications of Changing Arctic Sea Ice.**

Gifford Miller and Auslaug Geirsdottir (University of Iceland) organized a meeting of the Arctic paleoclimate and modeling communities to review present knowledge of arctic sea ice and plan future studies. Results from the meeting, *Sea Ice in the Climate System: The Record of the North Atlantic*, were published in *EOS* (20 February).

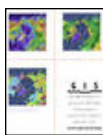


**Vikings!** Astrid Ogilvie participated in a Smithsonian traveling exhibition on Viking exploration, including the Viking Lecture Series. Ogilvie's talk took advantage of the wealth of literature that was written in Iceland in medieval times.

**Interhemispheric Climate Linkages.** Vera Markgraf edited a book based on research from the International Past Global Changes (PAGES) Pole-Equator-Pole (PEP-1) transect, titled *Interhemispheric Climate Linkages* (Academic Press). The book compiles results from an international group of scientists working to compare past climate changes throughout the Americas. It presents a comprehensive analysis of interhemispheric linkages of climate, present and past, and their effects on human societies.



Vera Markgraf (INSTAAR) assisted with sediment coring from this platform on Lago Cardiel, southern Patagonia (49°S), 2001. The lake cores are being used to reconstruct late Quaternary paleoclimatic changes through a project supported by NSF and Swiss National funds. Photo: D. Ariztegui (Gilli et al. [2001], *Terra Nova*, 13: 443–448; Markgraf et al. [2003], *The Holocene*, in press).

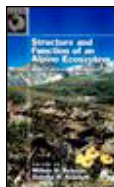


**Geographic Information Systems Infrastructure for Arctic Research.**

William Manley was cochair of an NSF workshop studying the Geographic Information infrastructure needed to support arctic research. A meeting document (“Recommendations for a Geographic Information Infrastructure to Support Arctic Research: Outcomes of the Arctic GIS Workshop”) is available from the Arctic Research Consortium (ARCUS) website.

**New Book Synthesizes Ecosystem Research at Niwot Ridge.**

William Bowman and Tim Seastedt have written a book titled *Structure and Function of an Alpine Ecosystem* (Oxford University Press) that gives a complete overview of an alpine ecosystem, based on the long-term research conducted at the Niwot Ridge LTER in Colorado.



**Fire and Ice.** Affiliate Daniel Grossman created a program titled “Fire and Ice” that aired on National Public Radio and is available on the Internet from Soundprint. Did Iceland’s volcanic eruption in 1783

cause Alaska’s year of two winters? Listen for free with RealPlayer!

**Paleoclimatic Record Considered in Colorado’s Drought Plan.**

Connie Woodhouse was cited in the recently published “Colorado Drought Mitigation and Response Plan” for her dendroclimatological work showing persistent periods of drought lasting longer than droughts in the instrumental record. This information will be used to address long-term drought preparedness and mitigation of impacts.



## 2002

**Increasing Nitrogen in Earth’s Soils May Signal Global Changes.**

A team led by Jason Neff (U.S. Geological Survey) and Alan Townsend found that the rapid increase of nitrogen falling from the sky as a result of fossil-fuel combustion and crop fertilization, combined with carbon stored in Earth’s soils, could change atmospheric concentrations of the greenhouse gas carbon dioxide. The team also included INSTAARs Scott Lehman, Jocelyn Turnbull, and William Bowman. The study area was Niwot Ridge, 35 miles west of Boulder, administered by INSTAAR and one of 20 Long-Term Ecological Research sites in North America funded by the National Science Foundation. The study shows that tundra soils are unexpectedly sensitive to added nitrogen, raising further questions about how changes in the nitrogen cycle throughout the world might affect CO<sub>2</sub> storage areas, or “sinks,” on land. The results were published in the 31 October 2002 issue of *Nature*.



**INSTAAR Featured in University’s Annual Report on Sponsored Research.**

INSTAAR’s research on Global Change and Global Warming was featured in the University of Colorado at Boulder’s fiscal year 2001–2002 report on sponsored research. The printed report highlighted INSTAAR’s global change research on the cover, accompanied by interviews with Tim Seastedt and graduate student Sarah Principato titled “Observing Global Change.” A website addition to the report has a section titled “Explaining Global Warming,” with excerpts from Jim White about the Carbon, Climate, and Society Initiative (CCSI), a program that enables CU students from the natural sciences, social sciences, and journalism fields to join forces and explore novel solutions to environmental problems.



James Dixon (middle, INSTAAR) and Craig Lee (right, INSTAAR) using helicopter and fixed-wing aircraft for archaeological reconnaissance and survey of glaciers in Wrangell–St. Elias National Park and Preserve, Alaska, July 2001. Photo: R. Ivan.



**Archaeology of Alaska Glaciers and Snowfields.**

James Dixon, William Manley, and colleagues are generating excitement about the archaeological potential of glaciers and snowfields by using Geographic Information System (GIS) models to predict the locations of well-preserved artifacts exposed by recent melting in Alaska. Artifacts range from gold-rush-era horse-hoof trimmings to an antler arrowhead possibly 1000 years old. Numerous paleontological specimens, including the remains of caribou, carnivores, rodents, and even birds, are also being discovered. Dixon and Manley’s research was noted in the 19 April issue of *Science* magazine and by Rita Colwell, Director of the National Science Foundation, at the Arctic Forum in May.





**Mark Meier Receives Goldthwait Polar Medal.** Mark Meier, one of the world's leading glaciologists, has been named the winner of the Goldthwait Polar Medal in recognition of his outstanding contributions to polar research. The Goldthwait Polar Medal, which

was presented to Meier at a ceremony in Columbus, Ohio, on 4 October, is the Byrd Polar Research Center's most prestigious award. Meier, who earned his doctorate from the California Institute of Technology in 1957, has conducted a variety of glacier dynamics investigations of both glaciers and snow cover in North America, Europe, Greenland, and Antarctica through the U.S. Geological Survey and CU-Boulder. Meier was one of the first scientists to apply remote-sensing techniques to snow and ice, to pioneer the study of glacial surges and iceberg-calving tidewater glaciers, and to spearhead a new "scaling" technique to estimate the rapid loss of glacier mass worldwide over the past century.

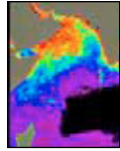
**John Andrews Honored with Special Sessions at Geological Society of America Annual Meeting.**

The Geological Society of America honored John Andrews's tremendous impact on the Quaternary sciences at the annual meeting with two special sessions titled "Quaternary Sciences from Land to Sea: In Honor of John T. Andrews." The sessions recognized Andrews's career through papers that reflected his many scientific contributions in ice-sheet, solid-earth, and ocean interactions. Andrews's former students Peter U. Clark (Oregon State University) and Gifford H. Miller organized the oral and poster presentations, which were cross-listed under Quaternary Geology, Geomorphology, Paleoclimatology, and Paleooceanography.



**First Depth Measurement of Colorado's Largest Glacier.** Tad Pfeffer, Nel Caine, and colleagues measured the depth of the Arapaho Glacier west of Boulder at 22 meters (about 72 feet) in a study relevant to water use and environmental change in the Front

Range. The measurement helped determine the total volume of ice in the city's watershed and its seasonal waxing and waning: annual snowmelt may create most of the water that the city draws from its watershed, but during drought years such as 2002, it's glacial melt that keeps regional streams flowing in late summer. Scientists have determined that the Arapaho and smaller glaciers nearby are shrinking, with particularly noticeable melt in the last three years. The results from Pfeffer and Caine's research appeared in a Boulder *Daily Camera* report by Katy Human.



**Increased Strength in Asian Southwest Monsoon during Last Four Centuries May Be Result of Northern Hemisphere Warming.** David Anderson and colleagues published study results showing that the Asian southwest monsoon, which affects the

livelihood of millions of people, appears to have increased in intensity during the last four centuries, perhaps as a result of warming in the Northern Hemisphere. The study used sediment cores from the Arabian Sea near Oman to indicate that the wind strength of the monsoon has increased. The authors hypothesized that the southwest monsoon strength will continue to increase during the coming century as greenhouse gases rise and northern latitudes continue to warm. Published in the 26 July 2002 issue of *Science* magazine.

**Diatoms on TV.** Sarah Spaulding appeared on the Court TV special "Digging for Clues" on 14 December 2002. The American Museum of Natural History teamed up with Court TV for a special program showing how modern scientific techniques can be used to evaluate criminal evidence. Spaulding discussed her research on the biogeographic distribution of diatoms, a group of single-celled algae that occur in marine and freshwater habitats. Spaulding explained the historical and ecological factors that determine the distribution of diatom species and how understanding the distribution of diatoms is used to reconstruct modern and paleo environments.



James Dixon (INSTAAR) surveying for archaeological materials on a glacier in the Tanada Peak area of Wrangell-St. Elias National Park, Alaska, July 2001. Locales such as this produced many surprising finds, including well-preserved animal carcasses. Photo: C. Lee.





**Wildfires Will Hurt Colorado Water Quality and Ecosystems.** Mark Williams, graduate student John Gartner (adviser: Nel Caine), and colleagues have been researching water-quality and erosion issues related to wildfires. Williams predicted that Colorado's record-setting wildfire season would leave

behind potentially harmful conditions in water supplies, including a potentially carcinogenic compound called trihalomethane (THM) in areas that drain burned regions. In a separate study, Gartner found at least three reservoirs likely to be contaminated by erosion in burned regions. The South Platte watershed and Cheesman Reservoir, one of Denver's important water sources, were affected by erosion from the Hayman fire, while the Missionary Ridge fire likely affected the Vallecito and Lemon Reservoirs.

**Sea-Level Changes: How Alaska Affects the World.**

Mark Meier and Mark Dyurgerov wrote a commentary for *Science* magazine discussing the contributions of glacier melting in Alaska to global sea-level rise. They highlighted a report in the same issue that showed how Alaskan glacier melting has been underestimated. They concluded that future sea-level rise may be higher than expected. Published in the 19 July 2002 issue of *Science* magazine.



**Aboriginal Climate Change.** Gifford Miller was interviewed while doing fieldwork in Australia by INSTAAR affiliate Daniel Grossman for stories aired on National Public Radio and Radio Netherlands in March 2002. Miller's studies indicate that Aborigines in Australia may have actually contributed to widespread climate change some 50,000 years ago (when the continent dried dramatically, fires raged, and almost every species of

animal larger than a bulldog disappeared). If proven, it would be the first solid evidence that technologically primitive humans could alter the environment. Others speaking on the shows included Rod Wells and John Kutzbach. "Aboriginal Climate Change" (NPR) and "Australia's Lost Giants" (RN), produced by Daniel Grossman, are available for listening on your computer with RealAudio.



**INSTAAR Member Key Player in CU Undergraduate Education.**

Mark Williams is codirector of CU Boulder's Undergraduate Academy, which focuses on expanding the education of top students outside the classroom. The Academy seeks to build a sense of intellectual community and help prepare students for postgraduate opportunities. The Academy also helps administer Boettcher Scholarships, which are considered to be the most prestigious merit-based scholarships available to graduating high school seniors in the state. Sixteen Boettcher Scholars at the University of Colorado at Boulder received enrichment grants in summer 2002 to conduct projects in locations ranging from campus laboratories to an aboriginal medical clinic in Australia.

**Environmental Changes in Colorado**

**Alpine Lakes.** Diane McKnight, together with several graduate and undergraduate students and colleagues, studied a high alpine lake in the Colorado Rockies that showed increased algal growth thought to be caused by changing climate and atmospheric nitrogen deposition from auto emissions and agricultural activity on the heavily populated Front Range, including Denver. Since about 1940, increased algal growth in Green Lake 4 has caused the accumulation of organic sediment and shifts in the dominant algal species. McKnight and her associates have studied algal species distribution in water samples, a sediment trap, and a small sediment core in the lake on a weekly to biweekly summer basis since 1998.



**Causes of Global Sea-Level Rise.**

Mark Meier and CU colleague John Wahr wrote a commentary on the causes of sea-level rise for a recent issue of the *Proceedings of the National Academy of Sciences USA* (99[10]: 6524-6526, 2002). Meier and Wahr detailed the current understanding of sea-level rise from a wide range of geophysical sciences and concluded that further study of both the steric and eustatic components of sea-level rise is needed before confident projections for the 21st century can be made.

Gifford Miller (INSTAAR) and Marilyn Fogel (Geophysical Laboratory, Carnegie Institute, Washington) collecting eggshells from nests of the extinct flightless bird *Genyornis newtoni* at "Geny Heaven," just outside Port Augusta, South Australia, July 2002. These are the first intact nests (six of them) of this extinct bird ever discovered. These eggs are about 60 ka old. Photo: G. Miller.





**Arctic and Alpine: Impressions of a Landscape.** An art exhibit featuring photography by Tad Pfeffer and paintings by Mark Meier was shown at the Macky Gallery (Macky Auditorium) on the CU-Boulder campus, commemorating the 50th anniversary of INSTAAR and the International Year of the Mountain. "Both of us have spent a lot of time in arctic and alpine environments," said Pfeffer. "My initial attraction to the landscape was aesthetic more than scientific, but it ultimately was the reason I became a glaciologist." Meier commented on their approach: "This exhibit is unusual because it combines art and science. . . . The images are not by artists collaborating with scientists but by two researchers melding their science with their art."

**CU Boulder Researchers Excavate**

**Mammoth Skull.** James Dixon and colleagues excavated the skull and tusks of a mammoth that died more than 10,000 years ago at Lamb Spring, an archaeological site that was once a freshwater spring near Roxborough State Park, Douglas County, Colorado. The CU Boulder researchers, including graduate students in the university's Museum and Field Studies program, raised the ancient skull out of the ground in late July. The skull was transported to the Denver Museum of Nature and Science to be conserved and cast. The cast will be placed on exhibit at Lamb Spring in the summer of 2003 as part of a long-range plan to develop a museum and research facility at the site.



**Global Sea Levels Likely to Rise Higher in 21st Century Than Previous Predictions.**

Mark Meier and Mark Dyurgerov calculated that global sea levels likely will rise more by the end of this century. Their predictions are higher than those made by the Intergovernmental Panel on Climate Change in 2001. The prediction of additional sea-level rise is due to a revised estimate of the ice melt from glaciers. New data show that the world's glaciers and ice caps have exhibited significant ice loss in the 20th century, which has accelerated since 1988.

**Excavations in Eastern Europe Reveal Ancient Human Lifestyles.**

John Hoffecker, Steven Forman (former INSTAAR), and Russian colleagues have unearthed evidence indicating that anatomically modern humans—who had migrated out of Africa 40,000 to 50,000 years ago—were developing new technologies for survival in the cold Central East European Plain 30,000 to 40,000 years ago. Ongoing excavations at two open-air sites at Kostenki, about 250 miles south of present-day Moscow, have yielded bone and ivory needles, with eyelets, that are 30,000 years old and large quantities of fox and hare remains. These point to new technologies in the form of tailored fur clothing and trapping devices that must have been critical to life in these environments during the last glacial period.



**32nd Annual International Arctic Workshop Held at INSTAAR.** John Andrews, Wendy Roth, David Lubinski, Anne Jennings, Bill Manley, Astrid Ogilvie, Jason Briner, Sarah Principato, and others organized the Arctic Workshop held at INSTAAR on 14–16 March 2002. More than 100 people from nine countries participated, including students from a number of institutions. All abstracts are searchable on the web. The Workshop was dedicated to John Andrews in appreciation of his hard work in organizing and maintaining the Arctic Workshop for 32 years.

**Desolate Landscapes: Ice-Age Settlement of Eastern Europe.**

John Hoffecker argued in a new book that the Eastern European settlement record reveals a stark contrast between Neanderthals and modern humans with respect to technology and social organization, both of which are tied to the development of language and the use of symbols. *Desolate Landscapes* (Rutgers University Press) brings readers up-to-date with the rich archaeological record in this significant region and its contribution to understanding one of the most important events in human evolution—the rise of modern humans and the extinction of the Neanderthals.



Gifford Miller (INSTAAR) collecting 60-ka-old *Dromaius* (emu) eggshells, Wilcatana Station, South Australia, July 2002. Photo: J. Magee.



#### **Ice Age Rearrangement of Ocean pH.**

David Anderson and David Archer (University of Chicago) reconstructed carbonate-ion concentration—and hence pH—of the glacial oceans, using the extent of calcium carbonate dissolution observed in foraminifer faunal assemblages. They found no evidence for a shift in the whole-ocean pH, as previously inferred from boron isotopes. Instead they found a rearrangement of ocean pH, probably due to changing ocean circulation from glacial to present times. The Anderson and Archer results are significant in revealing the ocean's role in the large natural cycles in atmospheric carbon dioxide that occurred during the Quaternary ice ages. Results were published in the 7 March 2002 issue of *Nature*.

#### **Antarctic Climate Cooling and Terrestrial Ecosystem Response.**

A team led by Peter Doran (University of Illinois at Chicago)—including INSTAAR scientist Diane McKnight and INSTAAR affiliates Andrew Fountain and Gary Clow—discovered that continental Antarctica has generally cooled during the last 35 years. This cooling is unique among Earth's continental landmasses, according to a paper published in the online version of *Nature*. Continental Antarctic cooling, especially the seasonality of cooling, poses challenges to models of climate and ecosystem change. Results were published in the 13 January 2002 online issue of *Nature*.



#### **Community Sediment Model Workshop.**

James Syvitski and colleagues hosted an NSF-supported workshop at INSTAAR on 19–22 February 2002 to develop both the concept of a Community Sediment Model (CSM) and a plan for its creation. At its most basic, a CSM may be defined as a community-built and freely available suite of integrated, ever-improving software modules predicting sedimentary basin and landscape evolution over a broad range of time and space scales. Participants included 60 researchers representing fields as diverse as glaciology, sedimentary geology, geomorphology, engineering, and geophysics. Following the workshop, they planned to develop a compelling science plan to launch what they hope will be a new era in quantitative modeling of Earth's surface.

#### **Mass Balance of Mountain and Subpolar Glaciers.**

Mark Dyurgerov and editors Mark Meier and Richard Armstrong (NSIDC) recently released the most complete glacier regime dataset for worldwide mountain and subpolar glaciers as INSTAAR Occasional Paper No. 55, *Glacier Mass Balance and Regime: Data of Measurements and Analysis*. This paper is not only a data collection but also a global analysis of glacier regime in connection with present-day climate, water balance, sea-level rise, and other environmental issues. These data will provide valuable inputs to models in hydrology, geomorphology, climatology, and paleoclimatology. This publication was one of INSTAAR's contributions to the United Nations International Year of Mountains, 2002.



# Mountain Research Station

**T**he Mountain Research Station (MRS), located near Nederland, 25 miles from Boulder, is an interdisciplinary research facility of the University of Colorado devoted to the advancement of study of mountain ecosystems. Its mission is to facilitate research and education to better understand the unique patterns and processes of biological and physical systems in mountains, and how environmental changes may affect these processes.

The MRS was established in 1921 and has continued to serve as an outstanding facility in field education and research. Research on nearby Niwot Ridge has contributed substantially to our understanding of the environmental science of mountain systems and is recognized internationally for its excellence. Approximately 40 researchers per year use the MRS as a base of operations, including faculty and students from CU and many other universities and federal laboratories in the United States and around the world.

The station's teaching mission includes formal undergraduate field courses, which have been offered at the MRS for over eight decades and have become an integral part of the academic experience of many college students. Several K-12 courses also use the MRS as a site to introduce students to field environmental science.

The MRS participates in educational experiences for the general public aimed at policy decisions that affect our environment. Through formal interactions with U.S. federal agencies such as the Forest Service, the Environmental Protection Agency, and the National Park Service, the MRS has provided expertise to help regulatory agencies make informed decisions about minimizing human impacts on



Julia Larson (INSTAAR) working on a field project investigating the effects of plant species diversity on ecosystem function, Niwot Ridge LTER, Colorado, July 2002. Photo: B. Bowman.



Bill Osburn revisits vegetation plots he established 40 years ago on Niwot Ridge LTER, Colorado, July 2002. Photo: B. Bowman.

mountain ecosystems. The MRS also provides summer seminars open to all on subjects of interest to both scientists and nonscientists. The MRS is a popular site for symposia and workshops aimed at decision-making and information sharing as well as CU departmental retreats and national scientific meetings.

The final phase of construction on the new Science Lodge is to take place in spring and summer 2003. The building will provide housing, classroom and meeting-room space, and dining facilities for students and researchers during the winter, when most of the station is shut down, as well as during the summer, when the facility is crowded or groups want to have a contained space. The high-efficiency radiant floor heating in combination with advanced passive solar energy collection, using a trombe wall, will result in a comfortable winterized building when completed.

The CU Alpine Observatory, dedicated in July 2000, continues to receive improvements. The facility houses an optical telescope with a 12.5-inch mirror purchased with NASA funds by CU Boulder Senior Research Associate Alan Kiplinger for solar studies. The telescope has the capacity to find the location of 65,000 celestial objects. We hope to establish regular educational programs during the summer, utilizing the dark night skies as well as daytime viewing of the sun using special optical filters. A recently obtained H-alpha filter will improve solar astronomy and provide a unique educational tool for many courses.

The Tundra Cam and Niwot Ridge climate stations continue to be popular sites for web browsers. These sites can be accessed via the recently renovated MRS home page <http://www.colorado.edu/mrs/>.

Several of the small student cabins received new roofs and new wood stoves in 2002. Ongoing structural renovations have significantly improved the comfort of the cabins



A group of Mountain Research Station staff.

at the station. CU Facilities Management completed a “green” sewage treatment facility that will not endanger one of the last remaining populations of greenback cutthroat trout in nearby Como Creek. Work was initiated in the fall of 2000 and completed before the summer 2002 season. The new facility operates year-round and will facilitate use of Science Lodge during the winter.

### **MRS Staff**

Director: William D. Bowman  
Associate Director: Diane McKnight  
Station Manager: Steven Seibold  
Facilities Management: Mark O’Keefe  
Course Coordinator: Julia Larson  
Climatologist: Mark Losleben  
LTER technician: Sandy Moore  
Kiowa Laboratory Manager: Christine Seibold



Niwot Ridge looking west toward (left to right) North and South Arapaho, Kiowa, Navajo, Apache, and Shoshone Peaks. The flower in the foreground is Old-Man-of-the-Mountain (*Hymenoxys grandiflora*). Photo: B. Bowman.



