Seminars

UCSB On-campus

July 22, 2003
Multiple Scattering of Seismic Waves: Disorder vs. Correlation, by Professor Michel Campillo from the Universite Joseph Fourier, France

March 3, 2004
Towards a 3D Reconstruction of Basin and Range Extension**,** by ICS Researcher Nathan Niemi

December 15, 2003
Damaging Long-Period Ground Motions from the 2003 Tokachi-oki, Hokkaido earthquake (Mw 8.0), by Professor Kazuki Koketsu from Earthquake Research Institute, University of Tokyo

December 15, 2003
Oblique Strike-Slip Faults and structural Geomorphology: New Insights From the Plate Boundary Transfer Zone, NE South Island, New Zealand, by Prof. Jarg Pettinga, Department of Geological Sciences, University of Canterbury, Christchurch, New Zealand

February 3, 2004
Non-invasive mapping of hydrocarbon-contaminated soils in Antarctica, by Professor David Nobes, Canterbury University, Christchurch, NZ

March 5, 2004
Topography Effects for Strong Ground Motion: A case study, by ICS Post-Doctoral Researcher Dominic Assimaki

Off Campus-Invited Lectures

2003
Antipodal fates of continental crust, University of North Carolina, by Bradley Hacker

"Antipodal fates of continental crust" and "Phase transformations and earthquakes", Virginia Polytechnic and State University, by Bradley Hacker

"Antipodal fates of continental crust", Appalachian State University by Bradley Hacker

"Phase transformations and earthquakes", University of Washington by Bradley Hacker

June 11, 2003
Invited keynote talk, "Surface processes and exhumation rates: erosional controls on tectonic rates" Gordon Conference on "Interior of the Earth", Mt. Holyoke by Douglas W. Burbank

July 22, 2003
Mechanism Dependent Radiation, Lawrence Livermore National Lab, invited workshop by Ralph Archuleta

September 16, 2003
Large-Scale Collapse Processes on Submarine Levees, for “Deep Water Processes" meeting at the Institut Ciencas del Mar in Barcelona, Spain, by Mason Dykstra

September 23, 2003
Invited keynote talk, "Calibrating interactions among climate, tectonics, and erosion", Joint annual meeting of the German Mineralogical Association, the Geological Association, and the German Geophysical Association, Ruhr-University, Bochum, Germany by Douglas W. Burbank

October 6, 2003
Multiple Scales of Mass-Failure on Continental Slopes: Processes, Products, and the Drastic Reorganization of Depositional Environments on the Shore, Shelf and Slope, University of Bologna, Italy, by Mason Dykstra

October 17, 2003
Radiated Seismic Energy Computed Directly from Models of Dynamic Rupture**,** Dept. of Geology and Geophysics, University of Wyoming by Ralph Archuleta

November 2003
The role of intermediate to felsic plutonism in the accreted Talkeetna arc, south central Alaska: Geological Society of America, Rioux, M., Hacker, B., Mattinson, J., Kelemen, P., Hanghoj, K., and Plank, T., 2003, Abstracts with Programs, v. 35, abstract 174-15.

November 7, 2003
Radiated Seismic Energy Computed Directly from Models of Dynamic Rupture**,** Center for Earthquake Research and Information, University of Memphis by Ralph Archuleta

November 19, 2003
Radiated Seismic Energy Computed Directly from Models of Dynamic Rupture, Dept. of Earth and Space Sciences, UCLA by Ralph Archuleta

November 20, 2003
Mountain building in a monsoonal climate: growth of the Nepalese Himalaya, Brown University by Douglas W. Burbank

November 21, 2003
Himalayan erosion at annual to million-year time scales: the interplay of climate and tectonics, MIT by Douglas W. Burbank

December 2003
Rioux, M., Hacker, B., Mattinson, J., Kelemen, P., Plank, T., and Reiners, P., 2003, The evolution of silicic magmatism in the accreted Talkeetna arc, south-central Alaska: Implications for the growth of continents: Eos, Transactions, American Geophysical Union, AGU 2003 Fall Meeting, v. 84, p. 1546.