# INSTAAR Laboratories and Other Facilities

## Amino Acid Laboratory

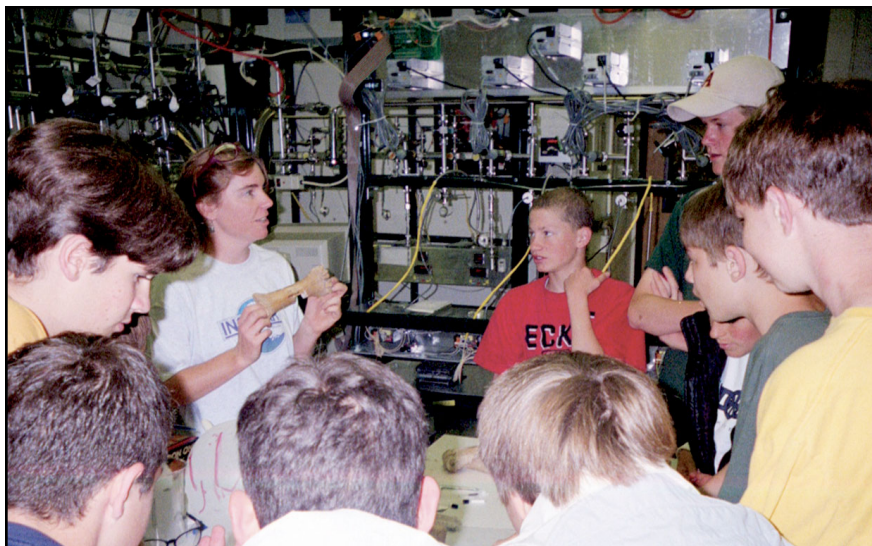
The purpose of this laboratory is to extract and quantify the amino acid composition and extent of racemization of indigenous proteinaceous residues preserved in biominerals for geochronological applications. The lab contains two HP-1100 automated high-pressure liquid chromatographs (HPLCs) and ancillary support equipment. Usually one HPLC runs in reverse-phase mode and the other in ion-exchange mode. The laboratory currently focuses on the kinetics of amino acid racemization in the eggshells of large flightless birds, bivalve molluscs from high-latitude regions, and oogonia, the calcified fruiting bodies of charophyte algae. The laboratory director is Gifford Miller. A full-time technician, Charles Hart, oversees the day-to-day operation of the laboratory. Graduate and undergraduate students use the laboratory in their research projects and to gain research experience.

## AMS Radiocarbon Preparation and Research Laboratory

This laboratory provides AMS radiocarbon-dating services to researchers from the United States and Latin America. In-house research focuses on method development in AMS  $^{14}\text{C}$  preparation and dating, calibration of the radiocarbon time scale, and estimation of past levels of radiocarbon activity as a proxy for various geophysical and solar processes. Under the direction of Scott Lehman and Staff Chemist Jocelyn Turnbull, the laboratory processes 25 authentic samples per week.

## Atmospheric Research Laboratory

This laboratory houses instrumentation for research on surface-atmosphere trace gas fluxes. A special emphasis is the analysis of volatile organic compounds (VOC), in particular emissions of biogenic VOC from vegetation. Measurements are made with solid adsorbent sampling techniques, thermal desorption instruments, and several gas chromatographs with different detection systems, including flame ionization and mass spectrometry. An eddy correlation flux measurement system consists of a sonic anemometer and an ion trap mass spectrometer with a direct inlet system. The Atmospheric Research Lab also pursues boundary-layer profiling measurements from a tethered balloon platform. Related equipment includes several helium balloons, a hydraulic winch, meteorological sensors, and chemical instruments for balloon/airborne measurements of temperature, pressure, wind speed, wind direction, water vapor, ozone, VOC, and particulates. The laboratory director is Detlev Helmig.



## Biogeochemistry Laboratories

These laboratories are specialized for preparation of water and soil samples for chemical analysis. Major equipment includes fume hood, oven, distilled water, shaker, and extraction equipment. Tim Seastedt and Mark Williams are in charge of these laboratories.

## Core Processing Laboratory

This laboratory is equipped for splitting, photographing, color logging, describing, sampling, and MS logging of sediment cores. The facility is under development and is intended for use in analysis of marine, lake, and other terrestrial cores. The facility is adjacent to the common INSTAAR cold room for convenient access to the cores. It is currently used mainly by John Andrews, Anne Jennings, and graduate students.

## Dendrochronology Laboratory.

Research in this laboratory concerns the use of dated, annual tree rings to investigate past climatic and environmental conditions. The laboratory is fully equipped for preparing, dating, and measuring tree-ring widths for dendrochronological studies. The laboratory is under the direction of Connie Woodhouse with Laboratory Manager Jeff Lukas.

## Dissolved Organic Matter Laboratory

This laboratory specializes in measuring the amount and character of dissolved organic matter from diverse ecosystems. Major equipment includes Shimadzu TOC analyzer, Antec 9000 DON analyzer, Agilent 8453 spectrophotometer, FluroMax2 fluorometer, fractionation columns, and Ulter-filtration. Mark Williams, Tim Seastedt, and Alan Townsend are in charge of the laboratory.

AMS Radiocarbon Preparation and Research Laboratory.

Professional scientist Jocelyn Turnbull (INSTAAR) explains the process of measuring radiocarbon ages to a group of eighth grade students, showing examples of extinct megafauna bones dated at INSTAAR, May 2001. Samples measured in the radiocarbon lab are used to aid in understanding of geology, archaeology, and climate change.

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## Ecosystems Laboratory

This laboratory is a sample preparation and microscopy facility for the identification and counting of algae, invertebrates, and plant material in samples from soils, lakes, and streams collected for the Niwot Ridge and McMurdo Sound LTER projects and from studies of acid mine drainage streams in Colorado. The laboratory is supervised by Diane McKnight and is used by students and researchers involved in the LTER projects.

## Environmental Computation and Imaging Facility

This facility houses two Sun Enterprise servers with 32 400-MHz processors, supported with 32 GB of RAM, 1TB of hard drive storage, two RAID systems, a 20 SunRay terminal system, a >1TB tape library backup system (native storage), color printers and plotters, scanners, and other support equipment. In 2003 the ECI Facility became a federally approved CU Internal Service Center. The facility provides INSTAAR with leading-edge power in our quest to remain a national leader in the development of numerical models of complex earth systems. It allows users to process high-resolution data from satellites and other geophysical (seismic, swath) systems. It also supports the research efforts of the INSTAAR Delta Force in geoacoustic modeling in support naval tasks: (1) antisubmarine warfare along continental margins and shallow coastal seas, (2) mine information warfare, and (3) special operation deployments within the littoral zone. The facility also supports efforts in marine geophysics and sediment transport modeling, characterization of reservoir properties (oil industry), natural disaster mitigation, growth and flow of ice sheets, and the Community Surface Dynamics Modeling Initiative. Rates for faculty, students, and other customers can be found at [http://instaar.colorado.edu/other/computing\\_super.html](http://instaar.colorado.edu/other/computing_super.html).

## Herbarium

This facility is housed at the Mountain Research Station. It contains a field collection of plants of the Front Range.

## Kiowa Environmental Chemistry Laboratory

This laboratory is the environmental chemistry laboratory for the Niwot Ridge/Green Lakes Valley Long-Term Ecological Research Program. The laboratory is located at the Mountain Research Station and is managed by Christine Siebold and directed by Mark Williams. Equipped with an ion chromatograph, a spectrophotometric flow injection analyzer, and an atomic absorption spectrometer, the laboratory analyzes air, snow, water, and soil samples collected by faculty and graduate students from alpine and subalpine ecosystems for major solutes and nutrients.

## Landscape Ecology and Conservation Laboratory

This laboratory conducts basic and applied research in three main areas: the ecology, distribution, and conservation planning of species, vegetation types, and ecosystems; multiscaled analysis of treeline structure, composition, and dynamics; and more recently the analysis of interactions between environmental and social dynamics, including forecasting the effects of these interactions on patterns of dynamic changes and the ecological resilience of complex socioecological systems. Research to date has focused on the development and prototyping of methods and techniques for integrated regional ecological assessments, ecosystem characterization and regionalization mapping of ecosystem units, modeling of plant species and vegetation type distributions, landscape analysis of ecotones at the alpine treeline, and integration of ecological knowledge into the planning process. Recent work has included integrating different technologies (modeling, GIS, remote sensing, development of knowledge bases, and reserve selection algorithms) to design regional networks of conservation reserves. Study areas include the western United States, with special emphasis on Colorado and the Pacific Northwest and Southwestern regions, and western Europe. The laboratory is directed by Patrick Bourgeron and managed by Hope Humphries.

## Limnology Laboratory

This is an analytical laboratory for studying water and sediment samples. The laboratory is equipped for sample preparation, analysis of metals and major cations using the atomic absorption spectrophotometer, and the preparative isolation of organic fractions using column chromatography. The laboratory is directed by Diane McKnight and is used by postdocs, graduate students, and undergraduate students enrolled in McKnight's classes.

## Micropaleontology Laboratory

This is a foraminiferal analysis laboratory equipped with sieves and other equipment needed for preparation of foraminiferal samples and binocular microscopes, faunal reference slides and books for foraminiferal assemblage analysis and picking of stable isotope and radiocarbon samples. An image analysis facility employing a binocular microscope, analog camera, and computer is available to all researchers or students for computer imaging of foraminifers, plant microfossils, molluscs, beetles, and other microfossils. The laboratory is managed by a senior micropaleontology technician and supervised by Anne Jennings.

## Mountain Research Station

The Mountain Research Station (MRS), located near Nederland, 25 miles from Boulder, is an interdisciplinary research facility of the University of Colorado devoted to advancement of study of mountain ecosystems. Its mission is to facilitate research and education to better understand the unique patterns and processes of biotic and physical systems in mountains, and how environmental changes may affect these processes.

## Oceanography Laboratory

The purpose of this facility is to develop and deploy marine instruments related to understanding sediment dynamics. Major equipment includes an underwater camera system for studying flocculation dynamics, a CTD, an attenuation meter, and a LISST (in situ laser particle size analyzer). The laboratory also houses an extensive geophysical data library of analog and digital seismic and sidescan data from glacial marine environments. James Syvitski and Eric Hutton are in charge of the laboratory.

## Paleoentomology Laboratory

The purpose of this laboratory is to prepare samples for fossil insect study. This involves soaking, heating, wet-screening, and kerosene flotation of samples, all of which is done under fume hoods. The university fabricated a special over-the-sink fume hood, linked with the main fume hood in the room, so that the fumes from the kerosene flotation could be properly ventilated. Scott Elias was the principal user of the laboratory with some additional student use.

## Palynology Laboratories

These laboratories comprise two pollen sample preparation laboratories and a pollen microscopy laboratory. The sample preparation laboratories have standard equipment for chemical pretreatment of sediment samples for micropaleontological analyses of pollen and diatoms. The microscopy laboratory has two high-powered, research-grade light microscopes with image analysis capabilities, several light microscopes for student use, and a binocular microscope with camera equipment. These laboratories are supervised by Vera Markgraf and Alex Wolfe.

## Permafrost Laboratory

This laboratory contains apparatus for controlled cyclic freeze-thaw experiments on the development of patterned ground. Experimental equipment includes refrigerated soil pans, sizes ranging up to 4 by 4 feet, cooling and heating controllers, precision temperature loggers and soil handling facilities. The laboratory is directed by Tad Pfeffer.

## Plant Physiology Laboratory

This is a soils preparation laboratory directed by Bill Bowman. It houses shakers, filter apparatuses, and two CO<sub>2</sub> analyzers used for soil and plant gas exchange analysis.



Tundra Laboratory and Tundra Cam (on mast) on Niwot Ridge, INSTAAR's mountain research area in the Colorado Front Range.

## Quaternary GIS Laboratory

This facility applies state-of-the-art tools and concepts with Geographic Information Systems (GIS) and remote sensing to a variety of environmental problems at high latitudes. Quantitative spatial analysis focuses on past and present glacier dynamics in Alaska as well as Arctic shoreline erosion and ice-field archaeology. Other projects involve graduate students and public outreach with studies of paleoclimate, coastal dynamics, and geomorphology from Australia to Arctic Russia. Under the direction of William Manley, and with the help of two technicians, the lab includes four workstations, a large-format scanner, peripherals, and a range of software (ArcGIS, MFWorks, ENVI, and others).

## Reading Room

This collection supports research in extreme environments found at present high latitudes and high altitudes, or similar past environments, such as those of the Quaternary. The Reading Room was supervised by staff Librarian Martha Andrews until 2003.

## Sediment Geochemistry Laboratory

Research in this laboratory is focused on quantitative reconstructions of past sea-surface temperatures, applications of organic geochemistry to problems in paleoclimatology, and calibration of the radiocarbon time scale. Major equipment includes trace organic clean preparation facilities, automated pressurized fluid extraction (Dionex ASE 200), gas chromatograph (HP 6890 with 100-position autosampler, programmable temperature vaporization [PTV] inlet, and FID). Andrew Croftwell and Chanda Herring are in charge of the day-to-day operation of the laboratory under the direction of Scott Lehman.



Stable Isotope Laboratory. Senior scientist Bruce Vaughn (INSTAAR) explains how climate history is revealed in ancient layers of ice to visiting eighth graders, May 2001. Over 10,000 ice samples are analyzed each year in the lab, yielding high-resolution proxy records of past temperatures from the isotopic ratios of hydrogen and oxygen.

## Sedimentology Laboratory

This laboratory is well equipped for a full range of rapid and efficient sedimentological measurements. Instruments include a Malvern long-bed laser system and a Sedigraph particle size analyzer for grain size analysis; a coulometer for determination of organic and inorganic carbon and an automated carbonate system for rapid carbonate determinations modeled after a system used at Woods Hole Oceanographic Institution; and instruments for measuring sediment magnetic properties including MS, SIRM, and IRM. The laboratory is coordinated by Wendy Freeman, under the supervision of John Andrews, and is used by numerous INSTAAR graduate students who receive training on the use of the equipment from Freeman.

## Snow and Ice Laboratory

This laboratory is built around a 400-square-foot cold room, with facilities presently configured for experimental work in heat and mass transfer in snow as well as general electronics and mechanical design and fabrication. The laboratory is directed by Tad Pfeffer.

## Stable Isotope Laboratory

This laboratory is a state-of-the-art facility that uses stable isotopes to understand the processes controlling environmental change on time scales relevant to human interactions with the environment. The research focuses on the modern carbon and water cycles and paleoclimate records from ice cores, lake sediments, and bogs. The laboratory houses six mass spectrometers and ten gas preparation systems for analysis of stable isotopes of oxygen, hydrogen, carbon, and nitrogen. The stable isotope laboratory is supervised by Jim White, is managed by Bruce Vaughn, and utilizes a staff of three technicians and numerous graduate students and postdocs to analyze over 48,000 samples per year.

## Terrestrial Ecosystem Analysis Laboratory

This laboratory focuses on nutrient analyses of soils and plant tissue, with an emphasis on carbon, nitrogen, and phosphorus. N and P in solution, including water samples, are also measured routinely, as are a variety of microbial functional attributes, including biomass, enzyme activities, and CO<sub>2</sub> emissions from soils. Major instrumentation includes Alpkem autoanalyzer, Carlo-Erba CHN analyzer, benchtop spectrophotometer, and PP Systems IR gas analyzer. The laboratory is directed by Alan Townsend and managed by Briana Constance. The laboratory is consistently used by graduate students from INSTAAR as well as from CIRES, EPOB, and Geological Sciences.

## Trace Element Laboratory

Construction of this laboratory is planned for 2003. It will house a Thermo Finnigan Element2 inductively coupled mass spectrometer (ICP-MS) for the measurement of trace and minor element concentrations in carbonates, natural waters, and other materials. An attached clean lab facility will be used for sample preparation. The laboratory is directed by Tom Marchitto.

# Library and Publications

## INSTAAR Reading Room

INSTAAR maintains a special library and electronic resources collection known as the Reading Room. The aim is to provide easy access to the most widely needed journals and books for students and scientists at INSTAAR. The room also provides study areas and a central table for group discussions.

The collection consists of 3600 books, 2050 reprints of faculty publications, 2400 reports, and 445 theses (over half by former INSTAAR students).

Users have access on the Reading Room computers to an online catalog of all materials in the collection. Two specialized bibliographic databases on CD, Arctic & Antarctic Regions and PolarPac, are also accessible from these computers.

From the Reading Room website <http://www.colorado.edu/INSTAAR/ReadingRoom/> users may access the LTER Niwot Ridge Bibliography. A list of journals held in the Reading Room, including links to those subscribed to in full-text version online by the University of Colorado Libraries, is provided as well as links to World Wide Web-based resources for cold regions information.



Martha Andrews

The Reading Room was managed through 2002 by Martha Andrews, who retired in January 2003. The current Librarian is Shelly Sommer.

## Publications

INSTAAR publishes two series: *Arctic, Antarctic, and Alpine Research*, an international quarterly journal, and Occasional Papers, an irregular monograph series.

*Arctic, Antarctic, and Alpine Research* (formerly *Arctic and Alpine Research*) is a refereed quarterly interdisciplinary journal devoted to publishing original research papers, shorter contributions, resulting correspondence, and book reviews. This internationally authored and circulated journal reports on any scientific or cultural aspect of arctic/subarctic, antarctic/subantarctic, and alpine/subalpine environments and related paleoenvironments. The content of the journal reflects areas of research performed at INSTAAR.

Mark W. Williams is Editor of the journal. Kathleen Salzberg, Managing Editor for 35 years, retired in October 2002. Connie Oehring is the current Managing Editor. The Editorial Board is composed of INSTAAR and University of Colorado faculty; members review papers and advise on policy. An international Interdisciplinary Board reviews papers and promotes the interests of the journal in members' respective countries. Most of the peer reviewers are selected by the Editor.

During 2001, 106 papers were submitted to the journal, a decrease of 6% over 2000; Volume 33 (2001) contained 492 pages and included 57 research papers. First authors represented 18 countries. Volume 33 included an international symposium, "High-Mountain Lakes and Streams: Indicators



Kathleen Salzberg with Joe Smiley (then President of the University of Colorado, center) and Jack Ives (the first Editor of *AAAR*) at a reception to celebrate the publication of the first issue of *Arctic and Alpine Research* in February 1969.

of a Changing World." During 2002, 116 papers were submitted to the journal, an increase of 9 percent over 2001; Volume 34 (2002) contained 492 pages and included 53 research papers and 1 guest editorial. First authors represented 18 countries. Subscriber numbers have remained fairly constant, with about 720 copies of each issue distributed to subscribers (libraries, individual, student), exchange partners, and miscellaneous complimentary "subscribers."

*Arctic, Antarctic, and Alpine Research* has an impact factor of 1.213 (an impact factor is the ratio of citations of recent articles to the number of recently published articles). It was ranked number 2 in the Geography category and number 13 in the Environmental Sciences category in Institute of Scientific Information's Journal Citation Reports (2001).

The journal has a dedicated website ([www.colorado.edu/instaar/arcticalpine](http://www.colorado.edu/instaar/arcticalpine)) that includes general information about the journal, contents and abstracts from 1993 to the present, instructions for manuscript submission, and subscription information. Beginning in 2003, full text is available on line at BioOne ([www.bioone.org](http://www.bioone.org)) through institutional subscriptions.

The Occasional Paper series is a miscellaneous collection of reports and papers on work performed by INSTAAR personnel and their associates that are generally too long or too data intensive for publication in research journals. Occasional Paper No. 55, *Glacier Mass Balance and Regime: Data of Measurements and Analysis*, by Mark Dyurgerov, eds. Mark Meier and Richard Armstrong, was published in 2002.

Kathleen at her desk in the office of *AAAR* in September 2002.



# Societal Outreach



A group of second and third grade students from Denver study snow layering with H. P. Marshall (INSTAAR, not pictured), December 2002. The students measured snow temperature with dial thermometers, snow density with spring balances, and snow wetness with a Denoth meter (electrical properties of snow). Photo: H. P. Marshall.

Andrew Todd (INSTAAR) shows aquatic insects collected in Boulder Creek to a group of eighth grade students, May 2001.



On a day-to-day basis, INSTAAR members respond to inquiries from the public and the media on the broad spectrum of scientific matters that relate to INSTAAR's research. They regularly give lectures and presentations to schools and civic groups and provide TV and radio interviews for the popular press.

In May 2001, INSTAAR continued its successful series of open houses by hosting the entire eighth grade from Southern Hills Middle School. A total of 140 students collected samples and learned about relationships among stream flow, water quality, and insect ecology at nearby Boulder Creek. By visiting a few of the many labs at INSTAAR and the National Snow and Ice Data Center (NSIDC), the students learned how materials such as bones and soils are radiocarbon dated, how climate controls the extent of glaciers and sea ice, and how climate is recorded in ice cores. In addition to the hands-on exercises, the students participated in lectures on Neanderthals as well as mathematical models of patterns in nature. The open house helped convey the diverse aspects of Earth Science, use of sophisticated instrumentation and modeling, and the relevance of Earth Science for important global and local issues. A detailed description of the open house and pictures of the activities are available on the INSTAAR website: [http://instaar.colorado.edu/education/open\\_house\\_2001/](http://instaar.colorado.edu/education/open_house_2001/).

Other outreach highlights for 2001–2002 include:

- INSTAAR personnel judged several science fairs, ranging from individual schools (such as Summit Middle School) to regional and state fairs.
- INSTAAR faculty and graduate students mentored promising high school students with research-related projects. Studies included geospatial analysis of glacier landforms and radar assessment of snowpack stability.
- Scott Elias continued progress with a project funded by NSF—Elementary, Secondary, and Informal Education to develop an interactive CD-ROM on arctic science for middle school students in Alaska.

- James Dixon was a particularly active speaker, giving talks to groups in locations ranging from Yukon Territory, Canada, to Michigan to Colorado.
- Tim Kittel and others contributed to scientific assessments for nongovernmental organizations, including the Nature Conservancy.
- Hans-Peter Marshall, an INSTAAR graduate student, led a field trip to Loveland Pass, showing second and third graders how to measure temperature, density, and other properties in snow pits.
- Connie Woodhouse gave talks to outdoor enthusiasts, as well as a water conservancy district, on the tree-ring record of past stream flows and drought in the western United States.



Scott Peckham (INSTAAR) explains how mathematical models can be used to understand patterns and forms in nature, such as soap films and the meandering stream shown on the screen, INSTAAR Open House, May 2001.

Through the Niwot Ridge Long-Term Ecological Research Program, INSTAAR's Mountain Research Station has offered a summer course, "Alpine Ecology and Experiential Learning," that involves K–12 outreach and training of in-service and preservice teachers from the local area and beyond. The field trips that are integral to this program are organized in conjunction with several local summer science programs for children: Science Discovery, Wild Bear Science School in Nederland, and Bixby School in Boulder.

INSTAAR continued strong involvement with several CU initiatives to directly involve undergraduates and minority students in scientific research. These included the Summer Undergraduate Research Fellowship (SURF) program, the Summer Multicultural Access to Research Training (SMART) program, the Significant Opportunities in Atmospheric Research and Science (SOARS) program, and others.

Other outreach activities are highlighted in the "Science Spotlights" section of this report.

# Courses Taught by INSTAAR Faculty

## 2001

### William D. Bowman

EPOB 4350 Field Biology, Summer 2001  
EPOB 3020 Principles of Ecology, Spring 2001

### E. James Dixon

M&FS 4011/5011 Introduction to Museum Studies (with Steve Lekson), 2001

### David J. Lubinski

GEOL 1070 Global Change 2, Spring 2001

### Diane M. McKnight

CVEN 5323 Applied Stream Ecology, Fall 2001  
CVEN 3434 Introduction to Applied Ecology, Spring 2001  
EPOB 2010 Alpine Ecology and Experiential Learning, Summer 2001

### Gifford H. Miller

GEOL 5420 Quaternary Stratigraphy/Geochronology, Fall 2001  
GEOL 1060 Global Change: An Earth Science Perspective, Fall 2000  
GEOL 5700 Seminar in Glacial Geology, Fall 2001  
GEOL 1011 Global Change Lab, Fall 2000  
GEOL 5700 Seminar in Quaternary Records, Spring 2001

### W. Tad Pfeffer

CVEN 3698 Engineering Geology, Spring 2001  
CVEN 4838/5838 Mechanics and Dynamics of Glaciers, Spring 2001  
CVEN 2121 Analytical Mechanics, Fall 2001  
CVEN 4511/5511 Finite Element Modeling, Fall 2001

### Timothy R. Seastedt

EPOB 5310 Graduate Environmental Biology (with Mike Breed), Fall 2001  
EPOB 6100 The Ecology and Biogeochemistry of the Alpine (with Steve Schmidt), Spring 2001

### James P. Syvitski

GEOL 4060/5060 Oceanography, 2001

### Alan R. Townsend

EPOB 4170/5170 Ecosystem Ecology, 2001  
EPOB 6100-4 Carbon, Climate and Society, 2001

### James W. C. White

ENVS 4990 Senior thesis in ENVS, Fall 2001  
ENVS 3930 Internship in ENVS (supervisor), Spring 2001  
GEOL 1110 Global Change Lab (supervisor), Spring 2001  
GEOL 3520 Environmental Issues, Spring 2001  
GEOL 1070 Global Change, large lecture class, Spring 2001  
ENVS 3930 Internship in ENVS (supervisor), Fall 2001  
ENVS 4990, Senior thesis in ENVS, Spring 2001

### Mark W. Williams

GEOG 1011 Landscapes and Water, Spring 2001  
GEOG 3511 Introduction to Hydrology, Fall 2001  
GEOG 4311/5421 Watershed Biogeochemistry, Fall 2001

## 2002

### David M. Anderson

GEOL 4060 Oceanography, Spring 2002

### John T. Andrews

GEOL 3040 Geologic Record of Global Change, Spring 2002  
GEOL 4360/5360 Glacial Geology, Spring 2002  
GEOL 5360 Glacial Geology, Fall 2002

### William D. Bowman

EPOB 3140 Plant Ecology, Fall 2002  
EPOB 4350 Field Biology, Summer 2002

### T. Nelson Caine

GEOG 3511 Introduction to Hydrology, Spring 2002

### E. James Dixon

MUSM 4011/5011 Introduction to Museum Studies, Fall 2002  
ANTH 4020/5020 Explorations in Anthropology—Arctic Archaeology, Spring 2002

### Diane M. McKnight

CVEN 5323 Applied Stream Ecology, Fall 2002  
CVEN 3434 Introduction to Applied Ecology, Spring 2002

### Gifford H. Miller

GEOL 1011 Global Change Lab, Fall 2002  
GEOL 1060 Global Change: An Earth Science Perspective, Fall 2002  
GEOL 5700 Readings in Quaternary Stratigraphy, Fall 2002

### W. Tad Pfeffer

CVEN 3698 Engineering Geology, Spring 2002  
CVEN 2121 Analytical Mechanics, Fall 2002

### Timothy R. Seastedt

EPOB 5310 Conservation and Ecology (with Carl Bock), Fall 2002

### Alan R. Townsend

EPOB 6100 Carbon, Climate and Society, Spring 2002  
EPOB 6100 Carbon, Climate and Society, Fall 2002

### James W. C. White

ENVS 4990 Senior thesis in ENVS, Fall 2002  
ENVS 3930 Internship in ENVS, Spring 2002  
GEOL 1110 Global Change Lab (supervisor), Spring 2002  
GEOL 3520 Environmental Issues, Spring 2002  
GEOL 5700 Environmental Isotopes, Fall 2002  
GEOL 1070 Global Change, Spring 2002  
ENVS 3930 Internship in ENVS, Fall 2002  
ENVS 4990 Senior thesis in ENVS, Spring 2002

### Mark W. Williams

GEOG 4321-001 Intro to Hydrology, Summer 2002  
GEOG 3511-010 Snow Hydrology, Fall 2002  
GEOG 4311-010 Intro to Hydrology, Fall 2002

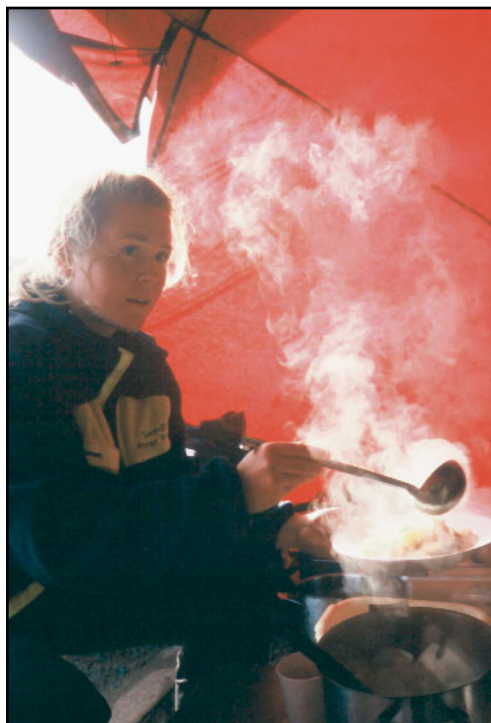


Diane McKnight (INSTAAR) after collecting 600 liters of water for dissolved organic matter extraction, Island Lake, Toolik LTER, Alaska, June 2002. Photo: Y. Chin (Ohio State University).

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# INSTAAR Noon Seminars

## Spring 2001



Hanna Lokrantz (Göteborg University) takes a needed food break after a long day studying Quaternary sediments. Hanna was a member of an international team (including INSTAAR) studying the glacial history of October Revolution Island, Severnaya Zemlya, Arctic Russia (79°N), August 2002. Photo: D. Lubinski.

Scott Elias, INSTAAR, "Beringian Paleoenvironments"

James Syvitski, INSTAAR Director, INSTAAR General Meeting

Alex Wolfe, INSTAAR, "Assessing the Ecological Response of Alpine Lakes to Nitrogen Deposition in Rocky Mountain National Park: An Application of Paleolimnology"

Vera Markgraf, INSTAAR, "The Southern Westerlies and Interhemispheric Correlation"

Elise Pendall, INSTAAR, "Soil Carbon Cycling under Elevated Atmospheric CO<sub>2</sub>"

Mark Dyurgerov, INSTAAR, "The Contribution of Mountain and Subpolar Glaciers to Sea-Level Rise Appears to be Increasing: Can We Predict This for the 21st Century?"

Shad O'Neel, INSTAAR, "Dynamics at the Terminus of a Tidewater Glacier"

Peter Molnar, CIRES, "The Closing of the Indonesian Seaway as the Missing Link between El Niño and Pliocene Aridification of East Africa, if Not the Key to the Ice Ages"

Helmut Eelsenbeer, University of Cincinnati, "Soils and Land-Use History in the Southern Alps"

Russ Graham, Denver Museum of Nature and Science, "Triggers, Thresholds, Russian Roulette, and Pleistocene Extinctions!"

John Hoffecker, INSTAAR, "East European Environments and the Ecology of the Neanderthals"

David Anderson, NOAA, "Comparing Marine Geologic Estimates of Sea Surface Temperature"

Scott Lehman, INSTAAR, "Radiocarbon Activity, the Ocean, and Earth's Magnetic Field"

## Fall 2001

James Syvitski, INSTAAR Director, INSTAAR General Meeting

Mark Losleben, INSTAAR, "Mountain Snowpack and Variability in Three Western United States Mountain Ranges"

Lisa Morgan, U.S. Geological Survey, "New Discoveries in Yellowstone Lake: Results from High-Resolution Sonar Imaging, Seismic Reflection, and Submersible Surveys"

Scott Peckham, INSTAAR, "Fluvial Landform Modeling"

James Syvitski, INSTAAR, "INSTAAR Turns 50: A Very Brief History" and "Developing a Community Sediment Model for Education and Research in the 21st Century"

Jim Maslanik, Aerospace Engineering and PAOS, "Development and Applications of a Small Unpiloted Aerial Vehicle for Polar Research"

Tad Pfeffer, INSTAAR, "100 Years of Arapahoe Glacier Observations (in 3 steps)"

Ida Lonne, The University Courses on Svalbard (UNIS), Norway, "Glacial Ghosts: Investigating Faint Traces of High Arctic Glaciations"

Ute Herzfeld, Heisenberg Fellow (German Science Foundation) and INSTAAR, "Mapping and Monitoring Changes in the Antarctic Ice Sheet from Combined RADARSAT SAR and GEOSAT to ERS Radar Altimeter Data Analysis"

Kevin Bishop, Swedish University of Agricultural Sciences, "Natural Dynamics and Unnatural Impacts in Boreal Catchments: A Hydrologist's Perspective on Acidification, Mercury, and Forestry in the Humic Waters of Northern Sweden"

Judith Curry, Aerospace Engineering and PAOS, "Applications of SHEBA Data to Improving Climate Models"

Detlev Helmig, INSTAAR, "The Ups and Downs of the Atmosphere: An Introduction to the Research of Surface-Atmosphere Interactions in a New Group at INSTAAR"

Robert Anderson, visiting scientist, University of California, Santa Cruz, "Evolution of a Tectonically Active Coastline: Lessons from Santa Cruz, California"

Herman Sievering, University of Colorado at Denver and INSTAAR Affiliate, "Atmospheric Nitrogen Contribution to Forest N Cycling and Growth: Niwot Spruce-Fir-Pine Case Study"

## Spring 2002

Tim Seastedt, INSTAAR Acting Director, General INSTAAR Meeting

Michael Mann, Environmental Studies, University of Virginia, "The Role of External Forcing in Climate Changes of the Past Few Centuries"



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Tim Barrows, Research School of Physical Sciences, Australian National University, "The Last Ice Age in Australia—Applications of Exposure Dating Using Cosmogenic Isotopes"

Gerard Roe, Quaternary Research Center, University of Washington, "Climate Feedbacks on the Evolution of Mountain Ranges"

Tom Marchitto, Lamont Doherty Earth Observatory, Columbia University, "Reconstructing Glacial-Interglacial Carbonate Ion Excursions in the Deep Pacific"

Ulysses Ninnemann, Lamont Doherty Earth Observatory, Columbia University, "Drake Passage Ocean Circulation and Climate Changes during the Last Deglaciation"

Susan Avery, Director of CIRES and Professor of Electrical and Computer Engineering, University of Colorado at Boulder, "Water, Science, and the New West"

Wes Lemasurier, Department of Geology, University of Colorado at Denver, INSTAAR Affiliate, "A 35 M.Y. History of Uplift and Erosion of the Marie Byrd Land Dome: Implications Regarding Glacial History and Possible Mid-Cenozoic Plate Motion in West Antarctica"

Robert Howarth, Cornell University, "Human Acceleration of the Nitrogen Cycle: National and Global Drivers and Trends"

Michael Richter, University Erlangen–Nürnberg (Germany), "Climate Interpretation by Phytoindication in High Mountains in Central Asia and Latin America"

Steve Solomon, Geological Survey of Canada (Atlantic), Bedford Institute of Oceanography, "Coastal Storms, Sea Ice, and Coastal Stability in the Canadian Beaufort Sea Region"

Chris Jenkins, INSTAAR, "A Global GIS of Seabed Materials"

Ned Andrews, USGS, "Influence of ENSO on Flood Frequency along the California Coast"

Lothar Schrott, visiting scientist, Department of Geography, University of Bonn, "Sediment Storage in Alpine Catchments: Quantification and Variability"

John Hoffecker, INSTAAR, "The Last Glacial Maximum and the Peopling of the New World"

Jon Landvik, Agricultural University of Norway, visiting scientist, "Svalbard during the Last Glaciation: Old Controversies Revisited"

## Fall 2002

James Syvitski, Director INSTAAR, "Global Change Is Much More Than Climate Change"

Diane McKnight, INSTAAR, "Ecological Response to Nitrogen Deposition and Climate Change in Alpine Lakes in the Colorado Front Range"

Larry Barber, USGS, "Sex, Drugs, and Water: Emerging Contaminants in the Boulder Creek Watershed"

Donna Francis, Harvard University, "Chironomids as Indicators of Past Climate Change in the Arctic"

Inge Aarseth, visiting scientist, University of Bergen, Norway, "Holocene Lacustrine Shorelines in Bedrock and Late Pleistocene Rock Platforms in and around Bergen, Norway"

Tim Kittel, National Center for Atmospheric Research, INSTAAR affiliate, "Historical and Future Climates of the Rocky Mountains"

Mark F. Meier, INSTAAR, "Sea-Level Rise: A Splendid Interdisciplinary Enigma"

Yu Ching, Ohio State University, visiting scientist, "Persistent Organic Pollutants in Polar Regions"

Steve Goodbred, State University of New York, Stony Brook, "The Ganges-Brahmaputra Sediment Dispersal System: Controls, Responses, and Stratigraphy during the Late Quaternary"

Ted Scambos, National Snow and Ice Data Center, "The Larsen B Breakup: The Climate and the Stability of the Major Ice Shelves around Antarctica"

Pierre Francus, University of Massachusetts, "Image Analysis, Sediments, and Paleoenvironmental Reconstruction"

Joe Stoner, INSTAAR, "Holocene Paleomagnetism in the Arctic: New Frontiers in Geophysics and Chronostratigraphy"

Ted Habermann, NESDIS/NGDC, "Geospatial Databases: The Foundation for Environmental Data Management"

Scott Peckham, INSTAAR, "TopoFlow: A New Distributed Hydrologic Model Based on ARHYTHM and RiverTools"

Lothar Schrott, University of Bonn, Germany, visiting scientist, "Hydrological Significance of Permafrost in the Semi-arid Andes"

Deborah Martin, USGS, "Geomorphic Impacts of Wildfire in the Semi-arid West"

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# Graduate Student Talks

## Spring 2001

Eran Hood, INSTAAR, "Innovative Techniques for Assessing the Source and Quality of Dissolved Organic Material (DOM) in a High-Elevation Catchment"

Laura Mujica-Crapanzano, INSTAAR, "Landscape Analysis of Vegetation and Diversity Patterns on Niwot Ridge, Colorado"

Durelle T. Scott, INSTAAR, "Manganese Cycling in a Mountain Stream"

Mikie Smith, INSTAAR, "Hidden Secrets of Forams and Stories of Past Gas in the Denmark Strait"

James Syvitski, INSTAAR Director, "A Fireside Chat with the Director on Stress Management (and Securing a Job)"

Andres Torizzo, INSTAAR, "Relations between Surface-Water Chemistry and Basin Characteristics in High-Elevation Watersheds, Rocky Mountain National Park, Colorado"

Isla Castañeda, INSTAAR, "Fun with Forams: Holocene Isotopic Data from the N. Iceland Continental Shelf"

Jason Briner, INSTAAR, "Glacial History of Northeastern Baffin Island: A Progress Report from Year One"

Alex Brown, INSTAAR, "South Pole Station, Antarctica: Science, Construction, and Life at the Bottom of the World"

Gita Dunhill, INSTAAR, "2000 Ski Mobiles, 3000 Polar Bears, and 1400 People (Studies on Svalbard)"

Dave Kinner, INSTAAR, "Determining Hydrologic Flowpaths in a Tropical Forest Using Hydrologic and Geochemical Evidence"

## Fall 2001

Hans-Peter (H. P.) Marshall, INSTAAR, "Snow Avalanche Physics: Slope Stability and Related Problems," or "Dude, Like, Ya Think if I Bomb through this Mega-gnarly Chute It's Gonna Slide on Me?"

Sarah Principato, INSTAAR, "Glacial Geology of the Isafjardardjup Coast, NWP Iceland: 2001 Preliminary Field Results"

Dave Kinner, INSTAAR, "Calculating the Sediment Budget of a Meso-Scale River Basin: Preliminary Observations and the Geomorphic Carbon Sink"

John Ortega, INSTAAR, "Flux Measurements of Volatile Organic Compounds by Disjunct Eddy Sampling and Ion Trap Mass Spectrometry Analysis"

Ryan Vachon, INSTAAR, "Figuring out the Distribution of Stable Isotopes of Precipitation across the US—Breaking Down Isotope Theory"

Practice GSA talks, including Francesca Smith, University of Chicago, "Phytolith Carbon Isotope Records of Neogene Grasses" and Jason Briner, INSTAAR, "Latest Glacial Geology Results from Baffin Island"

Trevor Popp, INSTAAR, "New Deep Ice Core in Greenland: Life, Drilling, and Progress at NorthGRIP"

Michael Gooseff, INSTAAR, "A Dissertation Defense Encore Presentation: Modeling Hyporheic Exchange Influences on Biogeochemical Processes in Dry Valley Streams, Antarctica"

INSTAAR scientists (l to r) Heidi Steltzer, Katie Suding, and Courtney Meier atop Sivy Vrch (Grey Hill) in the Western Tatra Mountains, Slovakia, along with collaborators from the Institute of Landscape Ecology, Slovak Academy of Sciences (l to r), Lubos Halada, Martin Boltiziar, and Frantisek Petrovic, May 2002. This project examines the impact of air pollution on alpine vegetation. Photo: B. Bowman.



## Spring 2002

Francesca Smith, University of Chicago, "The Record of Ancient Grasslands Held in the Carbon Isotope Signature of Fossil Phytoliths (Silica Bodies Made by Grasses)"

Tim Barrows, Research School of Physical Sciences, Australian National University, "The Last Ice Age in Australia—Applications of Exposure Dating Using Cosmogenic Isotopes"

Tom Marchitto, Lamont Doherty Earth Observatory, Columbia University, "Reconstructing Glacial-Interglacial Carbonate Ion Excursions in the Deep Pacific"

Laura Belanger, INSTAAR, presented some of her master's research findings on acid mine drainage, Snake River Watershed, Summit County, Colorado.

Jason Briner, INSTAAR, "Did Younger Dryas Climate Change Make It to Alaska? New Evidence from Lake Cores and the Glacial Record"

Ryan Vachon, INSTAAR, "Three Guys Avoiding Science in the Cordillera Blanca, Peru"

Erin VanMatre, INSTAAR, "Ten Years of Phytoplankton Ecology in the McMurdo Dry Valleys, Antarctica"

David Mixon, INSTAAR, "In Search of the Lost Reservoir: An Adventure in GIS"

Steve DeVogel, INSTAAR, "Paleo-Lake Levels of Lake Eyre, Australia: Reconstructed Using GIS"

Greta Bjork Kristjansdottir, INSTAAR, "Late Quaternary Sediment Deposition in Eyjafjardaráll, N. Iceland Shelf: What the Heck Happened in the Early Holocene?"

Irina Overeem, INSTAAR postdoc, "The Late Cenozoic Eridanos Delta System in the Southern North Sea Basin: A Climate Signal in Sediment Supply?"

## Fall 2002

Johan Temnerud, Rebro University, Sweden, "Spatial Variation of Dissolved Organic Carbon (DOC): An Example from Northern Sweden"

John Ortega, INSTAAR, "Biogenic Emissions of Volatile Organic Compounds: 2002 Summer Field Session at the University of Michigan Biological Station"

Rose Corey, INSTAAR, "The Concentration and Composition of Soil Water Dissolved Organic Matter across Olympic National Park, WA"



Jacques Hueber (visiting engineering student from France) develops a chemiluminescence ozone analyzer for the measurement of ozone deposition fluxes to the forest at the Niwot Ridge Ameriflux tower, Mountain Research Station, Colorado, August 2002. Photo: D. Helmig

Sarah Principato, INSTAAR, "Glacial Geology on the NWP, Iceland: 2002 Field Results"

Meredith Newman, INSTAAR visiting scientist, Associate Professor of Chemistry and Geology, Hartwick College, Oneonta, NY, "What's It Like to Teach?"

Jocelyn Turnbull, INSTAAR, "In the Land of Genghis Khan: Travels in Mongolia—A Totally Nonscientific Slide Show"

Jason Briner, INSTAAR, "An Ice-Stream-Dominated Northeastern Laurentide Ice Sheet?"

James Syvitski, INSTAAR Director, "The Art and Science of Journal Publishing"

Trevor Popp, INSTAAR, "Abrupt Climate Change Recorded in Greenland Ice Cores: New Results from NorthGRIP"

Chris Jaros, INSTAAR, slide show from his Antarctic field work titled "Why John Gardner Can't be Here Today . . ."

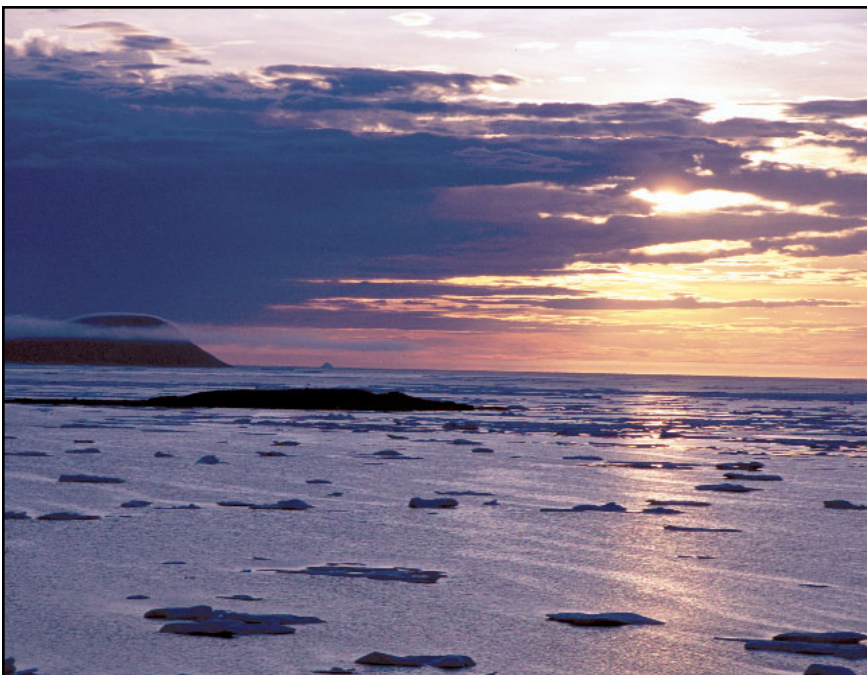
H. P. Marshall, INSTAAR, "Avalanche Science: How Can Ground-Penetrating Radar and Finite Element Models Further our Understanding of Snow Slope Stability?"