December 10, 2003
Exhumation of Norwegian Ultrahigh-Pressure Rocks: Zircon Geochronology and Tectonostratigraphy of the Hornelen Region, AGU in San Francisco, CA by Scott Johnson

2004
Mineralogical Society of America Distinguished Lecturer: by Bradley Hacker

"Phase transformations and earthquakes", Texas A&M University by Bradley Hacker

"Phase transformations and earthquakes", Rice University by Bradley Hacker

"The Role of Water in Rock Deformation", Gordon Research Conference by Bradley Hacker

"Antipodal fates of continental crust", University of Wisconsin by Bradley Hacker

"Antipodal fates of continental crust", Augustana College by Bradley Hacker

"Phase transformations and earthquakes", Kansas State University by Bradley Hacker

"Exhumation of Ultrahigh-Pressure Rocks: Constraints from Geochronology", European Geosciences Union by Bradley Hacker

"Antipodal fates of continental crust" and "Phase transformations and earthquakes", Technical University of Freiberg by Bradley Hacker

"Phase transformations and earthquakes", Technical University of Berlin/Potsdam University by Bradley Hacker

"Phase transformations and earthquakes", University of Würzburg by Bradley Hacker

"Antipodal fates of continental crust" and "Phase transformations and earthquakes", University of Bucharest by Bradley Hacker

"The Role of Water in Rock Deformation", Gordon Research Conference by Bradley Hacker

"Exhumation of Ultrahigh-Pressure Rocks: Constraints from Geochronology", European Geosciences Union by Bradley Hacker

January 2004
The Internal Structure and External Morphology of Mass-Transport Deposits, and the Generation of Accommodation on the Shelf, Slope, and Basin-Floor. Statoil, Stavanger, Norway, by Mason Dykstra

January 16, 2004
Turner Lecture, "Himalayan erosion at annual to million-year time scales: the interplay of climate and tectonics, University of Michigan by Douglas W. Burbank

January 29, 2004
Himalayan mountain building: a collisional orogen in a monsoonal climate, University of Washington by Douglas W. Burbank

February 6, 2004
Calibrating Orogenic Growth: Insights from the Kyrgyz Range, Tien Shan, Stanford University by Douglas W. Burbank

February 7, 2004
Himalayan erosion at annual to million-year time scales: the interplay of climate and tectonics, Stanford University by Douglas W. Burbank

March 10, 2004
Quantifying Himalayan erosion: insights from central Nepal, University of Canterbury, Christchurch, NZ by Douglas W. Burbank

March 11, 2004
Himalayan orogenesis in a monsoonal climate, Victoria University, Wellington, New Zealand by Douglas W. Burbank

April 28, 2004
External Geometry and International Architecture of Mass-Transport complexes, and the Creation of Ponded Turbidites on the Slope, International Association of Sedimentlologists' meeting on "Submarine Slope Systems: Process, Products & Prediction" by Ben Kneller

April 29, 2004
Arroyo San Fernando: an Upper Cretaceous Mid-Slope Valley-Levee Complex Built within and out of a Submarine Canyon, International Association of Sedimentlologists' meeting on "Submarine Slope Systems: Process, Products & Prediction" by Ben Kneller."

April 2004
The Internal Structure and External Morphology of Mass-Transport Deposits, Universidad de San Juan, Argentina by Mason Dykstra

May10, 2004
"Effects of CO2 Degassing in Well Bores- Relevance to Mineral Scaling and Fault Cementation", AAPG Pac. Section meeting in Bakersfield by Tom Carpenter.

May 17-21, 2004
INVITED COSMOS Virtual Data Center: Open Dissemination of Worldwide Strong Motion Data, NATO Workshop on Future Directions in Instrumentation for Strong Motion and Engineering Seismology, Kusadasi, Turkey by Ralph Archuleta

June 7, 2004
Approach to orogenic steady state: the evolution of nascent ranges, GeoForschungsZentrum Potsdam, Germany by Douglas W. Burbank

June 7, 2004
Himalayan erosion at decadal to million-year time scales: the interplay of climate and tectonics, University of Potsdam, Germany by Douglas W. Burbank

June 21-22, 2004
Predictability of Site Effects: Use of the Yokohama High-Density Seismic Network Symposium on Strong Ground Motion Prediction and Seismic Exploration in Urban Areas, Earthquake Research Institute, University of Tokyo, Japan by Ralph Archuleta

Workshops

Interaction of tectonics, erosion, and climate along a transect from Tibet to the Himalayan foreland Workshops, by Douglas Burbank and collaborators
Organized by Prof. Burbank of the Institute for Crustal Studies at the Department of Hydrology and Meteorology, His Majesty's Government Nepal at various times during the year.