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# Research Grants 2001–2002

- Anderson, Katherine; Elias, Scott: NSF ATM-9910639. Collaborative Research: Testing Earth System Models with Paleoenvironmental Observations. 1999–2003. \$138,835.
- Andrews, John: NSF OPP-9614129. Support for Graduate Attendance at the Arctic Workshop, 1996–2002. \$73,381.
- Andrews, John: NSF OPP-0118455. Paleo Ice Flow Paths from Till Provenance in the Ross Embayment, Antarctica. 2001–2003. \$27,913.
- Andrews, John: NSF OPP-0133709. Support for Participation of Graduate Students in the Annual Arctic Workshop. 2002–2005. \$73,375.
- Andrews, John; Jennings, Anne: NSF OPP-0004233. Ice Extent and Late Glacial and Deglacial History of W. Hunafloi, NW Iceland: Combining Terrestrial and Marine Evidence. 2001–2004. \$205,000.
- Andrews, John; Jennings, Anne; Farmer, G. Lang: NSF OPP-9906812. Late Quaternary Variations in Sediment Provenance and Ice Sheet Dynamics: NE Sector of the Laurentide, Inuitian and the W/NW Margin of the Greenland Ice Sheets. 1999–2001. \$56,651.
- Andrews, John; Jennings, Anne; Syvitski, James; Hardardottir, Jorunn; Anderson, D. M.: NSF OCE-9809001. Long Images Cores from High Latitude Shelves Bordering Denmark Strait. 1999–2002. \$333,251.
- Behrendt, John: NSF OPP-9814036. Interpretation of an Aneromagnetic Survey over the Butcher Ridge Igneous Complex, Transantarctic Mountains. 1999–2003. \$50,000.
- Bourgeron, Patrick: EPA R825465-01. Multi-Scaled Assessment Methods: Prototype Development within the Interior Columbia Basin. 1997–2001. \$1,516,180.
- Bourgeron, Patrick: Agriculture Forest Service PNW97-0507-2-JVA. Scaled Landscape Ecology Study of Ecosystem Patterns and Processes within the Pacific Northwest. 1997–2002. \$343,277.
- Bourgeron, Patrick: Nature Conservancy MPO-032802. Canyonland Integrated Ecological Assessment—Phase I: Ecosystem Characterization at the Canyon Country Ecological Research Site. 2002–2003. \$67,000.
- Bourgeron, Patrick; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$163,452.
- Bowman, William: NSF INT-0112281. Responsiveness of Alpine Vegetation to N. Inputs—A Comparison between Central European and North American Sites. 2001–2004. \$63,461.
- Bowman, William; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interaction of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$220,962.
- Brooks, Paul: Interior NPS CA-1268-2-9005 UCO-33. Variability in the Composition and Amount of DOC in Surface Waters of Rocky Mountain, Glacier, Olympic and Sequoia National Parks. 1999–2002. \$60,374.
- Buttenfield, Barbara; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$61,220.
- Caine, T. Nelson: Max Kade Foundation OCG4396B. New Approaches to the Understanding of Sediment Budget Components in Alpine Environments. 2002–2003. \$39,500.
- Caine, T. Nelson; Williams, Mark; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$299,701.
- Calkin, Parker: NSF ATM-9905493. Collaborative Research: Tree-Ring Based Records of Temperature and Glacial Fluctuation Spanning the Past Two Millennia, Prince William Sound, Alaska. 1999–2003. \$121,754.
- Dixon, E. James: NSF OPP-0096289. Late Quaternary Archaeology and Paleoecology of Southeast Alaska, Phase II. 2000–2002. \$189,038.
- Dixon, E. James: Interior NPS I443CA991000046. Culture History of Beringia: An Archaeological Synthesis. 2000–2004. \$166,840.

Baffin Bay, looking northwest from the Clyde Cliffs, a north-eastern Baffin Island cliff section as much as 40 meters high and containing sediment spanning the Quaternary and late Pliocene, August 2001. Photo: R. Coulthard.



Dixon, E. James; Manley, William: NSF OPP-0097753. Archaeology of Alaska Glaciers and Snowfields. 2001–2002. \$175,072.

Dixon, E. James; Manley, William: NSF OPP-0222490. Archaeology of Alaska Glaciers and Snowfields, Phase II. 2002–2004. \$259,267.

Dyurgerov, Mark; Bahr, David; Meier, Mark: NSF BCS-0099236. Toward a Realistic Estimate of Sea-Level Rise and Global Water Balance Due to Glacier Wastage. 2001–2003. \$249,976.

Elias, Scott: NSF ESI-9818837. Arctic Connections: An Interactive CD-ROM Program for Secondary Science Education. 1999–2004. \$730,100.

Elias, Scott: NSF OPP-9911048. Nature of Late Pleistocene Climatic Ameliorations in Eastern Beringia. 2000–2004. \$207,263.

Elias, Scott: NSF ESI-9818837. Arctic Connections: An Interactive CD-ROM Program for Secondary Science Education. 2000–2004. \$257,250.

Elias, Scott: NSF ESI-9818837. Arctic Connections: An Interactive CD-ROM Program for Secondary Science Education. 2000–2004. \$3,804.

Elias, Scott: NSF ESI-9818837. Arctic Connections: An Interactive CD-ROM Program for Secondary Science Education. 2002–2004. \$5,485.

Elias, Scott; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$71,510.

Harper, Joel; Pfeffer, W. Tad: NSF EAR-9901492. Postdoctoral Research Fellowship. 1999–2003. \$5,000.

Hart, Charles: NSF OPP-0202911. SGER: Geochronology of Ross Sea Carbonates: Collaborative Participation with the Italian National Antarctic Research Program CARBONANT Cruise 2002. 2001–2003. \$34,376.

Helmig, Detlev: EPA R-82522101-5. Development of Techniques for Eddy-Correlation Measurements of Non-Methane Volatile Organic Compounds Fluxes in the Atmosphere. 1996–2003. \$499,926.

Helmig, Detlev: NSF OPP-0137538. Collaborative Research: Trace Gas Deposition Processes in the Arctic Boundary Layer. 2002–2004. \$117,770.

Helmig, Detlev; Birks, John: NSF ATM-9911186. Sesquiterpenoid Compound Emissions from Vegetation—Chemical Analysis Technique for Ambient Measurements of the Contribution to the Formation of Ozone and Aerosols. 2000–2003. \$260,000.



Herzfeld, Ute; Caine, T. Nelson: NSF EAR-0001514. Snow Surface Roughness—Data Collection, Geostatistical Analysis, Relationship to Meteorologic Observations, and Relevance to Snow Hydrologic Models. 2000–2002. \$74,352.

Hoffecker, John: NSF BCS-0132553. Kostenki: Initial Upper Paleolithic in Eastern Europe. 2002–2004. \$153,6979.

Hoffecker, John; Elias, Scott: NSF OPP-9906653. Uivvaq: Archaeology and Paleoclimatology of an Arctic Coastal Midden. 1999–2002. \$100,319.

Hughen, Konrad; Overpeck, Jonathan; Lehman, Scott: NSF ATM-9709563. Radiocarbon, Ocean and Climate Change over the Last Deglaciation. 1997–2001. \$305,000.

Jenkins, Chris: DOD Navy ONR N00014-02-1-0432. Improved Data Input Systems for Mine Burial Prediction. 2002. \$40,000.

Jenkins, Chris: Interior USGS 02WRAG0061. Development of usSEABED Database and 3-D Mapping Techniques. 2002–2003. \$39,463.

Jennings, Anne; Andrews, John; Anderson, David: NSF OPP-0082347. Ice-Ocean-Atmosphere Interactions along the East Greenland Margin on Decade to Century Timescales over the Last 14 ka. 2000–2003. \$463,664.

Lehman, Scott: NSF EAR-9726185. Cosmogenic Nuclide Chronology of Bedrock Weathering Zones in Fennoscandia and Implications for the History of the Fennoscandian Ice Sheet. 1998–2001. \$50,057.

Lehman, Scott: NSF ATM-9809285. Preparation and AMS <sup>14</sup>C Dating of Terrestrial Materials for ESH Program Research: Making Good Chronology a Priority. 1998–2001. \$871,251.

Gifford Miller (INSTAAR) and Aslaug Geirsdottir (University of Iceland) are assisted by Thorsteinn Jonsson and Sveinbjorn Steinthorsson while coring at Vatnsdalsvatn, Northwest Iceland, March 2002. Photo: P. Sauer.



Aslaug Geirsdottir, Thorsteinn Jonsson, and Sveinbjorn Steinthorsson (University of Iceland) recover a high-sedimentation-rate (3.5 m/ka) core of lake sediment from Hvitvatn, central Iceland, March 2002. In the background, an outlet glacier of Langjokull Ice Cap calves into the lake. Photo: G. Miller.

Lehman, Scott: NSF OCE-0081257. Collaborative Research: A Benchmark Record of Temperature for the Last Four Glacial Cycles in Sediments of the Bermuda Rise. 2000–2003. \$539,696.

Lehman, Scott: NSF ATM-0117194. Preparation and AMS <sup>14</sup>C Dating of Terrestrial Materials for the ESH Program. 2001–2002. \$180,275.

Losleben, Mark: Harding ESE, Inc. S68D98112-SITEOP-701 EPA 68D98112. Site Operator Agreement, CASTNet II Site 701 (C094). 2000–2001. \$4,830.

Losleben, Mark: Commerce NOAA 43RANRIM0533. Carbon Cycle Atmospheric Gas Collection. 2000–2001. \$14,276.

Losleben, Mark: Commerce NOAA 43RANRIM0050. Halocarbon Atmospheric Sampling. 2000–2001. \$12,966.

Losleben, Mark: Harding ESE, Inc. S68D98112-SITEOP-701. Site Operator Agreement, CASTNet II Site 701 (C094). 2001–2002. \$4,830.

Losleben, Mark: Commerce NOAA RA1330-02-SE-0023. Halocarbon Atmospheric Sampling. 2001–2002. \$12,966.

Losleben, Mark: Commerce NOAA RA1330-02-SE-0064. Carbon Cycle Atmospheric Gas Collection. 2001–2002. \$14,276.

Losleben, Mark: Commerce NOAA RA1330-03-SE-0010. Halocarbon Atmospheric Sampling. 2002–2003. \$12,966.

Losleben, Mark: Commerce NOAA RA1330-03-SE-0045. Carbon Cycle Atmospheric Gas Collection. 2002–2003. \$14,704.

Losleben, Mark: Harding ESE, Inc. S68E98112-SITEOP-701. Site Operator Agreement, CASTNet II Site 701 (C094). 2002–2003. \$4,830.

Lubinski, David: National Research Council OCG4253B INT-0002341. Fellowship. 2000–2001. \$15,000.

Lubinski, David: NSF OPP-0196182. Collaborative Research: Reconstructing the Past 20,000 Years of Glacial and Sea-Level History for Severnaya Zemla, Russia, 80 North. 2000–2003. \$132,263.

Lubinski, David: Ohio State University Research Foundation 735612 OPP-9725418. Reconstructing Arctic-Atlantic Interactions on a Sub-Millennial Time Scale: Holocene Sediment Records from the Southeastern Barents Sea. 2001. \$6,468.

Manley, William: NSF OPP-9977972. Collaborative Research: Paleoglaciology of Alaska—Climate Parameters during the Last Glacial Maximum from GIS Determination of Equilibrium Line Altitudes. 1999–2003. \$397,000.

Manley, William; Dyurgerov, Mark; Meier, Mark: NSF ATM-0081379. Spatial Analysis and Calibration of Glacier-Climate Relationships across Alaska. 2000–2003. \$284,636.

Manley, William; Maslanik, James: NSF OPP-0224071. High-Resolution Imagery and Terrain Model for Collaborative Research of Environmental Change at Barrow, Alaska. 2002–2003. \$98,455.

Manley, William; Maslanik, James: NSF OPP-0224071. High-Resolution Imagery and Terrain Model for Collaborative Research of Environmental Change at Barrow, Alaska. 2002–2003. \$123,351.

Markgraf, Vera: NSF EAR-9709145. Patagonia Lake Drilling Project (PATO): Phase I. 1997–2001. \$596,368.

Markgraf, Vera: NSF ATM-0082067. Collaborative Research: Patagonia Lake Drilling Project (PATO): Phase II. 2000–2003. \$179,617.

Markgraf, Vera: University of Minnesota T5246373001 ATM-0081279. Patagonian Lake Drilling Project (PATO): Phase II. 2001–2003. \$62,935.

McKnight, Diane: EPA R826649-01. Photochemical Processes Controlling Manganese Chemistry in Pristine and Contaminated Mountain Streams. 1998–2001. \$351,175.

McKnight, Diane: DOD Navy ONR N00014-99-1-0296. Quantification of the Humic Electron Transfer Reactions in Natural and Contaminated Marine Sediments. 1999–2002. \$259,446.

McKnight, Diane: Ohio State University Research Foundation 739204 PO# RF00915335 OPP-0096250. McMurdo Dry Valley Long Term Ecological Research (Research Studies). 2000–2003. \$248,189.

McKnight, Diane: Ohio State University Research Foundation 739204 PO# RF00915335 OPP-0096250. McMurdo Dry Valley Long Term Ecological Research (Operations). 2000–2003. \$210,725.

McKnight, Diane: Ohio State University Research Foundation 739204 PO# RF00915335 OPP-0096250. McMurdo Dry Valley Long Term Ecological Research (Equipment). 2000–2003. \$25,000.

McKnight, Diane: DOD Navy ONR N00014-99-1-0296. Quantification of the Humic Electron Transfer Reactions in Natural and Contaminated Marine Sediments. 2001–2002. \$4,102.

McKnight, Diane: NSF OPP-0097182. Collaborative Research: The Direct and Indirect Photolytic Fate of Persistent Organic Pollutants in Arctic Surface Waters. 2001–2003. \$103,713.

McKnight, Diane: Keystone Center OCG4399B X-98840101-0. Characterization of Stream Ecosystem in Snake River Basin for the Snake River Task Force. 2001–2003. \$56,713.

McKnight, Diane: Ohio State University Research Foundation 739204 PO# RF00915335 OPP09810219. The Role of Natural Legacy on Ecosystem Structure and Function in a Polar Desert: The McMurdo Dry Valley LTER Program. 2000–2003. \$14,681.

McKnight, Diane: Colorado State University G-68-5840-01 R-82964001-0. Influence of Climate-Induced Alterations in Dissolved Organic Carbon on UV Radiation and Metal Toxicity in High Elevation Streams. 2002–2005. \$227,999.

McKnight, Diane: Ohio State University Research Foundation 739204 PO# RF00915335 OPP-0096250. McMurdo Dry Valley Long Term Ecological Research: TEA Supplement. 2002–2003. \$12,447.

McKnight, Diane; Flores, Nicholas, Waldman, Donald: NSF SES-0108652. A Decision-Making Framework for Stream Restoration from Acid Mine Drainage. 2001–2003. \$45,131.

McKnight, Diane: Ohio State University Research Foundation 739204 PO# RF00915335 OPP-0096250. McMurdo Dry Valley Long Term Ecological Research. 2001–2003. \$5,400.

McKnight, Diane; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls of the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$105,308.

McKnight, Diane; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 2000–2003. \$59,986.

Miller, Gifford: NSF ATM-9709918. Marine Terrestrial Variability of the Labrador Sea Region over Decadal to Millennial Time Scales (Labrador Sea Variability over Decade to Millennial Time Scales). 1997–2001. \$541,999.

Miller, Gifford: NSF ATM-0082254. Collaborative Research: Megafauna Extinction, Ecosystem Disruption and Climate Change: Assessing the Human Factor. 2000–2003. \$322,669.

Miller, Gifford: NSF OPP-0138586. Collaborative Research: Laurentide Ice Sheet Dynamics: Applying Cosmogenic Exposure Dating to Constrain Chronology and Glacial Style in the Eastern Canadian Arctic. 2002–2004. \$172,641.

Miller, Gifford: NSF OPP-0138010. High-Resolution Constraints on the Magnitude and Timing of Climate Change in Iceland over the Past 15 ka. 2002–2004. \$80,000.

Miller, Gifford; Johnson, Beverly: NSF ATM-9709806. Drought in the Australian Outback: Milankovitch and Anthropogenic Forcing of the Australian Monsoon. 1997–2001. \$360,000.

Miller, Gifford; Manley, William: NSF EAR-9817645. Upgrade of High-Pressure Liquid Chromatograph (HPLC) for Amino Racemization (AAR) Research of Quaternary Geochronology and Paleoclimatology. 1999–2001. \$41,047.

Miller, Gifford; Steig, Eric: NSF OPP-0004466. Collaborative Research: The NE Sector of the Laurentide Ice Sheet: Dating Outlet and Local Glacier Moraines at Clyde with Cosmogenic Isotopes. 2001–2003. \$92,356.

Miller, Gifford, Steig, Eric: NSF OPP-0004466. Collaborative Research: The NE Sector of the Laurentide Ice Sheet: Dating Outlet and Local Glacier Moraines at Clyde with Cosmogenic Isotopes. 2001–2003. \$63,597.

Ogilvie, Astrid; Andrews, John; Jennings, Anne; Barlow, Lisa: NSF OPP-9726510. Environmental Changes and Human Responses in the North Atlantic (Iceland and Greenland Sectors) during the Last 2,000 Years: A Contribution to the ARCSS Systems, Integration and Modeling Initiative. 1998–2004. \$409,954.

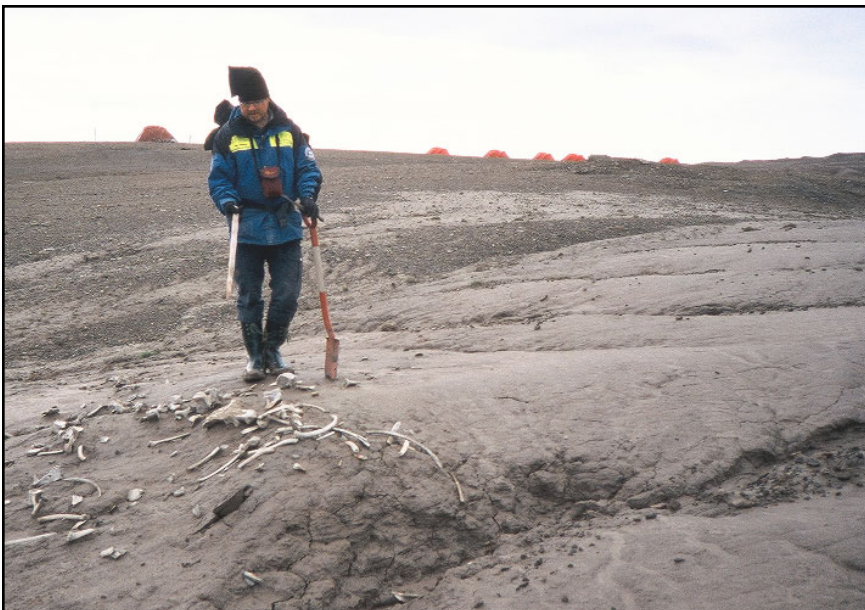
Ogilvie, Astrid; McGoodwin, James: NSF OPP-0002651. Landscapes and Seascapes: Linkages between Marine and Terrestrial Environments and Human Populations in the North Atlantic (Iceland Sector: A Contribution to the HARC Initiative). 2000–2003. \$366,945.

Peckham, Scott: University of Alaska Fairbanks FP200803. Conversion of ARYTHM Hydrologic Model from Fortran to IDL. 2001–2002. \$20,000.

Brian Clarke (CU undergraduate Geology major) hikes the amazing mountainous landscape of the Clyde Region, Baffin Island, August 2001. Clarke was helping Jason Briner (INSTAAR) elucidate the glacial history of the area. Photo: J. Briner.



Ólafur Ingólfsson (UNIS, Norway) points an ancient tusk at a narwhale skeleton, which lies about 50 meters above sea level after being raised by glacio-isostatic uplift, August 2002. Such spectacular finds were only a short distance from an international camp (including INSTAAR) on October Revolution Island, Severnaya Zemlya, Arctic Russia (79°N).  
Photo: D. Lubinski.



- Peckham, Scott: University of Alaska Fairbanks FP206280 OPP-9818066. Conversion of ARYTHYM Hydrologic Model from Fortran to IDL. 2002–2003. \$15,000.
- Peckham, Scott: GW Scientific, LLC OCG4480B. WERC Hydrologic Model, Conversion and Testing. 2002–2003. \$12,000.
- Peckham, Scott: University of Alaska Fairbanks UAF 03-0036/PO # FP302964 OPP-0229705. Conversion of Hydrologic Model from Fortran to GUI. 2002–2003. \$15,000.
- Pendall, Elise; White, James: University of Nebraska LWT 62-123-06541 & 26-6223-0002-040. Stable Isotope Traces of CO<sub>2</sub> Fluxes on Shortgrass Steppes under CO<sub>2</sub> Enrichment. 1999–2003. \$295,155.
- Pendall, Elise; White, James: University of Nebraska LWT 62-123-06541 & 26-6223-0002-040. Stable Isotope Tracers of CO<sub>2</sub> Fluxes on Shortgrass Steppes under CO<sub>2</sub> Enrichment. 2001–2003. \$780.
- Pfeffer, Tad; Marshall, Hans-Peter: NASA Goddard NGTS-30416. Snow Slope Stability: Modeling and Investigations. 2001–2005. \$33,317.
- Pfeffer, W. Tad: NSF EAR-9614424. Ice-Core Analysis and Physical Glaciology of the Galena Creek Rock Glacier, Wyoming. 1997–2002. \$306,416.
- Pfeffer, W. Tad: NSF EAR-9614424. Ice-Core Analysis and Physical Glaciology of the Galena Creek Rock Glacier, Wyoming. 1999–2002. \$43,381.
- Pfeffer, W. Tad: NSF OPP-0121399. Columbia Glacier Photogrametry. 2001–2003. \$43,218.
- Pfeffer, W. Tad: NSF OPP-0118721. Collaborative Research: Linking Subglacial Hydrology and Sliding Dynamics through Variations along the Glacial Length. 2002–2004. \$156,916.
- Pfeffer, W. Tad: NSF OPP-0228223. SGER: Columbia Glacier Photogrametry. 2002–2003. \$44,147.
- Pfeffer, W. Tad; Amadei, Bernard: NSF OPP-9531450. Direct Measurement of the In-Situ Stress Tensor at Depth in Glacier Ice: A Collaborative Study. 1996–2001. \$335,034.
- Pfeffer, W. Tad; Meier, Mark; Amadei, Bernard: NSF OPP-9614493. Observations and Modeling of Flow and Fracture Processes Leading to Iceberg Calving. 1997–2002. \$380,795.
- Pfeffer, W. Tad; Meier, Mark; Amadei, Bernard: NSF OPP-9614493. REU Supplement to: Collaborative Research: Observations and Modeling of Flow and Fracture Processes Leading to Iceberg Calving. 1998–2002. \$1,303.
- Seastedt, Timothy: NSF DEB-9806438. Collaborative Research: Identifying Ecosystem Controls on Biodiversity: A US/UK Project. 1998–2003. \$399,962.
- Seastedt, Timothy: NSF DEB-9810218. REU Supplement to: The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function, and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1999–2003. \$64,000.
- Seastedt, Timothy: EPA MM988113-01. Enhancing the Effectiveness of Biocontrol Insects as Part of Non-Chemical Management of Diffuse Knapweed. 1999–2002. \$40,000.
- Seastedt, Timothy: EPA PE-98872201. Developing Sustainable Management Procedures for Wide-Spread Noxious Weeds on Public Lands in the Colorado Front Range. 2002–2003. \$40,000.
- Seastedt, Timothy; Suding, Katherine: Agriculture CSREES 2001-35320-10628. Causes and Consequences of Invasion of a C3-C4 Grassland by Diffuse Knapweed. 2001–2004. \$280,000.
- Seastedt, Timothy; Townsend, Alan; Wessman, Carol; Williams, Mark: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$2,428,718.
- Seastedt, Timothy; Townsend, Alan; Wessman, Carol; Williams, Mark: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$57,624.
- Seastedt, Timothy; Townsend, Alan; Wessman, Carol; Williams, Mark: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$166,679.
- Seastedt, Timothy; Townsend, Alan; Wessman, Carol; Williams, Mark: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on



the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 2000–2003. \$50,000.

Seastedt, Timothy; Townsend, Alan; Wessman, Carol; Williams, Mark: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 2000–2003. \$29,060.

Sievering, Herman: Agriculture Forest Service 01-DG-11242343-012. Impact of Canopy Nitrogen Deposition on Forest Carbon Storage: A Manipulative Experiment at the Howland AmeriFlux Site. 2001–2004. \$9,300.

Sievering, Herman: Tulane University TUL-083-99/00 DE-FC03-90ER61010. Nitrogen Atmosphere-Forest Canopy Exchange at Coniferous and Mixed Forest AmeriFlux Sites: Relation to CO<sub>2</sub> Fluxes. 2001–2003. \$84,565.

Sievering, Herman: Agriculture Forest Service 02-DG-11242343-073. Impact of Canopy Nitrogen Deposition on Forest Carbon Storage. 2001–2004. \$9,300.

Sievering, Herman: Tulane University TUL-130-02/03 DE-FC03-90ER61010 901214. Nitrogen Flux and Carbon Sequestration at Coniferous and Mixed Forest AmeriFlux Sites. 2002–2003. \$95,000.

Sievering, Herman; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$59,385.

Stallard, Robert: NSF DEB-0212284. Collaborative Research: Effects of Soil-Borne Resources on the Structure and Dynamics of Lowland Tropical Forests. 2002–2005. \$155,108.

Stoner, Joseph: Texas A&M University Research Foundation F001501/418929-BA268. U.S. Science Support Program: Scientific Cruise. 2002. \$18,099.

Stoner, Joseph: Texas A&M University Research Foundation F001671 / 418920-BA268. Paleomagnetism (paleointensity, secular variation, geomagnetic excursions, magnetic stratigraphy and environmental magnetism) from ODP Leg 202 Sediments. 2002–2005. \$28,120.

Syvitski, James: Duke University 99-SC-NSF-1010 EAR-9896392. Collaborative Research: Experimental Study of Basin Stratigraphy. 1999–2001. \$7,493.

Syvitski, James: DOD Navy ONR N00014-00-1-0810. Predicting the Distribution and Properties of Buried Submarine Topography on Continental Shelves. 2000–2004. \$548,922.

Syvitski, James: Exxon Mobil Upstream Research Company UR-0418. Developing a 3D Numerical Model Able to Simulate Continental Margin Stratigraphy. 2001–2003. \$200,400.



Syvitski, James: NSF OCE-0082228. Collaborative Research: Experimental and Theoretical Study of Linked Sedimentary Systems. 2001–2004. \$126,310.

Syvitski, James: DOD Navy ONR N00014-01-1-0905. Seabed Variability and Its Influence on Acoustic Prediction Uncertainty. 2001–2004. \$277,400.

Syvitski, James: NSF OCE-0111623. Margins: Community Sedimentary Model Science Plan for Sedimentology and Stratigraphy. 2001–2002. \$40,000.

Syvitski, James: DOD Navy ONR N00014-02-1-0041. Modeling the Effect of Climatic and Human Impacts on Margin Sedimentation. 2001–2003. \$181,000.

Syvitski, James: NSF OCE-0111623. Margins: Community Sedimentary Model Science Plan for Sedimentology and Stratigraphy. 2001–2002. \$10,000.

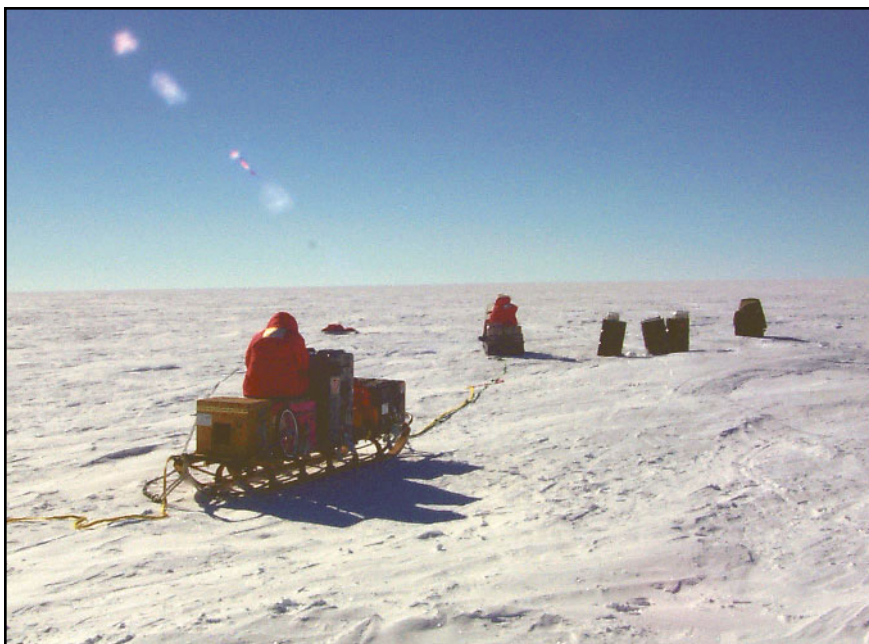
Syvitski, James; Bahr, David: DOD Navy ONR N00014-95-1-1281. ONR-Strataform Scaling and Integration of Process-Response Stratigraphic Models (formerly “Linking Short and Long Term Sediment Delivery to Morphology and Seascapes Evolution of Continental Margins”) (formerly “Predicting Sediment Delivery and Stratigraphy on Marginal Slopes and Shelf Basins”). 1995–2002. \$697,705.

Syvitski, James: DOD Navy ONR N00014-01-1-0338. Sediment Flux to the Coastal Zone: Predictions for the Navy. 2001–2003. \$146,968.

Syvitski, James: NSF OPP-0100120. An Integrate Assessment of the Impacts of Climate Variability on the Alaskan North Slope Coastal Region. 2001–2004. \$241,251.

Field Assistant Rebecca Harrison (Lancaster University, UK) packs up to investigate the sea-level history of the Aston Lowlands, south shore of outer Inugsuin Fiord, Baffin Island, August 2002. She and Roy Coulthard (INSTAAR) checked for extensive Last Glacial Maximum ice-sheet cover as implied by recent cosmogenic exposure dating. Photo: R. Coulthard.

Ginny Catania and Howard Conway (University of Washington) work with H. P. Marshall (INSTAAR, not pictured) to radio-echo-sound a ridge between ice streams A and B, West Antarctica, November 2001. This technique allows calculation of ice thickness, and reflections from internal layers give information about how stable the ice stream has been in the past.  
Photo: H. P. Marshall.



- Syvitski, James; Pfeffer, W. Tad: DOD Navy ONR N00014-00-1-0569. Environmental Computational and Imaging Facility. 2000–2002. \$437,000.
- Townsend, Alan; Cleveland, Cory: NSF DEB-0104819. Dissertation Research: Is Decomposition in Moist Tropical Forests Phosphorus Limited? 2001–2002. \$8,800.
- Townsend, Alan; Schmidt, Steven: NSF DEB-0089447. Phosphorus Regulations of Decomposition, Microbial Dynamics, and Foliar Chemistry in Moist Tropical Forests. 2001–2003. \$365,730.
- Townsend, Alan; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$116,036.
- Veblen, Thomas; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$71,951.
- Walker, Donald; Seastedt, Timothy: NSF DEB-9810218. The Niwot Ridge Long Term Ecological Research Program 1998–2004: Controls on the Structure, Function and Interactions of Alpine and Subalpine Ecosystems of the Colorado Front Range. 1998–2003. \$32,206.
- Webb, Robert; Miller, Gifford; Goetz, Alexander: NASA Goddard NAG5-6051. Assessing Future Stability of U.S. High Plains Landcover: Integration of Process Modeling with Landsat. In Situ Modern and Paleoclimate Data. 1997–2001. \$393,135.
- White, James: NSF OPP-9615232. Isotopic Analyses on the NGRIP Deep Ice Core. 1997–2001. \$374,225.
- White, James: NSF ATM-9809463. International Ice Core Data Cooperative. 1998–2001. \$49,246.
- White, James: NSF OPP-9815200. Stable Isotope Studies at West Antarctic ITASE Sites. 1999–2003. \$140,807.
- White, James: NSF ATM-9809463. International Ice Core Data Cooperative (Subcontract—Pennsylvania University). 1998–2001. \$101,118.
- White, James: NSF OPP-9909968. Developing a 480,000 Year Climate Record for West Antarctica. 2000–2003. \$120,023.
- White, James: NSF ATM-0081294. Collaborative Research: Isotopic Characteristics of Precipitation across the United States: Patterns and Processes. 2000–2003. \$271,290.
- White, James: NSF DGE-9987607. IGERT Full Proposal: Carbon, Climate, and Society. 2002–2003. \$24,034.
- White, James: University Corporation for Atmospheric Research S03-39667 ATM-9732665. High-Precision  $^{12}\text{CO}_2/^{13}\text{CO}_2$  Ratio Measurements Using an Optical Fiber Based Difference Frequency Generation Laser Source. 2002–2003. \$71,393.
- White, James: Commerce NOAA NA03OAR4310042. Stable Isotopes of  $\text{CO}_2$  in Aircraft Measurements to Constrain the U.S. Biosphere Carbon Sink, and Development of Isotopic Standards for Atmospheric Greenhouse Gases. 2002–2003. \$183,318.
- White, James; Miller, John; Ferretti, Dominic: NSF OPP-0095078. Measurements of Stable Isotopes in Atmospheric Gases from the NorthGRIP Ice Cores. 2001–2004. \$170,000.
- White, James; Miller, John; Ferretti, Dominic: NSF OPP-0087357. Measurement and Interpretation of  $\delta^{13}\text{C}$  in Atmospheric Methane from the Law Dome Ice Cores. 2001–2004. \$309,377.
- White, James; Townsend, Alan: NSF DGE-9987607. IGERT Full Proposal: Carbon, Climate, and Society. 2000–2003. \$1,717,864.
- Williams, Mark: University of California Santa Barbara KK8013 NAGW-2602. Hydrology, Hydrochemical Modeling and Remote Sensing of Seasonal Snow Covered Areas. 1997–2001. \$102,858.
- Williams, Mark: North Atlantic Treaty Organization ENVIR.LG 974676. Glaciers of Central Asia and Their Relation to Global Hydrological Cycle. 1999–2001. \$12,703.
- Williams, Mark: State of Colorado Dept. Natural Resources OCG 4154B. Source Water and Flowpath Identification, Mary Murphy Mine, Chalk Creek, Colorado. 1999–2001. \$30,000.
- Williams, Mark: Interior NPS CA-1268-2-9005 UCO129. Nitrogen Dynamics: Interactions between Snowmelt and Runoff. 1999–2001. \$64,708.
- Williams, Mark: San Miguel County OCG 4234B. Airmon Installation and Operation, Telluride, Colorado. 2000–2001. \$18,044.

Williams, Mark: University of California Santa Barbara KK2109 NAGS-9844. Hydrology, Hydrochemical Modeling and Remote Sensing of Seasonal Snow Covered Areas. 2001–2002. \$62,982.

Williams, Mark: State of Colorado Dept. of Natural Resources C188325 EPA R83067401. Mary Murphy Mine Source Water & Flowpath Identification. 2002–2003. \$40,000.

Williams, Mark: Idaho State University 02-232A DEB-0216588. Complexity across Boundaries: Coupled Human and Natural Systems in the Yellowstone Northern Elk Winter Range. 2002–2004. \$35,548.

Williams, Mark; Dyrgerov, Mark; Konovalov, Vladimir: NSF ATM-0118384. Regional Updating and Expansion of the Global Historical Climate Network (GHCN) Database: High Mountain Areas of Central Asia. 2001–2003. \$99,851.

Williams, Mark; McKnight, Diane: NSF DEB-0087248. LTER Cross-Site: Dissolved Organic Nitrogen Intersite Comparison (DONIC). 2000–2004. \$196,506.

Williams, Mark; McKnight, Diane: NSF DEB-0087248. LTER Cross-Site: Dissolved Organic Nitrogen Intersite Comparison (DONIC). 2000–2004. \$46,499.

Williams, Mark; McKnight, Diane: NSF DEB-0087248. LTER Cross-Site: Dissolved Organic Nitrogen Intersite Comparison (DONIC). 2000–2004. \$56,500.

Wolfe, Alexander: NSF ATM-9808943. Lacustrine Records of Late Quaternary Water Balance Fluctuations in the Venezuelan Andes: Assessing the Interplay of Insolation and Ocean Circulation as Paleoclimatic Controls in the Tropics. 1999–2002. \$63,054.

Wolfe, Alexander: University of Wisconsin La Crosse DEB-0089600. RUI: Integrating Algal Physiological Ecology and Paleolimnology to Decipher the Effects of Atmospheric Deposition and Climate Changes on Alpine Lakes. 2001–2003. \$7,550.

Woodhouse, Connie: University of Arizona Y501756. Temperature Variability since AD 1000 in the Western US from Tree Rings. 1998–2002. \$52,784.

Woodhouse, Connie: NSF ATM-0080889. Collaborative Research: Reconstruction of Drought and Streamflow over the Conterminous United States from Tree Rings, with Extensions into Mexico and Canada. 2000–2003. \$35,674.

Woodhouse, Connie; Brown, Peter: NSF ATM-9729571. Expanded and Lengthened Dendroclimatic Reconstructions of Great Plains Drought. 1998–2002. \$304,827.

Woodhouse, Connie; Webb, Robert: Commerce NOAA RA1330-02-AE-0037. Extended Hydroclimatic Records for the Upper Colorado River Basin. 2002–2004. \$69,709.

Inugsuin Fiord, one of the eastern Baffin Island fiords, August 2002. Although presently ice free, these fiords were probably occupied by outlet glaciers of the Laurentide Ice Sheet as recently as 10 ka. Photo: R. Coulthard.



# Support at INSTAAR, 2000–2002

Source of Funds	2000/01 AY		2001/02 AY	
	New Awards	K\$	New Awards	K\$
<b>Federal Agencies</b>				
NSF	47	\$ 6,640	37	\$ 4,112
DoDefense	6	424	9	576
EPA	1	117	0	—
NASA	0	—	2	76
DoInterior	2	119	0	—
DoAgriculture	2	289	0	—
DoCommerce	2	27	2	27
<b>Non-Federal Agencies</b>	12	645	16	753
<b>Gift Funds</b>	20	241	12	19
<b>Total Awards Received</b>	<b>92</b>	<b>\$ 8,502</b>	<b>80</b>	<b>\$5,563</b>
<b>CU General Funds</b>		\$ 1,205		\$ 1,196
<b>CU Match</b>		244		16
<b>Total CU Revenue</b>		<b>\$ 1,449</b>		<b>\$ 1,212</b>
<b>Auxiliary Funds</b>		\$ 958		\$ 940
<b>Total Revenue</b>		<b>\$ 10,909</b>		<b>\$ 7,715</b>

# Expenditures at INSTAAR, 2000–2002

<b>Budget Expenditures by Fund</b>		
Contract and Grant Funds	\$ 5,520	\$ 6,397
General Funds	1,023	1,148
Plant Funds	148	209
Auxiliary Funds	927	746
CU Match Funds	244	16
Gift Funds	173	160
<b>Total Expenditures</b>	<b>\$ 8,035</b>	<b>\$8,677</b>
<b>Other Revenue/Expenditure</b>	<b>\$ 415</b>	<b>\$ 140</b>
(INSTAAR R/E tracked through other CU units)		
<b>Budget Expenditures by Type</b>		
Salaries	\$ 3,871	\$ 4,486
Operating Expenses	1,438	1,516
Travel	352	370
Equipment	839	539
Tuition	34	61
Subcontracts	229	182
Recharges + ICR	1,274	1,525
<b>Total Expenditures</b>	<b>\$ 8,035</b>	<b>\$8,677</b>
Salaries = Salaries + benefits + stipends + student aid		
ICR = Indirect Cost Recovery		

# Theses Completed

## 2001

Barber, D. 2001: Laurentide ice sheet dynamics from 35 to 7 KA: Sr-Nd-Pb isotopic provenance of NW North Atlantic Margin sediments. Boulder, 160 pp. Thesis (PhD) University of Colorado.

Castañeda, I. 2001: Holocene paleoceanographic and climatic variations of the inner North Iceland continental shelf, Reykjarfjordur area. Boulder, 154 pp. Thesis (MSc) University of Colorado.

Cleveland, C. 2001: Soil microbial dynamics and biogeochemical cycling in moist tropical forests. Boulder, 128 pp. Thesis (PhD) University of Colorado.

Daniels, N. 2001: Diatom-inferred salinity changes and drought history of the last 3000 years from Round Lake, Nebraska. Boulder, 156 pp. Thesis (M.Sc.) University of Colorado.

Doner, L. 2001: Late Holocene paleolimnology and paleoclimatology from sub-arctic lakes in Nunavut, Canada and Iceland. Boulder, 333 pp. Thesis (PhD) University of Colorado.

Gooseff, M.N. 2001: Modeling hyporheic exchange influences on biogeochemical processes in Dry Valley streams, Antarctica. Boulder, 137 pp. Thesis (PhD) University of Colorado.

Hood, E.W. 2001: Ecological controls on the source and character of dissolved organic matter in an alpine/sub-alpine watershed, Green Lakes Valley, Colorado Front Range. Boulder, 188 pp. Thesis (PhD) University of Colorado.

Huber, U. 2001: Linkages among climate, vegetation and fire in Fuego-Patagonia during the late-glacial and Holocene. Boulder, 258 pp. Thesis (PhD) University of Colorado.

Klapper, L. 2001: Humic substance redox detection using fluorescence spectroscopy. Boulder, 90 pp. Thesis (MSc) University of Colorado.

Lewis, K.J. 2001: Solar-forced roughening of Antarctic glaciers and the Martian icecaps: How surficial debris and roughness affect glacial melting in Taylor Valley, Antarctica and how this can be applied to the Martian icecaps. Boulder, 182 pp. Thesis (PhD) University of Colorado.

O'Grady, D.B. 2001: Sedimentary geomorphology of siliclastic continental slopes. Boulder, 189 pp. Thesis (PhD) University of Colorado.

Scott, A.B., 2001: Effects of cattle grazing on diffuse knapweed (*Centaurea diffusa*) and other exotic plant species in Boulder County, Colorado grasslands. Boulder, 73 pp. Thesis (M.A.) University of Colorado.

Scott, D.T., IV. 2001: Redox sensitive metal cycling in mountain streams: manganese and iron transport. Boulder, 158 pp. Thesis (PhD) University of Colorado.

Smith, L.M. 2001: Holocene paleoenvironmental reconstruction of the continental shelves adjacent to the Denmark Strait. Boulder, 219 pp. + data separately bound. Thesis (PhD) University of Colorado.

## 2002

Belanger, L. 2002: Source and effect of acid rock drainage in the Snake River Watershed, Summit County, Colorado. Boulder, 130 pp. Thesis (MSc) University of Colorado.

Forbis, T.A. 2002: Seedling establishment on alpine tundra: community patterns, population demography, and disturbance effects. Boulder, 96 pp. Thesis (PhD) University of Colorado.

Hamann, H.B. 2002: The ionic pulse, snowmelt flowpaths, and surface water chemistry in two alpine basins, Colorado Rocky Mountains, USA. Boulder, 142 pp. Thesis (PhD) University of Colorado.

Lejeune, K.D. 2002: An investigation of relationships between soil resource availability and the invasion and dominance of Colorado Front Range Prairies by the non-native *Centaurea diffusa* Lam. Boulder, 135 pp. Thesis (PhD) University of Colorado.

Participants in the National Science Foundation-sponsored Research Experiences for Undergraduates Program at the Mountain Research Station pose for a group photo near the D1 site, Niwot Ridge LTER, Colorado, July 2002. Photo: B. Bowman.



- Mangan, J.M. 2002: An integrative study using Landsat TM data, CENTURY model output, and a digital elevation model to quantify climatic effects on High Plains vegetation related to sand dune stability. Boulder, 238 pp. Thesis (PhD) University of Colorado.
- Manthorne, D., 2002: An inventory of atmospheric mercury enrichment to alpine lakes in Colorado. Boulder, 76 pp. Thesis (M. Sc.) University of Colorado.
- Miller, A.E. 2002: Uptake of organic and inorganic nitrogen by alpine tundra plants. Boulder, 104 pp. Thesis (PhD) University of Colorado.
- Mixon, D. 2002: Automatic watershed location and characterization with GIS for an analysis of reservoir sedimentation patterns. Boulder, 170 pp. Thesis (MSc) University of Colorado.
- Rueger, B.F. 2002: Holocene environments of Bermuda. Boulder, 357 pp. Thesis (PhD) University of Colorado.
- Smith, F. 2002: The carbon isotope signal of fossil phytoliths: the dynamic of C3 and C4 grasses in the Neogene. 226 pp. Thesis (PhD) University of Chicago.
- Turner, P.L. 2002: Effects of augmented snow on phenology, reproduction, community structure and spatial distribution of alpine plants. Boulder. Thesis (PhD) University of Colorado.
- Van Matre, E. 2002: Local climate influences on phytoplankton species distribution in Lake Fryxell, Antarctica. Boulder, 144 pp. Thesis (MSc) University of Colorado.



Brian Clarke and Doug Dickens (CU undergraduate Geology majors) take a look at the fiord wall on which they later made a first ascent, Baffin Island, May 2002. During their ascent, they collected rock samples for cosmogenic exposure dating, allowing them to test the efficiency of glacial erosion on vertical surfaces.  
Photo: J. Briner.