Numerical Modeling of Earthquake Source Dynamics Workshop, by Ralph Archuleta
The goals of the workshop are:

- to bring together the various researchers from America, Asia and Europe who use numerical simulations to investigate dynamics of the earthquake source
- to communicate the state-of-the-art of the earthquake dynamics research
- to provide a unique opportunity for in-depth discussions on earthquake dynamics

The workshop will be held August 31-September 4 at Smolenice Castle in the Slovak Republic. This workshop is a joint collaboration among scientists from the US, Europe and Asia. It is organized by a steering committee: Ralph Archuleta, Chairman, University of California at Santa Barbara, Santa Barbara, California, USA; Michel Bouchon**,** Université Joseph Fourier, Grenoble, France; Kojiro Irikura, Kyoto University, Kyoto, Japan, Raul Madariaga**,** École Normale Supériere, Paris, France; Peter Moczo**,** Comenius University, Bratislava, and Slovak Academy of Sciences, Bratislava, Slovak Republic.

The three days of talks and discussion will cover a full range of topics related to earthquake dynamics:

- initial stress distributions on the fault
- nucleation of the rupture
- rupture propagation
- friction laws
- rupture arrests
- stress drops and scaling
- fault geometry
- material heterogeneity
- fault interaction

- energy budget and seismic radiation
- numerical techniques
- modeling real earthquakes

The Slovak Academy of Sciences and Comenius University will be hosts for this international workshop. A website http://www.seismology.sk/NMESD2003.html announces the objectives, venue and logistics to the international geophysical community. Because the space of the castle limits the number of participants, the number of US participants is limited to 20, Asia, 20 and Europe (including Russia) and Australia, 40.

Funding from National Science Foundation.

Bedout: An End-Permian Impact Site Off-Shore Northwestern Australia Workshop, by Luann Becker
The workshop intends to provide an international forum to present the available geologic and geophysical data about the offshore Bedout structure, the geochemical and petrologic characteristics of its core, and to discuss possible end-Permian crater structure. The workshop will involve both Australian American scientist and students, as well as others who are familiar with and can critically evaluate the available data. This workshop will provide the framework for a Bedout Working Group whose purpose will be to initiate, foster and coordinate multi-disciplinary, international studies of the Bedout structure and its possible relationship to the end-Permian mass extinction event. August 2003.

Funding from the National Aeronautics and Space Administration.

Earth Education Collaboration
The goals are to introduce a faculty team from a variety of institutions to the EarthEd Online software system. A primary goal is to test determine how this resource fits the team's needs, and to specify what modifications and additions are needed to proceed to the beta test stage. A strategy for moving the software system from beta test to possible adoption will be developed. Also, because the team has extensive experience with online learning, another goal is to summarize "best practices" and other related issues to this learning modality.

Funding from National Science Foundation, Division of Undergraduate Education, and UCSB Office of Instructional Development
http://oceanography.geol.ucsb.edu/Collab/workshp_2003/index.html

Research Experience for Graduates

Thirty-nine graduate students are involved in research administered through ICS. These students are involved in field research both locally and internationally. Many have presented their research with talks or posters at professional meetings: e.g., American Geophysical Union, Geological Society of America, Seismological Society of America, annual Southern California Earthquake Center. In addition to the abstracts presented, ICS graduate students are also involved as co-authors on articles in referred journals.

Reneé Perez
Ph.D. Program, James Boles, advisor
Reneé Perez received his Ph.D. from the Geological Science Department. A Department of Energy award funded his dissertation research. Abstract: Mineralization along faults and fractures play a critical role in diagenesis, reservoir quality, and economic accumulations in sedimentary basins. So far, predictive models of water-rock interactions in relation to tectonic features are extremely difficult to evaluate. A number of assumptions are needed, specifically pertaining to fracture and fault development, as well as flow, heat and mass transport mechanisms.

I approached these difficulties through direct observations of fractured rocks and quantifying fluid flow, fractured mechanisms, and developing a new paleothermometer applicable to fractured and non-fractured sandstones.

In the San Joaquin basin, California, my petrographic observations indicate that the distribution of cement and porosity, within a Quaternary age thrust fault in the subsurface of the Wheeler Ridge oil field, is a function of depth, temperature, and varies spatially. Based on stable oxygen isotopes, I distinguish veins cemented by intraformational (lateral) flow into the fault from veins cemented by ascending fluids along the fault. My calculations suggest that ascending cementing fluids traveled at least 75 to 750 m vertically, agreeing with data generated by other studies.

In the Eocene Misoa Formation from the Maracaibo basin, Venezuela, I find four types of microveins. I believe that the first three types of microveins formed hydraulically by overpressures formed during burial. I solved quartz cementation kinetic algorithms coupled with unaxial strain equations and find that thermoelastic contraction, caused by uplift, erosion, and cooling of the formation is a feasible mechanism for the generation of the last veining event.