# Publications 2001

- Andreev, A.A.; **Manley, W.F.**; Ingolfsson, O.; Forman, S.L. 2001: Environmental changes on Yugorski Peninsula, Kara Sea, Russia during the last 12,800 radiocarbon years. *Global and Planetary Change* 31:255–264.
- Andrews, J.T.** 2001: Millennial scale climate variability. In: Steele, J. Thorpe, S. and Turekian, K. (eds.), *Encyclopedia of Ocean Sciences*. London. Academic Press, pp. 1814–1821.
- Andrews, J.T.**; Caseldine, C.; **Weiner, N.J.**; Hatton, J. 2001: Late Holocene (ca. 4 ka) marine and terrestrial environmental change in Reykjarfjordur, north Iceland: climate and/or settlement? *Journal of Quaternary Science* 16(2):133–143.
- Andrews, J.T.**; Helgadottir, G.; Geirsdottir, A.; **Jennings, A.E.** 2001: Multicentury-scale records of carbonate (hydrographic?) variability on the northern Iceland margin over the last 5000 years. *Quaternary Research* 56:199–206.
- Andrews, J.T.**; **Jennings, A.E.**; MacLean, B. 2001: Late Quaternary stratigraphy of Hatton and Resolution basins, east of Hudson Strait. In: MacLean, B. (ed.) *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and Late Glacial-Deglacial History Derived From Marine and Terrestrial studies*. Geological Survey of Canada, Bulletin 566:57–64.
- Andrews, J.T.**; **Kristjansdottir, G.B.**; Geirsdottir, A.; Hardardottir, J.; Helgadottir, G.; Sveinbjornsdottir, A.E.; **Jennings, A.E.**; Smith, L.M. 2001: Late Holocene (~5 cal ka) trends and century-scale variability of N. Iceland marine records: measures of surface hydrography, productivity, and land/ocean interactions. *American Geophysical Union. Geophysical Monograph* 126: The oceans and rapid climate change: past, present, and future, pp. 69–81.
- Andrews, M.L.**; Tahirkheli, S.N. 2001: Preparation of an arctic bibliography database. In: Kelsey, B.E.(ed.), *Gateways: Archives and libraries into the next millennium. Proceedings of the 18th Polar Libraries Colloquy*, Winnipeg Manitoba, Canada 12–17 June, pp. 6–12.
- Asner, G.P.; **Townsend, A.R.**; Riley, W.J.; Matson, P.A.; Neff, J.C.; **Cleveland, C.C.** 2001: Modeling tropical and semi-arid ecosystem responses of increased N deposition. *Biogeochemistry* 54:1–39.
- Bahr, D.B.**; **Hutton, E.W.H.**; **Syvitski, J.P.**; Pratson, L. 2001: Exponential approximation to compacted sediment porosity profiles. *Computers and Geosciences* 27(6):691–700.
- Barclay, D.J.; **Calkin, P.E.**; Wiles, G.C. 2001: Holocene history of Hubbard Glacier in Yakutat Bay and Russell Fiord, southern Alaska. *Geological Society of American Bulletin* 113:388–402.
- Barlow, L.K.** 2001: The time period AD 1400–1980 in central Greenland ice cores in relation to the North Atlantic Sector. *Climatic Change* 48(1): 101–119.
- Blankenship, D.D.; Morse, D.L.; Finn, C.A.; Bell, R.E.; Peters, M.E.; Kempf, S.D.; Hodge, S.M.; Studinger, M.; **Behrendt, J.C.**; Brozena, J.M. 2001: Geologic controls in the initiation of rapid basal motion for the ice streams of the southeastern Ross Embayment: a geophysical perspective including new airborne radar sounding and laser altimetry results. In: R.B. Alley and R.A. Bindschadler (eds.), *The west Antarctic ice sheet: behavior and environment*. Antarctic Research Series, American Geophysical Union, pp. 105–121.
- Bomblys, A.**; **McKnight, D.M.**; **Andrews, E.D.** 2001: Retrospective simulation of lake level rise in Lake Bonney based on recent 21-year record: indication of recent climate change in the McMurdo Dry Valleys. *Journal of Paleolimnology* 25:477–492.
- Bourgeron, P.S.**; Fortin, M.J.; **Humphries, H.C.** 2001: Elements of spatial data analysis in ecological assessments. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 187–199.
- Bourgeron, P.S.**; **Humphries, H.C.**; Jensen, M.E. 2001: Ecosystem characterization and ecological assessments. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 40–54.
- Bourgeron, P.S.**; **Humphries, H.C.**; Jensen, M.E. 2001: Elements of ecological land classifications for ecological assessments. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 321–320.
- Bourgeron, P.S.**; **Humphries, H.C.**; Jensen, M.E. 2001: General data collection and sampling design considerations for integrated ecological assessments. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 92–107.
- H. P. Marshall (INSTAAR), Howard Conway (University of Washington), Ginny Catania (University of Washington), and Maurice Conway (mountain guide) load a Twin Otter with two months' worth of supplies, snowmobiles, etc., for a flight to a remote camp between ice streams A and B, West Antarctica, December 2001. Studies of the ice streams further understanding of ice instability and dynamics. Photo: H. P. Marshall.





As the sun sets and the fog clears, Alex Wolfe, Roy Coulthard, and Jason Briner (INSTAAR) get a good night's sleep in their tents before coring lakes the next day, Aston Lowlands, Baffin Island, May 2002. Photo: J. Briner.

- Bourgeron, P.S.; Humphries, H.C.;** Jensen, M.E.. 2001: Representative assessments. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 292–306.
- Bourgeron, P.S.; Humphries, H.C.;** Jensen, M.E.; Brown, B.A. 2001: Integrated regional ecological assessments and land use planning. In: Dale, V. and Haeuber, R. (eds.), *Applying Ecological Principles to Land Management*. New York, Springer-Verlag, pp. 276–315.
- Bowman, W.D.** 2001: Introduction: Historical perspective and significance of alpine ecosystem studies. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 3–12.
- Bowman, W.D.; Bilbrough, C.J.** 2001: Influence of a pulsed nitrogen supply on growth and nitrogen uptake in alpine graminoids. *Plant and Soil* 233:283–290.
- Bowman, W.D.;** Fisk, M.C. 2001: Primary production. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 177–197.
- Bowman, W.D.** (ed.); **Seastedt, T.R.** (ed.) 2001: *Structure and Function of an Alpine Ecosystem*. New York: Oxford University Press, 338 p.
- Brigham-Grette, J.; **Elias, S.A.** 2001: David M. Hopkins—an inspiration to multidisciplinary science. *Quaternary Science Reviews* 20:1–3.
- Briner, J.P.;** Swanson, T.W.; Caffee, M. 2001: Late Pleistocene cosmogenic  $^{36}\text{Cl}$  glacial chronology of the southwestern Ahklun Mountains, Alaska. *Quaternary Research* 56:148–154.
- Butler, B.; **Andrews, M.L.;** Boyett, J. 2001: Solo librarians: jack of all trades. In: Markham, J.W. and Duda, A.L. (eds.), *IAMS LIC 2000: Tides of technology*. Proceedings of the 26th Annual Conference of the International Association of Aquatic and Marine Science Libraries and Information Centers, Victoria, B.C., Canada. IAMS LIC, Fort Pierce, Florida, pp 109–112.
- Caine, N.** 2001: The geomorphic systems of Green Lakes Valley. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 45–74.
- Calkin, P.E.;** Wiles, G.C.; Barclay, D.J. 2001: Holocene coastal glaciation of Alaska. *Quaternary Science Reviews* 20:449–461.
- Cohen, S.; Miller, K.; Duncan, K.; Gregorich, E.; Groffman, P.; Kovacs, P.; Magana, V.; **McKnight, D.;** Mills, E.; Schimel, D. 2001: North America. In: MacCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J., and White, K.S. (eds.), *Climate Change 2001: Impacts, Adaptation, and Vulnerability*. Cambridge University Press, pp. 734–800.
- Condit, R.; Robinson, W.D.; Ibanez, D.R.; Aguilar, S.; Sanjur, A.; Martinez, R.; **Stallard, R.F.;** Garcia, T.; Angehr, G.R.; Petit, L.; Wright, S.J.; Robinson, T.R.; Heckadon, M.S. 2001: The status of the Panama Canal watershed and its biodiversity at the beginning of the 21st Century. *Bioscience* 51(5):389–398.
- Demaree, G.R.; **Ogilvie, A.E.J.** 2001: Bon baisers d'Islande: climatological, environmental and human dimensions impacts in Europe of the Lakagigar eruption (1783–1784) in Iceland. In: Jones, P.D., **Ogilvie, A.E.J.;** Davies, T.D., and Briffa, K.R. (eds.), *History and Climate: Memories of the Future?* New York, Boston, Dordrecht, London, Moscow, Kluwer Academic/Plenum Publishers, pp. 219–246.
- Dixon, E.J.** 2001: Human colonization of the Americas: timing, technology and process. In: Beringian Paleoenvironments: Festschrift in honor of David M. Hopkins. **Elias, S.A.** and J. Brigham-Grette eds. *Quaternary Science Reviews* 20:277–299.
- Dyke, A.S.; **Andrews, J.T.;** Clark, P.U.; England, J.H.; **Miller, G.H.;** Shaw, J.; Veillette, J.J. 2001: The Laurentide and Innuitian ice sheets during the Last Glacial Maximum. *Quaternary Science Reviews* 21:9–31.
- Dyurgerov, M.B.;** Dwyer, J. 2001: The steepening glacier mass balance gradients with the Northern Hemisphere glaciers. *Zeitschrift für Gletscherkunde und Glazialgeologie* 36:107–118.
- Elias, S.A.** 2001: Beringian paleoecology: results from the 1997 workshop. *Quaternary Science Reviews* 20:7–13.
- Elias, S.A.** 2001: Mutual climatic range reconstructions of seasonal temperatures based on late Pleistocene fossil beetle assemblages in Eastern Beringia. *Quaternary Science Reviews* 20:77–91.



- Elias, S.A.** 2001: Paleocology and Late Quaternary environments of the Colorado Rockies. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 285–303.
- Elias, S.A.**, ed.; Brigham-Grette, J., ed. 2001: Beringian paleoenvironments. *Quaternary Science Reviews* 20:(1–3) 574 pp.
- Forman, S.L.; **Andrews, J.T.**; **Lubinski, D.**; Steele, M.; Zhang, J.; Lammers, R.; Peterson, B. 2001: Researchers explore arctic freshwater's role in ocean circulation. *Eos, Transactions, American Geophysical Union* 81(16):169,174.
- Gilli, A.; Anselmetti, F.S.; Ariztegui, D.; Bradbury, J.P.; Kelts, K.R.; **Markgraf, V.**; McKenzie, J.A. 2001: Tracking abrupt climate change in the Southern Hemisphere: a seismic stratigraphic study of Lago Cardiel, Argentina (45 deg. S) *Terra Nova* 13:443–448.
- Gonzalez, G.; Ley, R.E.; Schmidt, S.K.; Zou, X.; **Seastedt, T.R.** 2001: Soil interactions between invertebrates and microbes: comparisons between tropical and subalpine forests. *Oecologia* 128:549–556.
- Gonzalez, G.; **Seastedt, T.R.** 2001: Soil fauna and plant litter decomposition in tropical and subalpine forests. *Ecology* 82:955–964.
- Greenland, D.; **Losleben, M.V.** 2001: Climate. In: Bowman, W.D. and Seastedt, T.R.(eds.), *Structure and function of an alpine ecosystem*. Oxford University Press, pp. 15–31.
- Grimm, E.C.; Lozano-Garcia, S.; Behling, H.; **Markgraf, V.** 2001: Holocene vegetation and climate variability in the Americas. In: **V. Markgraf** (ed.) *Interhemispheric Climate Linkages*. San Diego, Academic Press, pp. 325–370.
- Hall, F.R.; **Andrews, J.T.**; Kerwin, M.; Smith, L.M. 2001: Studies of sediment colour, whole-core magnetic susceptibility, and sediment magnetism of the Hudson Strait-Labrador Shelf region: CSS Hudson cruises 90023 and 93034. In: MacLean, B. (ed.) *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and Late Glacial-Deglacial History Derived From Marine and Terrestrial studies*. Geological Survey of Canada, Bulletin 566:161–170.
- Hardy, D.; **Williams, M.W.**; Escobar, C. 2001: Near-surface faceted crystals and avalanche dynamics in high-elevation, tropical mountains of Bolivia. *Cold Regions Science and Technology* 33(2–3):291–302.
- Harper, J.T.; Humphrey, N.F.; **Pfeffer, W.T.**; Hurzurbazar, S.V.; **Bahr, D.B.**; Welch, B.C. 2001: Spatial variability in the flow of a valley glacier: deformation of a large array of boreholes. *Journal of Geophysical Research, Solid Earth* 106(B5):8547–8562.
- Hazen, J.M.**; **Williams, M.W.**; Stover, B.; Wireman, M. 2001: Acid mine drainage characterization and remediation using a combination of hydrometric, chemical, and isotopic analyses, Mary Murphy Mine, Colorado. *Environmental Geochemistry and Health* 63:1–22.
- Herzfeld, U.C.**; Zahner, O. 2001: A connectionist-geostatistical approach to automated image classification, applied to the analysis of crevasse patterns in surging ice. *Computers & Geosciences* 27:499–512.
- Hoffecker, J.F.** 2001: Central and eastern Europe and ex-USSR, early periods. In: P.G. Bahn (ed.), *The Penguin Archeology Guide*. London, Penguin Books.
- Hoffecker, J.F.** 2001: *Desolate Landscapes: Ice Age Settlement in Eastern Europe*. New Brunswick: Rutgers University Press, 298 p.
- Hoffecker, J.F.** 2001: *Twenty-Seven Square Miles: Landscape and History at Rocky Mountain Arsenal National Wildlife Refuge*. Denver: U.S. Fish and Wildlife Service, 101 p.
- Hood, E.W.**; **Williams, M.W.** 2001: Seasonal changes in the character and nitrogen content of dissolved organic material in an alpine/subalpine headwater catchment. *The Scientific World* 1.
- Humphries, H.C.**; **Bourgeron, P.S.** 2001: Methods for determining historical range of variability. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 273–291.
- Inyan, B.**; **Williams, M.W.** 2001: Protecting headwater catchments from future degradation, San Miguel River, CO. *Mountain Research Development* 21(1):71–78.
- Jackson, R.B.; Dahm, C.N.; Postel, S.R.; Carpenter, S.R.; **McKnight, D.M.**; Naiman, R.J.; Running, S.W. 2001: Water in a changing world. *Ecological Applications* 11:1027–1045.
- Jennings, A.E.**; Hagen, S.; Hardardottir, J.; Stein, R.; **Ogilvie, A.E.J.**; Jonsdottir, I. 2001: Oceanographic change and terrestrial human impacts in a post A.D. 1400 sediment record from the southwest Iceland shelf. *Climatic Change* 48:83–100.
- Brian Clarke (CU undergraduate Geology major) and Michael Robinson (right) zero their altimeter so they can get accurate elevations of raised marine features at the head of Clyde Inlet, Baffin Island, August 2001. They were helping Jason Briner (INSTAAR) elucidate the deglaciation and postglacial emergence records of the area. Photo: J. Briner.



Oleg Antonov (VSEGI, St. Petersburg) enjoys a rare moment of sun after a long day working on Quaternary sediment sections. Oleg was part of an international team (including INSTAAR) studying the glacial history of October Revolution Island, Severnaya Zemlya, Arctic Russia (79°N), August 2002. Photo: D. Lubinski.



- Jensen, M.E.; **Bourgeron, P.S.** 2001: Introduction. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 1–10.
- Jensen, M.E.; Christensen, N.L.; **Bourgeron, P.S.** 2001: An overview of ecological assessment principles and applications. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 12–28.
- Jensen, M.E.; DiBenedetto, J.P.; Montagne, C.; **Bourgeron, P.S.** 2001: Biophysical modeling of potential vegetation at landscape scale. *Journal of Range Management* 54:528–536.
- Jensen, M.E.; Goodman, I.A.; **Bourgeron, P.S.**; Poff, N.L.; Brewer, C.K. 2001: Effectiveness of biophysical criteria in the hierarchical classification of drainage basins. *Journal of the American Water Resources Association* 37:1155–1168.
- Jensen, M.E.; Goodman, I.A.; Frissell, C.A.; Brewer, C.K.; **Bourgeron, P.S.** 2001: Ecological classification and mapping of aquatic systems. In: Jensen, M.E., and **Bourgeron, P.S.** (eds.), *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, pp. 352–366.
- Jensen, M.E., (ed.); **Bourgeron, P.S.** (ed.) 2001: *A Guidebook for Integrated Ecological Assessments*. New York, Springer-Verlag, 536 p.
- Johnsen, S.J.; Dahl-Jensen, D.D.; Gunderstrup, N.; Steffensen, J.P.; Clausen, H.K.; Miller, H.; Masson-Delmotte, V.; Sveinbjornsdottir, A.E.; **White, J.** 2001: Oxygen isotope and paleotemperature records from six Greenland ice-core stations: Camp Century, Dye-3, GRIP, GISP2, Renland and NorthGRIP. *Journal of Quaternary Science* 16(4):299–307.
- Jones, P.D.; **Ogilvie, A.E.J.**; Davies, T.D.; Briffa, K.B. 2001: Unlocking the doors to the past: recent developments in climate and climate-impact research. In: Jones, P.D., **Ogilvie, A.E.J.**, Davies, T.D., and Briffa, K.R. (eds.), *History and Climate: Memories of the Future?* New York, Boston, Dordrecht, London, Moscow, Kluwer Academic/Plenum Publishers, pp. 1–8.
- Jones, P.D. (ed.); **Ogilvie, A.E.J.** (ed.); Davies, T.D. (ed.); Briffa, K.B. (ed.) 2001: *History and Climate: Memories of the Future?* New York, Boston, Dordrecht, London, Moscow: Kluwer Academic/Plenum Publishers 295 p.
- Kaplan, M.R.**; **Miller, G.H.**; **Steig, E.J.** 2001: Low-gradient outlet glaciers (ice streams?) drained the Laurentide ice sheet. *Geology* 29(4):343–346.
- Kaufman, D.S.; **Manley, W.F.**; Forman, S.L.; Layer, P.W. 2001: Pre-Late Wisconsin glacial history, coastal Ahklun Mountains, southwestern Alaska—new amino acid, thermoluminescence, and  $^{40}\text{Ar}/^{39}\text{Ar}$  results. *Quaternary Science Reviews* 20:337–352.
- Kaufman, D.S.; **Manley, W.F.**; **Wolfe, A.P.**; Hu, F.S.; Preece, S.J.; Westgate, J.A.; Forman, S.L. 2001: The last interglacial to glacial transition, Togiak Bay, southwestern Alaska. *Quaternary Research* 55:190–202.
- Kocielek, J.P.; Lyon, D.; **Spaulding, S.A.** 2001: Revision of the South American species of *Actinella*. In: Jahn, R., Kocielek, J.P., Witkowski, A. & Compère P. (eds). *Lange-Bertalot-Festschrift: Studies on Diatoms*, Koeltz Scientific Books, Koenigstein. pp. 131–166.
- Kocielek, J.P.; **Spaulding, S.A.** 2001: Eunotioid and Asymmetrical Diatoms. In: Sheath, R. & Wehr, J. (eds). *Freshwater Algae of North America*, Academic Press.
- Leavitt, S.W.; **Pendall, E.**; and 8 Others. 2001: Stable-carbon isotopes and soil organic carbon in wheat under  $\text{CO}_2$  enrichment. *New Phytologist* 150(2):305–314.
- Lejeune, K.D.**; **Seastedt, T.R.** 2001: *Centaurea* species: the forb that won the West. *Conservation Biology* 15(6):1568–1574.
- Lubinski, D.J.**; Polyak, L.; Forman, S.L. 2001: Freshwater and Atlantic water inflows to the deep northern Barents and Kara seas since ca 13  $^{14}\text{C}$  ka: foraminifera and stable isotopes. *Quaternary Science Reviews* 20:1851–1879.
- MacLean, B.; **Andrews, J.T.**; Gray, J.T.; Hall, F.R.; Hardy, I.; **Jennings, A.E.**; **Manley, W.F.**; **Pfeffer, W.T.**; Vilks, G. 2001: Hudson Strait Quaternary sediments and late glacial and deglaciation history: a discussion and summary. In: MacLean, B. (ed.) *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and Late Glacial-Deglacial History Derived From Marine and Terrestrial studies*. Geological Survey of Canada, Bulletin 566:181–192.
- MacLean, B.; Vilks, G.; Hardy, I.; Deonarine, B.; **Jennings, A.E.**; **Manley, W.F.** 2001: Quaternary sediments in Hudson Strait and Ungava Bay. In: MacLean, B. (ed.) , *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments,*

Depositional Environments, and Late Glacial-Deglacial History Derived from Marine and Terrestrial Studies. Geological Survey of Canada Bulletin. 566:71–125.

**Manley, W.F.**; Kaufman, D.S.; **Briner, J.P.** 2001: Pleistocene glacial history of the southern Ahklun Mountains, southwestern Alaska: soil-development, morphometric, and radiocarbon constraints. *Quaternary Science Reviews* 20:353–370.

**Manley, W.F.**; Lokrantz, H.; Gataullin, V.; Ingolfsson, O.; Forman, S.L.; Andersson, T. 2001: Late Quaternary stratigraphy, radiocarbon chronology, and glacial history at Cape Shpindler, southern Kara Sea, arctic Russia. *Global and Planetary Change* 31:239–254.

**Manley, W.F.**; **Miller, G.H.** 2001: Glacial-geological record on southern Baffin Island reflecting late glacial ice-sheet dynamics in the eastern Hudson Strait Region. In: MacLean, B. (ed.) *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and Late Glacial-Deglacial History Derived From Marine and Terrestrial studies*. Geological Survey of Canada, Bulletin 566:19–30.

**Markgraf, V.** (ed.) 2001: *Interhemispheric Climate Linkages*. San Diego: Academic Press, 454 p.

**Markgraf, V.**; Seltzer, G. 2001: Pole-equator-pole paleoclimates of the Americas integration: towards the big picture. In: V. Markgraf (ed.) *Interhemispheric Climate Linkages*. San Diego, Academic Press, pp. 433–442.

**McKnight, D.M.** 2001: Freshwater ecosystems and climate change: recent assessments and recommendations. *Limnology and Oceanography Bulletin* 10(4):61–65.

**McKnight, D.M.**; Boyer, E.W.; Westerhoff, P.T.; Doran, P.T.; Kulbe, T.; Anderson, D.T. 2001: Spectrofluorometric characterization of dissolved organic matter for indication of precursor organic material and aromaticity. *Limnology and Oceanography* 46(1):38–48.

**McKnight, D.M.**; Kimball, B.A.; Runkel, R.L. 2001: pH dependence of iron photoreduction in a Rocky Mountain stream affected by acid mine drainage. *Hydrological Processes* 15:1979–1992.

**McKnight, D.M.**; Scott, D.T.; Hrncir, D.C.; Lovley, D.R. 2001: Photochemical and microbial processes influencing iron-humic interactions in stream and lake sediments. In: *Soil Science society of America: Humic substances and chemical contaminants*, pp. 351–369.

**Miller, G.H.**, lead author; CAPE Project Members. 2001: Holocene paleoclimate data from the Arctic: testing models of global climate change. *Quaternary Science Reviews* 20:1275–1287.

**Miller, G.H.**; Geirsdottir, A.; Koerner, R.M. 2001: Climate implications of changing arctic sea ice. *Eos, Transactions, American Geophysical Union*, 82(8):97,103.

Monson, R.K.; **Bowman, W.D.**; **Mullen, R.B.** 2001: Plant nutrient relations. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 198–221.



Oleg Antonov (VSEGEI, St. Petersburg) prevents camp gear from blowing away while helicopter takes off, August 2002. Oleg was participating in a Swedish-American-Russian expedition (including INSTAAR) to study the Quaternary glacial geologic history of October Revolution Island, Severnaya Zemlya, Arctic Russia (79°N). Photo: D. Lubinski.

Moore, J.J.; Hughen, K.A.; **Miller, G.H.**; Overpeck, J.T. 2001: Little Ice Age recorded in summer temperature reconstruction from varved sediments of Donard Lake, Baffin Island, Canada. *Journal of Paleolimnology* 25:503–517.

Morehead, M.D.; **Syvitski, J.P.**; **Hutton, E.W.H.** 2001: The link between abrupt climate change and basin stratigraphy: a numerical approach. *Global and Planetary Change* 28:107–127.

**Muhs, D.R.** 2001: Evolution of soils on Quaternary reef terraces of Barbados, West Indies. *Quaternary Research* 56(1):66–78.

**Muhs, D.R.**; Ager, T.A.; Beget, J.E. 2001: Vegetation and paleoclimate of the last interglacial period, central Alaska. In: Elias, S.A., and Brigham-Grette, J. (eds.), *Beringian paleoenvironments: festschrift in honour of D. M. Hopkins*, *Quaternary Science Reviews* 20(1–3):41–61.

**Muhs, D.R.**; Bettis, E.A., III; Been, J.; McGeehin, J.P. 2001: Division S-5—Pedology. Impact of climate and parent material on chemical weathering in loess-derived soils of the Mississippi River Valley. *Soil Science Society America Journal* 65:1761–1777.

**Muhs, D.R.**; Holliday, V.T. 2001: Origin of late Quaternary dune fields on the Southern High Plains of Texas and New Mexico. *Geological Society of America Bulletin*. 113(1):75–87.

**Niyogi, D.K.**; Lewis, W.M.; **McKnight, D.M.** 2001: Litter breakdown in mountain streams affected by mine drainage: biotic mediation of abiotic controls. *Ecological Applications* 11:506–516.

Brian Clarke (CU undergraduate Geology major) at base camp overlooking Clyde Inlet, Baffin Island, August 2001. Brian was helping Jason Briner (INSTAAR) elucidate the glacial history of the area. Photo: J. Briner.



- Nummendam, D.; Slingerland, R.; Lowe, R.; Flemings, P.; Swift, D.; Heller, P.; **Syvitski, J.P.M.**; Simo, T.; Paola, C.; Ashley, G.; Montanez, I. 2000: Sedimentary systems in space and time—high priority National Science Foundation research initiatives in sedimentary geology. *GSA Today* July 2000:12–15.
- O’Grady, D.B.**; **Syvitski, J.P.M.** 2001: Predicting profile geometry of continental slopes with a multiprocess sedimentation model. In: Merriam, D.F., and Davis, J.C. (eds.), *Geological Modeling and Simulation: Sedimentary Systems*. New York, Kluwer Academic/Plenum Publishers, pp.99–117.
- Ogilvie, A.E.J.** 2001: Climate and farming in northern Iceland, ca 1700–1850. In: Sigurdsson, I. and Skaptason, J. (eds.), *Aspects of Arctic and Sub-Arctic History*. Reykjavik, University of Iceland Press, pp. 289–299.
- Ogilvie, A.E.J.**; Jonsson, T. 2001: “Little Ice Age” research: a perspective from Iceland. In: **Ogilvie, A.E.J.** and Jonsson, T. (eds.) *The Iceberg in the Mist: Northern Research in Pursuit of a “Little Ice Age,”* Dordrecht: Kluwer Academic Publishers. Reprinted from *Climatic Change* 48:9–52.
- Ogilvie, A.E.J.** (ed.); Jonsson, T. (ed.) 2001: *The Iceberg in the Mist: Northern Research in Pursuit of a “Little Ice Age”* Dordrecht: Kluwer Academic Publishers. Reprinted from *Climatic Change* 48(1):1–263.
- Pacala, S.W.; Hurtt, G.T.; Baker, D.; Peylin, P.; Houghton, R.A.; Birdsey, R.A.; Heath, L.; Sundquist, E.T.; **Stallard, R.F.**; Ciais, P.; Moorcroft, P.; Caspersen, J.P.; Sheliakova, E.; Moore, B.; Kohlmaier, G.; Holland, E.; Gloor, M.; Harmon, M.E.; Fan, S.-M.; Sarmiento, J.L.; Goodale, C.L.; Schimel, E.; Field, C.B. 2001: Consistent land- and atmosphere-based U.S. carbon sink estimates. *Science* 292(5525):2316–2320.
- Paola, C.; Mullin, J.; Ellis, C.; Mohrig, D.C.; Swenson, J.B.; Parker, G.; Hickson, T.; Heller, P.L.; Pratson, L.; **Syvitski, J.P.M.**; Sheets, B.; Strong, N. 2001: Experimental stratigraphy. *GSA Today*, July: 4–9.
- Parsons, J.D.; Bush, J.; **Syvitski, J.P.M.** 2001: Hyperpycnal plume formation with small sediment concentrations. *Sedimentology* 48:465–478.
- Pendall, E.**; Leavitt, S.W.; and 10 Others. 2001: Elevated CO<sub>2</sub> stimulates soil respiration in a FACE wheat field. *Basic and Applied Ecology* 2:193–201.
- Pendall, E.**; **Markgraf, V.**; **White, J.W.C.**; **Dreier, M.** 2001: Multiproxy record of Late Pleistocene-Holocene climate and vegetation change from a peat bog in Patagonia. *Quaternary Research* 55:168–178.
- Pfeffer, W.T.** 2001: Ice dynamics modeling of the Hudson Strait region at late glacial time. In: MacLean, B. (ed.) *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and Late Glacial-Deglacial History Derived From Marine and Terrestrial studies*. Geological Survey of Canada, Bulletin 566.
- Pomeroy, J.W.; Holler, P.; Marsh, P.; Walder, D.A.; **Williams, M.W.** 2001: Snow vegetation interactions: issues for a new initiative. In: Dolman, A.J., Hall, A.J., Kavvas, M.L., Oki, T. and Pomeroy, J.W. (eds.) *IAHS Publication No.270: Soil-vegetation-atmosphere transfer schemes and large scale hydrological models*. Wallingford, UK, IAHS Press, pp. 299–305.
- Pratson, L.; Imran, J.; **Hutton, E.**; Parker, G.; **Syvitski, J.P.M.** 2001: BANGID: a one-dimensional Lagrangian model of turbidity current mechanics. *Computers and Geosciences* 27(6):701–716.
- Rattray, G.; **Sievering, H.** 2001: Dry deposition of ammonia, nitric acid, and nitrate to alpine tundra at Niwot Ridge, CO. *Atmospheric Environment* 35:1085–1109.
- Rosell-Mele, A.; Bard, E.; et al. Including **Lehman, S.J.** and 37 others. 2001: Precision of the current methods to measure alkenone relative (Uk37’) and absolute abundance in sediments: results of an inter-laboratory comparison study. *Geochemistry, Geophysics, Geosystems* 2.
- Sachs, J.P.**; Anderson, R.F.; **Lehman, S.J.** 2001: Glacial surface temperatures of the southeast Atlantic ocean. *Science* 293:2077–2079.
- Sauer, P.E.; **Miller, G.H.**; Overpeck, J.T. 2001: Oxygen isotope ratios of organic matter in arctic lakes as a paleoclimate proxy: field and laboratory investigations. *Journal of Paleolimnology* 25:43–64.
- Seastedt, T.R.** 2001: Soils. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 157–173.
- Seastedt, T.R.**; Adams, G.A. 2001: Effects of mobile tree islands on alpine tundra soils. *Ecology* 82:8–15.
- Seastedt, T.R.**; Vaccaro, L. 2001: Plant species richness, productivity and nitrogen and phosphorous limitation across a snowpack gradient in alpine tundra. *Arctic, Antarctic and Alpine Research* 33:100–106.
- Seastedt, T.R.**; **Walker, M.D.**; **Bryant, D.** 2001: Controls on decomposition processes in alpine tundra. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge, Colorado*. New York, Oxford University Press, pp. 222–236.

- Sherrod, S.K.; **Seastedt, T.R.** 2001: Effects of the northern pocket gopher (*Thomomys talpoides*) on alpine soil characteristics, Niwot Ridge, Colorado. *Biogeochemistry* 55:195–218.
- Sievering, H.** 2001: Atmospheric chemistry and deposition. In: Bowman, W.D. and Seastedt, T.R. (eds.), *Structure and function of an alpine ecosystem*. Oxford University Press, pp. 32–44.
- Sievering, H.**; Kelly, T.; McConville, G.; **Seibold, C.**; Turnipseed, A. 2001: Nitric acid dry deposition to conifer forests: Niwot Ridge spruce-fir-pine study. *Atmospheric Environment* 35:3851–3859.
- Spaulding, S.A.**: Kocielek, J.P. 2001: Freshwater diatoms (Bacillariophyceae) In: Goodman, S. & Benstead, J. (eds). *Natural History of Madagascar*, University of Chicago Press.
- Spaulding, S.A.**: Kocielek, J.P. 2001: Symmetrical Naviculoid Diatoms. In: Sheath, R. & Wehr, J. (eds). *Freshwater Algae of North America*, Academic Press.
- Stallard, R.F.** 2001: Possible environmental factors underlying amphibian decline in eastern Puerto Rico: analysis of government data archives. *Conservation Biology* 15(4):1–16.
- Syvitski, J.P.M.** 2001. Supply and flux of sediment along hydrological pathways: anthropogenic influences at the global scale. *LOICZ Newsletter* 20: 4–7.
- Syvitski, J.P.M.**; **Bahr, D.B.** 2001: Numerical models of marine sediment transport and deposition. *Computers and Geosciences* 27(6):617–618.
- Syvitski, J.P.M.**; **Hutton, E.W.H.** 2001: 2D SEDFLUX 1.0C: an advanced process-response numerical model for the fill of marine sedimentary basins. *Computers and Geosciences* 27:731–753.
- Syvitski, J.P.M.**; **Peckham, S.**; Wiberg, P., Howard, A., Driscoll, N. 2001. Predicting the distribution and properties of buried submarine topography on continental shelves. In: Hines, P.C. Makris, N.C. and Holland, C.W. (eds.) *Geoclutter and Boundary Characterization 2001: Acoustic Interaction with the Seabed*. Defence Research Establishment Atlantic, Technical Memorandum DREA TM-2001-185, pp. 67–71.
- Syvitski, J.P.M.**; Stein, A.B.; **Andrews, J.T.**; Milliman, J.D. 2001: Icebergs and the sea floor of the East Greenland (Kangerlussuaq) continental margin. *Arctic, Antarctic, and Alpine Research* 33(1):52–61.
- Takacs, C.D.; Prisco, J.P.; **McKnight, D.M.** 2001: Bacterial dissolved organic carbon demand in Antarctic Dry Valley lakes. *Limnology and Oceanography* 46: 1189–1194.
- Turney, C.S.M.; Bird, M.I.; Fifield, L.K.; Roberts, R.G.; Smith, M.; Dortch, C.E.; Grun, R.; Lawson, E.; Ayliffe, L.K.; **Miller, G.H.**; Dortch, J.; Cresswell, R.G. 2001: The human occupation at Devil's Lair, Southwestern Australia 50,000 years ago. *Quaternary Research* 55:3–13.
- Vimeux, F.; Masson, V.; Jouzel, J.; Petit, J.R.; Steig, E.J.; Stievenard, M.; Vaikmae, R.; **White, J.W.C.** 2001: Holocene hydrological cycle changes in the Southern Hemisphere documented in East Antarctic deuterium excess records. *Climate Dynamics* 17:503–513.
- Welker, J.M.; **Bowman, W.D.**; **Seastedt, T.R.** 2001: Response of alpine tundra to environmental change. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge*. Colorado. New York, Oxford University Press, pp. 304–322.
- Whitlock, C.; **Markgraf, V.**; Bartlein, P.; Ashworth, A. 2001: The Midlatitudes of the North and South America during the Last Glacial Maximum and early Holocene: similar paleoclimatic sequences despite differing large-scale controls. In: **V. Markgraf** (ed.) *Interhemispheric Climate Linkages*. San Diego, Academic Press, pp. 391–415.
- Williams, M.W.**, contributing author. 2001: Hydrology section. In: Matzner, R.A. (ed.), *Dictionary of Geophysics, Astrophysics, and Astronomy*. New York, CRC Press, 526 p.
- Williams, M.W.**; **Caine, N.** 2001: Hydrology and hydrochemistry. In: **Bowman, W.D.** and **Seastedt, T.R.** (eds.), *Structure and Function of an Alpine Ecosystem: Niwot Ridge*, Colorado. New York, Oxford University Press, pp. 75–96.
- Williams, M.W.**; **Hood, E.**; **Caine, N.** 2001: The role of organic nitrogen in the nitrogen cycle of a high-elevation catchment, Colorado Front Range, USA. *Water Resources Research* 37(10):2569–2581.
- Williams, M.W.**; **Hood, E.**; Ostberg, G.; Francou, B.; Galarraga, R. 2001: Synoptic survey of inorganic and organic C, N, and P concentrations, paramo high-altitude region, Antisasa Ecological Reserve, Ecuador. *Arctic, Antarctic, and Alpine Research* 33(4):397–403.
- Williams, M.W.**; Manthorne, D. 2001: Class I areas at risk: event-based nitrogen deposition to a high-elevation, western site, *The Scientific World* 1.
- Woodhouse, C.A.** 2001: A tree-ring reconstruction of streamflow for the Colorado Front Range. *Journal of the American Water Resources Association* 37:561–570.
- Woodhouse, C.A.**; Brown, P.M. 2001: Tree-ring evidence for Great Plains drought. *Tree-Ring Research* 57:89–103.
- Wyroll, K.-H.; **Miller, G.H.** 2001: Initiation of the Australian summer monsoon 14,000 years ago. *Quaternary International* 83–85:119–128.
- Zeeberg, J.; **Lubinski, D.J.**; Forman, S.L. 2001: Holocene relative sea-level history of Novaya Zemlya, Russia, and implications for Late Weichselian ice-sheet loading. *Quaternary Research* 56:218–230.

# Publications 2002

- Anderson, D.M.;** Archer, D. 2002: Glacial-interglacial stability of ocean pH inferred from foraminifer dissolution rates. *Nature* 416(6876):70–73.
- Anderson, D.M.;** Overpeck, J.T.; Gupta, A.K. 2002: Increase in the Asian southwest monsoon during the past four centuries. *Science* 297(5581):596–599.
- Andersson, C.; Warnke, D.A.; Channell, J.E.T.; **Stoner, J.;** Jansen, E. 2002: The mid-Pliocene (4.3–2.6 Ma) benthic stable isotope record of the Southern Ocean: ODP Sites 1092 and 704, Meteor Rise. *Palaeogeography, Palaeoclimatology, Palaeoecology* 182:165–181.
- Andrews, J.T.;** Barber, D.C. 2002: Dansgaard-Oeschger events: Is there a signal off the Hudson Strait Ice Stream? *Quaternary Science Reviews* 21:443–454.
- Andrews, J.T.;** Geirsdottir, A.; Hardardottir, J.; **Principato, S.;** Gronvold, K.; **Kristjansdottir, G.B.;** Helgadottir, G.; Drexler, J.; Sveinbjornsdottir, A. 2002: Distribution, sediment magnetism and geochemistry of the Saksunarvatn (10 180 ± 60 cal.yr BP) tephra in marine, lake, and terrestrial sediments, northwest Iceland. *Journal of Quaternary Science* 17(8):731–745.
- Andrews, J.T.;** Hardardottir, J.; Geirsdottir, A.; Helgadottir, G. 2002: Late Quaternary ice extent and depositional history from the Djupall trough, off the Vestfirir peninsula, north-west Iceland: a stacked 36 cal. Ky environmental record. *Polar Research* 21(2):211–226.
- Andrews, J.T.;** Kihl, R.; **Kristjansdottir, G.B.;** Smith, L.M.; Helgadottir, G.; Geirsdottir, A.; **Jennings, A.E.** 2002: Holocene sediment properties of the East Greenland and Iceland continental shelves bordering Denmark Strait (64–68 deg. N), North Atlantic. *Sedimentology* 49:5–24.
- Andrews, J.T.;** **Principato, S.M.** 2002: Grain-size characteristics and provenance of ice-proximal glacial marine sediments (or why do grain-size analyses anyway?) In: Dowdeswell, J.A. and O’Cofaigh, C. (eds.), *Glacier Influenced Sedimentation at High-Latitude Continental Margins*: Geological Society of London, pp. 305–324.
- Andrews, M.** 2002: Electronically influenced changes in library users’ behavior: a case study at the Institute of Arctic and Alpine Research (INSTAAR) In: Caning, K. and V.S. Jakobsen (eds.), *Poles apart—poles on-line*. Proceedings of the 19th Polar Libraries Colloquy, 17–21 June. Copenhagen: Danish Polar Center, pp.48–54.
- Behrendt, J.C.;** Damaske, D.; Finn, C.A.; Kyle, P.; Wilson, T.J. 2002: Draped aeromagnetic survey in Transantarctic Mountains over the area of the Butcher Ridge igneous complex showing extent of underlying mafic intrusion. *Journal of Geophysical Research—Solid Earth* 107:B8, art. no. 2160.
- Bowman, W.D.;** Cairns, D.M.; Baron, J.S.; **Seastedt, T.R.** 2002: Islands in the sky: Tundra and treeline ecosystems of the Rockies. In: Baron, J.S. (ed.), *Rocky Mountain Futures: An Ecological Perspective*. Island Press, pp. 183–202.
- Bowman, W.D.;** Damm, M. 2002: Causes and consequences of alpine vascular plant diversity in the Rocky Mountains. In: Koerner, C. and Spehn, E. (eds.), *Global Mountain Biodiversity Assessment*. Pergamon Press, pp. 35–47.
- Briner, J.P.;** Kaufman, D.S.; Werner, A.; Caffee, M.; Levy, L.; **Manley, W.F.;** Kaplan, M.R.; Finkel, R.C. 2002: Glacier readvance during the late glacial (Younger Dryas?) in the Ahkun Mountains, southwestern Alaska. *Geology* 30(8):679–682.
- Byers, J.E.; Reichard, S.; Randall, J.M.; Parker, I.M.; Smith, C.S.; Lonsdale, W.M.; Atkinson, I.A.E.; **Seastedt, T.R.;** Williamson, M.; Chornesky, E.; Hayes, D. 2002: Directing research to reduce the impacts of nonindigenous species. *Conservation Biology* 16(3):630–640.
- Caine, N.** 2002: Declining ice thickness on an alpine lake is generated by increased winter precipitation. *Climatic Change* 54:463–470.
- Channell, J.E.T.; **Stoner, J.S.** 2002: Plio-Pleistocene magnetic polarity stratigraphies and diagenetic magnetite dissolution at ODP Leg 177 Sites (1089, 1091, 1093 and 1094). *Marine Micropaleontology* 45:269–290.
- Cleveland, C.C.;** **Townsend, A.R.;** Schmidt, S.K. 2002: Phosphorus limitation of microbial processes in moist tropical forests: Evidence from short-term laboratory incubations and field studies. *Ecosystems* 5(7):680–691.
- Clow, G.D.;** Koci, B. 2002: A fast mechanical-access drill for polar glaciology, paleoclimatology, geology, tectonics and biology. *Memoirs of National Institute of Polar Research, Special Issue, No. 56*:5–37.
- Coats, R.; **Liu, Fengjing.;** Goldman, C.R. 2002: A Monte Carlo test of load calculation methods, Lake Tahoe Basin, California-Nevada. *Journal of the American Water Resources Association* 38(3):719–730.

Historic can fragment, possibly from the gold rush era (ca. 1900 A.D.), Chisana Glacier, Wrangell–St. Elias National Park, Alaska, July 2001. A preliminary GIS model developed by William Manley and James Dixon (INSTAAR) successfully predicted locations such as these by overlaying snow and ice with historical trails and other information useful in predicting archaeological site locations. Photo: R. Ivan.



Dyke, A.S.; **Andrews, J.T.**; Clark, P.U.; England, J.H.; **Miller, G.H.**; Shaw, J.; Veillette, J.J. 2002: The Laurentide and Innuitian ice sheets during the Last Glacial Maximum. *Quaternary Science Reviews* 21(1–3):9–31.

**Dyurgerov, M.** 2002: Glacier mass balance and regime: Data of measurements and analysis. **Meier, M.** and **Armstrong, R.** (eds.), Occasional Paper No. 55, Institute of Arctic and Alpine Research, University of Colorado, 264 pp.

**Elias, S.A.** 2002: Coleoptera and Trichoptera. In: Smol, J.P., Birks, H.J.B., and Last, W.M. (eds.), *Tracking Environmental Change Using Lake Sediments: Biological and Statistical Techniques (Volume IV)*. Kluwer Academic Publishers, pp. 67–80.

**Elias, S.A.** 2002: The Natural History of the Rocky Mountains. Smithsonian Institution Press, 192 pp.

**Elias, S.A.** 2002: Setting the stage: environmental conditions in Beringia as people entered the New World. In: Jablonski, N. (ed.), *The First Americans: The Pleistocene Colonization of the New World*. Memoirs of the California Academy of Sciences, pp. 9–26.

**Elias, S.A.**; Matthews, J.V., Jr. 2002: Arctic North American seasonal temperatures in the Pliocene and Early Pleistocene, based on mutual climatic range analysis of fossil beetle assemblages. *Canadian Journal of Earth Sciences* 39:911–920.

Fisher, T.G.; Smith, D.G.; **Andrews, J.T.** 2002: Preboreal oscillation caused by a glacial Lake Agassiz flood. *Quaternary Science Reviews* 21:873–878.

Forman, S.L.; Ingólfsson, O.; Gataullin, V.; **Manley, W.**; Lokrantz, H. 2002: Late Quaternary stratigraphy, glacial limits, and paleoenvironments of the Marrsle area, Yamal Peninsula, Russia. *Quaternary Research* 57:355–370.