I develop a paleothermometer through empirically derived kinetic equations that estimates the extent of reaction for albitization of plagioclase as a function of time, temperature, and grain surface area from 0 to 200°C. My results indicate that albitization in many basins fits an apparent activation energy of 70±2 kJ and frequency factor of 2.2 ± 0.5 E-7 mol/cm^{2}s. The rate dependence on temperature is consistent with experimental values for albite crystal growth and with empirically derived precipitation rates of other diagenetic silicates such as illite and quartz. The parameters and fit suggest that albitization can be modeled as a surface controlled reaction, primarily dependent on temperature.

Robert Decesari
Ph.D. Program, Bruce Luyendyk, advisor
Robert Decesari participated in a marine geology and geophysical investigation in the eastern Ross Sea, Antarctica. This included sites surveys for drilling from the Ross Ice Shelf into the seafloor beneath it. The survey will include long profiles and detailed grids over potential drill sites. Also observations of present day sedimentary processes beneath the ice shelf in newly exposed areas. The research team prepared for drilling from the Ross Ice Shelf that will answer questions about the evolution of the East and West Antarctic ice sheets, Antarctic climate, global sea level, and tectonic history of the West Antarctic rift system.

Karen Blair
Ph.D. Program, Phillip Gans, advisor
I have gotten involved with the study of sedimentary basins related to Basin and Range extensional tectonics. One project I have been working on involves early Tertiary sedimentary and volcanic units in the northern White Pine Range, east-central Nevada. Some of the questions I am grappling with are: What did the landscape of the central Great Basin look like before it was broken and stretched by extensional tectonics? Was there a large plateau sitting high on the shortened crust of the Sevier hinterland? Were there lakes in fault-bounded basins? How did sedimentation change as volcanic activity increased and what did that do to the paleogeography? My thesis field area is the Sahuaripa River valley, eastern Sonora, Mexico. The non-marine conglomerates, sandstones, siltstones, and interbedded volcanic units have all been lumped under one formation name: the Bacaurit. My first field season will be during the winter of 2002 when I will spend about 6 weeks in Sonora studying the faults, sediments, and their lateral changes. The structures shaping and dividing this basin and their relationship to the sedimentary units will help me determine the temporal and structural evolution of the basin as it relates to the eastern edge of the Gulf of California rift margin.

Karen Blair has received a UC MEXUS Dissertation Grant. Her project proposes to expand the study of mid-Tertiary extensional basins in east central Sonora, Mexico. The detailed structural and lithologic mapping, stratigraphic, sedimentologic and 40Ar/39Ar geochronologic analysis of the sedimentary and volcanic sequences as well as the Mesozoic basement in the Sahuaripa area will provide data with which to reconstruct the local geologic history as well as comparison of seemingly similar adjacent basins such as the Rio Yaqui basin.

Martin Wong
Ph.D. Program, Phillip Gans, advisor
Martin Wong has received a UC MEXUS Dissertation Grant to study the Sierra Mazatan metamorphic core complex in Sonora, Mexico. Sonora is part of an area that has undergone Neogene crustal extension that progressed to continental rifting in the Gulf of California. The Gulf of California region is an ideal natural laboratory in which to study continental extension and rifting processes because extension and rifting occurred fairly recently, preserving extension/rift-related structures and deposits. The goals of this project are to determine the precise timing and magnitude of large-magnitude extensional deformation in the Sierra Mazatan metamorphic core complex, located in the Sonoran part of the rifted margin. These data will provide important insights on the extensional history that lead up to rifting in the Gulf region.

Kris Broderick
MS Program, Bruce Luyendyk, advisor
I'm working on structural and tectonic models in Santa Monica Bay, the northernmost component of the offshore California Continental Borderland. Central to this research is the identification of kinematic relations between major NNW-trending dextral faults and E-W trending sinistral and reverse faults. Is right-lateral slip transferred by folding in the hanging wall of blind faults? Can vertical-axis block rotations accommodate space problems in tectonic restorations? Are the Santa Monica Mountains actively folding, and if so, along which structure(s)? All these and more form the underlying questions in offshore California. Research focuses on shelf-slope deformation in Santa Monica Bay, CA. He is using seismic reflection and

well data to create 3D models of faults and folds in this portion of the inner Continental Borderland. Newly mapped blind thrust faults, and their kinematic relations to known strike-slip faults, may have significant implications for seismic hazard analyses in southern California.