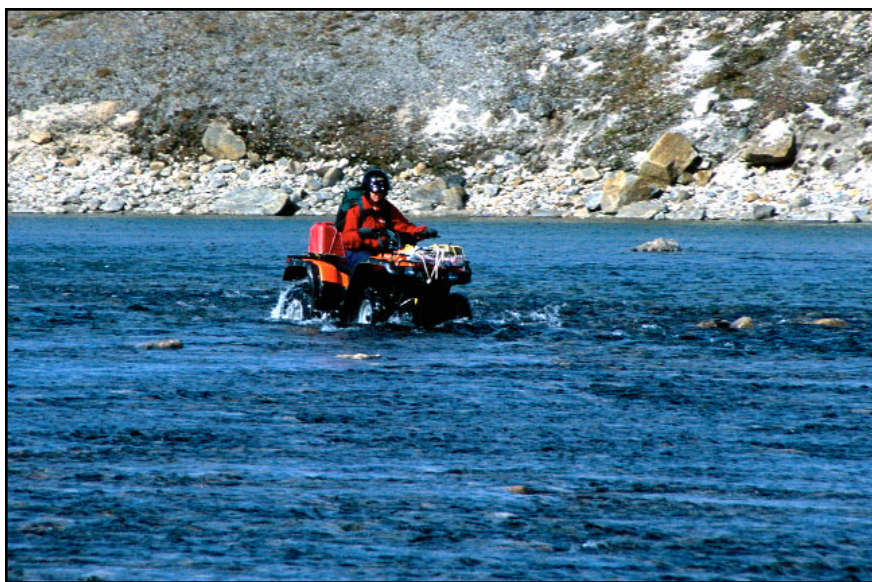
Geirsdóttir, A.; **Andrews, J.T.**; Ólafsdóttir, S.; Helgadóttir, G.; Hardardóttir, J. 2002: A 36 Ky record of iceberg rafting and sedimentation from north-west Iceland. *Polar Research* 21(2):291–298.

Hazen, J.M.; **Williams, M.W.**; Stover, B.; Wireman, M. 2002: Characterisation of acid mine drainage using a combination of hydrometric, chemical and isotopic analyses, Mary Murphy Mine, Colorado. *Environmental Geochemistry and Health* 24(1):1–22.

**Helmig, D.**; Boulter, J.; David, D.; Birks, J.W.; Cullen, N.J.; Steffen, K.; Johnson, B.J.; Oltmans, S.J. 2002: Ozone and meteorological summit, Greenland, boundary-layer conditions during 3–21 June 2000. *Atmospheric Environment* 36(15–16):2595–2608.

Hemming, S.R.; Hall, C.M.; Biscaye, P.E.; Higgins, S.M.; Bond, G.C.; McManus, J.F.; Barber, D.C.; **Andrews, J.T.**; Broecker, W.S. 2002:  $^{40}\text{Ar}/^{39}\text{Ar}$  ages and  $^{40}\text{Ar}$  concentrations of fine-grained sediment fractions from North Atlantic Heinrich layers. *Chemical Geology* 182:583–603.

**Herzfeld, U.C.** 2002: Vario functions of higher order—definition and application to characterization of snow surface roughness. *Computers & Geosciences* 28(5):641–660.



Hood, R.W.; **Williams, M.W.**; **Caine, N.** 2002: Yields of dissolved organic C, N, and P, from three high-elevation catchments. Colorado Front Range, U.S.A. *Water, Air and Soil Pollution: Focus* 2:165–180.

Jain, S.; **Woodhouse, C.A.**; Hoerling, M.P. 2002: Multidecadal streamflow regimes in the interior western United States: Implications for the vulnerability of water resources. *Geophysical Research Letters*, 29(21):2036, doi:10.1029/2001GL014278.

**Jennings, A.E.**; Gronvold, K.; **Hilberman, R.**; Smith, M.; Hald, M. 2002: High-resolution stuke of Icelandic tephtras in the Kangerlussuaq Trough, southeast Greenland, during the last deglaciation. *Journal of Quaternary Science* 17(8):747–757.

**Jennings, A.E.**; Knudsen, K.L.; Hald, M.; Hansen, C.V.; **Andrews, J.T.** 2002: A mid-Holocene shift in Arctic sea ice variability on the East Greenland shelf. *The Holocene* 12:49–58.

Kaplan, M.R.; **Wolfe, A.P.**; **Miller, G.H.** 2002: Holocene environmental variability in southern Greenland inferred from lake sediments. *Quaternary Research* 58(2):149–159.

Karbiwnyk, C.M.; Mills, C.S.; **Helmig, D.**; Birks, J.W. 2002: Minimization of water vapor interference in the analysis of non-methane volatile organic compounds by solid adsorbent sampling. *Journal of Chromatography A* 958(1–2):219–229.

Kocielek, J.P.; **Spaulding, S.A.** 2002: Eunotiod and asymmetrical diatoms. In: Sheath, R. and Wehr, J.(eds.), *Freshwater Algae of North America*. Academic Press, pp. 655–666.

Kocielek, J.P.; **Spaulding, S.A.** 2002: Evolutionary relationships, species concepts and implications of two disparate freshwater, fossil centric diatoms (Bacillariophyta) from western North America. *Journal of Phycology* 38:821–833.

Rebecca Harrison (Lancaster University, UK) crosses the Kuuktannaq River ahead of Roy Coulthard (INSTAAR, not pictured), Aston Lowlands, northeastern Baffin Island, August 2002. The Kuuktannaq River has incised the adjacent raised marine Aston Delta, creating several sections from which in situ bivalves were collected and dated to >48,800  $^{14}\text{C}$  years. The age of the shells testify to the antiquity of the delta, which may have been overrun by cold-based ice during the Last Glacial Maximum. Photo: R. Coulthard.



Gifford Miller (right, INSTAAR) and Jon Landvik (UNIS, Norway) take notes on one last boulder sample for cosmogenic exposure dating, May 2002. The exposure age of this erratic boulder, and others like it from the Clyde Foreland, Baffin Island, reveals when the location was last covered by the Laurentide Ice Sheet. Photo: J. Briner.

- Kocielek, J.P.; **Spaulding, S.A.** 2002: Morphological variation, species concepts, and classification of an unusual fossil centric diatom (Bacillariophyta) from western North America. *Journal of Phycology* 38:821–833.
- Kocielek, J.P.; **Spaulding, S.A.** 2002: Symmetrical navicula diatoms. In: Sheath, R. and Wehr, J. (eds.), *Freshwater Algae of North America*. Academic Press, pp. 637–651.
- Kolesar, S.E.; **McKnight, D.M.**; Waters, S.B. 2002: Late fall phytoplankton dynamics in three lakes, Rocky Mountain National Park. *Hydrobiologia*. 472:249–263.
- Lee, H.J.; **Syvitski, J.P.M.**; Parker, G.; Orange, D.; Locat, J.; **Hutton, E.W.H.**; Imran, J. 2002: Distinguishing sediment waves from failure deposits: field examples, including the ‘Humboldt slide’, and modelling results. *Marine Geology* 192:79–104.
- Licht, K.J.; **Andrews, J.T.** 2002: The  $^{14}\text{C}$  Record of Late Pleistocene ice advance and retreat in the Central Ross Sea, Antarctica. *Arctic, Antarctic, and Alpine Research* 34(3):324–333.
- Litaor, M.I.; **Seastedt, T.R.**; Walker, D.A. 2002: Spatial analysis of selected soil attributes across an alpine topographic/snow gradient. *Landscape Ecology*. 17:71–85.
- Lynch, A.; Brunner, R.; Curry, J.; Jensen, J.; Maslanik, J.; Mearns, L.; Sheehan, G.; **Syvitski, J.P.M.** 2002: Integrated assessment of the impacts of climate variability on the Alaska North Slope coastal region. In: Rachold, V., Brown, J., and Solomon, S. (eds.), *Arctic Coastal Dynamic*. Reports on Polar Research 413:30.
- MacLean, B.; Vilks, G.; Hardy, I.; Deonarine, B.; **Jennings, A.E.**; **Manley, W.F.** 2002: Quaternary sediments in Hudson Strait and Ungava Bay. In: MacLean, B. (ed.), *Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and Late Glacial-Deglacial History Derived from Marine and Terrestrial Studies*. Geological Survey of Canada Bulletin. 566:71–125.
- Marchant, R.; Almeida, L.; Behling, H.; Berrio, J.C.; Bush, M.; Cleef, A.; Duivenvoorden, J.; Kappelle, M.; De Oliveira, P.; de Oliveira-Filho, A.T.; Lozano-Garia, Socorro; Hooghiemstra, H.; Ledru, M-P; Ludlow-Wiechers, B.; **Markgraf, V.**; Mancini, V.; Paez, M.; Prieto, A.; Rangal, O.; Salgado-Labouriau, M.L. 2002: Distribution and ecology of parent taxa of pollen lodged within the Latin American Pollen Database. *Review of Palaeobotany and Palynology*. 121:1–75.
- Markgraf, V.**; Webb, R.S.; **Anderson, K.H.**; Anderson, L. 2002: Modern pollen/climate calibration for southern South America. *Palaeogeography, Palaeoclimatology, Palaeoecology* 181:375–397.
- Marshall, H.P.**; Harper, W.T.; **Pfeffer, W.T.**; Humphrey, N.F. 2002: Depth-varying constitutive properties observed in an isothermal glacier. *Geophysical Research Letters*. 29(23):61-1, 61-4.
- Mathieu, R.; Pollard, D.; Cole, J.E.; **White, J.W.C.**; **Webb, R.S.**; Thompson, S.L. 2002: Simulation of stable water isotope variations by the GENESIS GCM for modern conditions. *Journal of Geophysical Research—Atmospheres* 107(D4): art. no. 4037.
- Meier, M.F.** 2002: Glaciers. In: MacCracken, M.S., and Perry, J.S. (eds.), *Encyclopedia of Global Environmental Change, Vol.1: The Earth System*. J. Wiley and Son, pp. 404–410.
- Meier, M.F.**; **Dyurgerov, M.B.** 2002: How Alaska affects the world. *Science* 297(5580):350–351.
- Meier, M.F.**; Wahr, J.M. 2002: Sea level is rising: Do we know why? *Proceedings National Academy of Sciences* 99(10):6524–6526.
- Miller, A.E.; **Bowman, W.D.** 2002: Variation in nitrogen-15 natural abundance and nitrogen uptake traits among co-occurring alpine species: Do species partition by nitrogen form? *Oecologia* 130(4):609–616.
- Miller, G.H.**; **Wolfe, A.P.**; **Steig, E.J.**; Sauer, P.E.; Kaplan, M.R.; **Briner, J.P.** 2002: The Goldilocks dilemma: big ice, little ice, or “just-right” ice in the Eastern Canadian Arctic. *Quaternary Science Reviews* 21:33–48.
- Miller, J.B.; **Mack, K.A.**; Dissly, R.; **White, J.W.C.**; Dlugokencky, E.J.; Tans, P.P. 2002: Development of analytical methods and measurements of C-13/C-12 in atmospheric CH<sub>4</sub> from the NOAA Climate Monitoring and Diagnostics Laboratory global air sampling network. *Journal of Geophysical Research-Atmospheres* 107(D13), art. no. 4178.
- Moy, C.M.; Seltzer, G.O.; Rodbell, D.T.; **Anderson, D.M.** 2002: Variability of El Nino/Southern Oscillation activity at millennial timescales during the Holocene epoch. *Nature* 420(6912):162–165.



- Muhs, D.R.** 2002: Evidence for the timing and duration of the Last Interglacial Period from high-precision uranium-series ages of corals on tectonically stable coastlines. *Quaternary Research* 58:36–40.
- Muhs, D.R.:** Simmons, K.R.; Kennedy, G.L.; Rockwell, T.K. 2002: The last interglacial period on the Pacific Coast of North America: timing and paleoclimate. *GSA Bulletin* 114(5):569–592.
- Murphy, L.; Warnke, D.A.; Andersson, C.; Channell, J.E.T.; **Stoner, J.** 2002: History of ice rafting at South Atlantic ODP Site 177-1092 during the Gauss and Late Gilbert Chrons. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 182:183–196.
- Neff, J.C.; **Townsend, A.R.;** Gleixner, G.; **Lehman, S.J.;** **Turnbull, J.;** **Bowman, W.D.** 2002: Variable effects of nitrogen additions on the stability and turnover of soil organic carbon. *Nature* 419(6910):915–917.
- Ogilvie, A.E.J.** 2002: Biocomplexity of marine and terrestrial environments and human populations in Iceland. In: Abstracts from the Arctic Forum 2002. The Arctic Research Consortium of the U.S. (ARCUS), p. 16.
- Ogilvie, A.E.J.** 2002: Landscapes and seascapes: linkages between marine and terrestrial environments and human populations in the North Atlantic (Iceland sector). In: Program and Abstracts. Connectivity in Northern Waters. Arctic Ocean, Bering Sea, and Gulf of Alaska Interrelationships, 18–21 September, University of Fairbanks, Alaska. AAAS Arctic Division, p. 170.
- Ogilvie, A.E.J.;** **Barlow, L.K.;** **Jennings, A.E.** 2002: North Atlantic climate c. AD 1000. In: Wawn, A. and Sigurdurdottir, Th. (eds.), *Approaches to Vinland*. Sigurdur Nordal Institute, pp.173–188.
- O'Grady, D.B.; **Syvitski, J.P.M.** 2002. Large-scale morphology of Arctic continental slopes: the influence of sediment delivery on slope form. In: Dowdeswell, J.A., and O'Cofaigh, C. (eds.), *Glacier-influenced sedimentation on high-latitude continental margins*. Geological Society, Special Publication 203:11–31.
- Peckham, S.D.;** **Manley, W.;** **Dyurgerov, M.;** **Syvitski, J.P.M.** 2002: Modeling coastal erosion near Barrow, Alaska. In: Rachold, V., Brown, J., and Solomon, S. (eds.), *Arctic Coastal Dynamics Reports on Polar Research* 413:46–47.
- Pauketat, T.R.; Kelly, L.S.; Fritz, G.J.; Lopinot, N.H.; **Elias, S.A.;** Hargrave, E. 2002: The residues of feasting and public ritual at early Cahokia. *American Antiquity* 67:52–65.
- Polyak, L.; Korsun, S.; Febo, L.A.; Stanovoy, V.; Khusid, T.; Hald, M.; Paulsen, B.E.; **Lubinski, D.J.** 2002: Benthic foraminiferal assemblages from the southern Kara Sea, a river-influenced Arctic marine environment. *Journal of Foraminiferal Research* 32(3):252–273.
- Randerson, J.T.; Still, C.J.; Balle, J.J.; Fung, I.Y.; Doney, S.C.; Tans, P.P.; Conway, T.J.; **White, J.W.C.;** **Vaughn, B.;** Suits, N.; Denning, A.S. 2002: Carbon isotope discrimination of arctic and boreal biomes inferred from remote atmospheric measurements and a biosphere-atmosphere model. *Global Biogeochemical Cycles* 16(3):art. no. 1028.
- Schwalb, A.; Burns, S.J.; Cusminsky, G.; Kelts, K.; **Markgraf, V.** 2002: Assemblage diversity and isotopic signals of modern ostracodes and host waters from Patagonia, Argentina. *Palaeogeography, Palaeoclimatology, Palaeoecology* 187:323–339.
- Seastedt, T.R.** 2002: Base camps of the Rockies: the intermountain grasslands. In: Baron, J.S., Fagre, D., and Hauer, R. (eds.), *Rocky Mountain Futures: An Ecological Perspective*. Island Press, pp. 219–236.
- Slingerland, R.; **Syvitski, J.P.M.;** Paola, C. 2002: Sediment Modeling System enhances education and research. *EOS, Transactions of AGU* 83:578–579.
- Smith, F.A.;** **White, J.W.C.** 2002: The development of Neogene grasslands in relation to climate and atmospheric CO<sub>2</sub>: The carbon isotope ratios of fossil phytoliths. *Geochimica et Cosmochimica Acta* 66(15A): A722–A722.
- Spaulding, S.A.;** Kociolek, J.P. 2002: New Gomphonema (Bacillariophyceae) Species from Madagascar. *Proceedings of the California Academy of Sciences* 50(16):361–379.
- Spaulding, S.A.;** Kociolek, J.P.; Davis, D.R. 2002: A new diatom (Bacillariophyceae) genus with two new species from New Mexico, USA. *European Journal of Phycology* 37:135–143.
- Spaulding, S.A.;** Kociolek, J.P.; Wong, D. 2002: A taxonomic and systematic revision of the genus *Muelleria* (Bacillariophyta). *Phycologia* 38(4):314–341.
- Stoermer, E.F.M.; Julius, J.P.; **Spaulding, S.A.** 2002: Centric diatoms. In: Sheath, R. and Wehr, J.(eds.), *Freshwater Algae of North America*. Academic Press, pp. 559–562.
- Stoner, J.S.;** Laj, C.; Channell, J.E.T.; Kissel, C. 2002: South Atlantic and North Atlantic geomagnetic paleointensity stacks (0–80 ka): implications for inter-hemispheric correlation. *Quaternary Science Reviews*. 21:1141–1151.



Gifford Miller (INSTAAR), Midra Miller, and Tisha Magee enjoy a sip of wine as the full moon rises over a well-studied stratigraphic section at Williams Point, Madigan Gulf, that records past high stands of Lake Eyre, central Australia, August 2002. Photo: G. Miller.

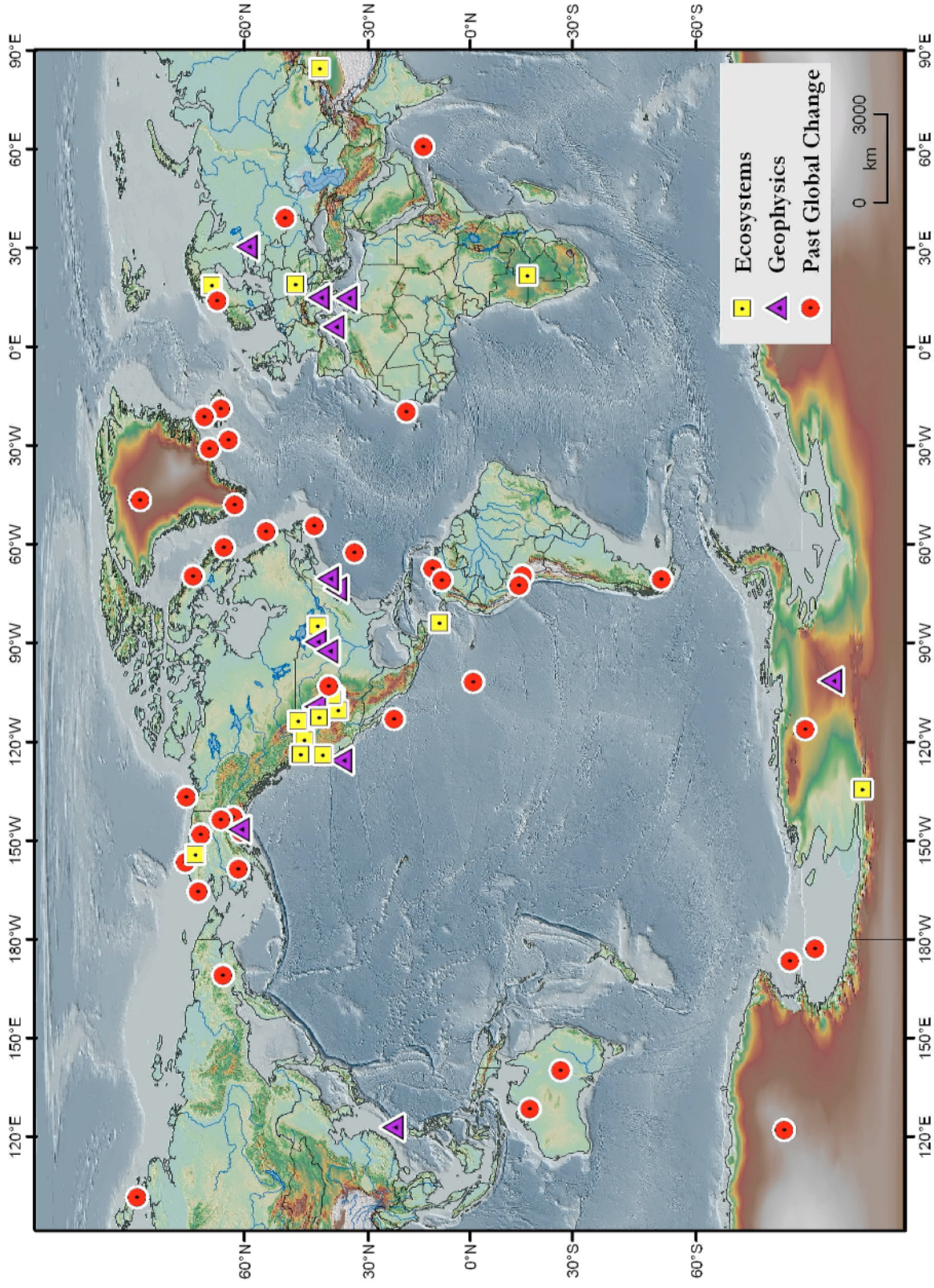
- Syvitski, J.P.M.** 2002: Sediment transport variability in Arctic rivers: implications for a warmer future. *Polar Research* 21(2):323–330.
- Syvitski, J.P.M.; Hilberman, R.D.; and Peckham, S.D.** 2002: Sediment flux to the coastal zone: predictions for the Navy. *Terra Nostra* 2, International Association of Mathematical Geologists, Berlin, pp. 437–442.
- Syvitski, J.P.M.; Paola, C.; and Slingerland, R.** 2002: Development of a Community Sediment Model. *MAR-GINS Newsletter* 8:8–9.
- Taylor, S.; Feng, X.; Williams, M.W.; McNamara, J.** 2002. How isotopic fractionation of snowmelt affects hydrograph separation. *Hydrologic Processes* 16: 3683–3690.
- Townsend, A.R.; Asner, G.P.; White, J.W.C.; Tans, P.P.** 2002: Tropical land use effects on atmospheric C-13 imply a sizable terrestrial carbon sink in equatorial latitudes. *Geophysical Research Letters* 29(10), art. no. 1426.
- Townsend, A.R.; Asner, G.P.; Cleveland, C.C.; Lefer, M.E.; Bustamante, M.M.C.** 2002: Unexpected changes in soil phosphorus dynamics following tropical deforestation to cattle pasture. *Journal of Geophysical Research* 107(D20):8067.
- Williams, M.W.** 2002: Editorial—United Nations International Year of the Mountains. *Arctic, Antarctic, and Alpine Research* 34(1):1–2.
- Williams, M.W.; Losleben, M.; Hamann, H.** 2002: Alpine areas in the Colorado Front Range as monitors of climate change and ecosystem response. *Geographical Review* 92(2):180–191.
- Williams, M.W.; Francou, B.; Hood, E.; Vaughn, B.** 2002: Interpreting climate signals from a shallow equatorial core: Antisana, Ecuador. In: Casassa, G. F., Sepulveda, V., and Sinclair, R. M. (eds.), *The Patagonian Icefields*. Kluwer Academic/Plenum Publishers, pp. 169–176.
- Woodhouse, C.A.; Lukas, J.J.; Brown, P.M.** 2002: Drought in the western Great Plains, 1845–56. *Bulletin of the American Meteorological Society*, October 2002:1485–1493.

The Alaska Pipeline and Dalton Highway, near Toolik Lake LTER, Alaska, June 2002. An INSTAAR/Ohio State team collected hundreds of liters of water from nearby lakes and streams to study the effect of dissolved organic matter on the photolytic breakdown of Persistent Organic Pollutants (POPs). Photo: Y. Chin (Ohio State University).



# Where in the world is INSTAAR?

Active research programs 2001-2002.



Map: W. Manley

Colorado  
University of Colorado at Boulder