Kenichi Tsuda
Ph.D. Program, Ralph Archuleta, advisor
Kenichi Tsuda is analyzing ground motion data from the Yokohama city high-density accelerometer network. This network of 150 surface accelerometers and 9 borehole accelerometers is the most concentrated set of ground motion recorders in a small area, ~20 km x 20 km. He is determining the site response and source parameters for 30 events that have been recorded across the network. His objective is to determine the spatial variation of ground motion and its relation to physical parameters such as depth of basin, distance to basin edge, local shear wave velocity in the upper 20 m, etc. These results are applicable to other areas, in particular the Pacific Northwest, which has a similar geological and tectonic environment.

Shou Ma
Ph.D. Program, Ralph Archuleta, advisor
Shuo Ma has been developing 3D finite element codes to simulate an earthquake dynamic rupture. Using dynamic rupture models for different faulting mechanisms he has found that the model results for radiated energy are not in agreement with teleseismic observations. While one would naturally defer to observations versus models, the observations are the product of many assumptions including simplified models of the earthquake source. Ma has also been building a hybrid model for wave propagation that merges finite element and 4th order staggered grid finite difference. This approach will allow maximum flexibility for modeling the earthquake source using finite elements while taking advantage of the efficiency of the finite difference scheme for propagating elastic waves in the bulk of the medium.

Beth Pratt-Situala
Ph.D. Program, Doug Burbank, advisor
Beth Pratt-Situala, working with Dr. Burbank, is using cosmogenic nuclide exposure-age dating to reconstruct the record of river incision in the central Himalaya. She has discovered that, despite the sustained bedrock incision by rivers over the past 100,000 years, there are major pulses of sedimentation that inundate the river valleys with sediment and create massive river terraces. These gradational episodes appear to be driven by increases in the strength of the Asian monsoon.

7,800-Mile Field Trip

Nepal's Annapurna mountain range in the Himalayas was then-junior Michelle Garde's research lab for eight weeks in spring 2002. Garde (left, in back) was field assistant to Beth Pratt-Situala (left, front), a graduate student working under the supervision of Douglas Burbank, geology professor and director of the Institute for Crustal Studies. Burbank is leading an eight-university team studying interactions between climate, erosion, and mountain building in the world's highest mountains.

Nepalese village in the vicinity of field research site. Graduate student researcher Beth Pratt-Situala is taking a picture of a young boy with the digital camera. He was delighted to see himself.

Colin Amos
Ph.D. Program, Doug Burbank, advisor
My research interests focus on the structural and geomorphic expression of deformation in the earth's upper crust and the interactions between tectonic and surface processes in controlling the form and evolution of actively deforming mountain belts. Specifically, I am interested in understanding the distribution and accommodation of deformation in collisional orogens as well as the interplay between tectonics, erosion, and climate in landscape evolution. As such, current research with Doug Burbank focuses on the structural and geomorphic development of the Ostler fault zone in the Southern Alps of New Zealand. There, well-preserved glacial outwash surfaces and nested suites of fluvial terraces track and record progressive deformation in a zone of active thrusting related to the ongoing oblique collision of the Pacific and Australian plates. By combining detailed field mapping, differential GPS surveying, and analysis of digital elevation data with age dating of deformed geomorphic features, we hope to understand both the distribution and variability in deformational style as well as the rates and timing of active shortening across the fault zone. Additional areas of investigation include fluvial interactions with active deformation and the influence of pre-existing structure and Quaternary climate change in the topographic and physiographic development of the modern Southern Alps.

William Amidon
MS Program, Doug Burbank, advisor
I am currently working on a project in the central Nepal Himalaya using the distribution of U-Pb zircon ages in river sand as a sediment-mixing tracer. Basically, erosion of different lithologies introduces unique populations of U-Pb ages into the fluvial system which then act as both a provenance fingerprint and a tracer of sediment mixing. By understanding the relative amounts of sediment derived from different regions of the Himalaya, relative erosion rates can be calculated. I would like to apply this technique to determining relative erosion rates above and below the Main Central Thrust to assess the importance of tectonic uplift versus climate in determining erosion rates. This is one of the fundamental questions in tectonic geomorphology and has important impacts for the long-term evolution of mountain belt morphologies and the concept of "steady state" mountain belts.

Thomas Carpenter
MS Program, Jim Boles, advisor
The past quarter I have been involved in the construction of oil seep monitoring devices with Ira Leifer over at the Ocean Engineering Laboratory (off campus). These devices are to be deployed off Coal Oil Point when underwater visibility improves in the spring. I have been preparing to join Bruce Luyendyk next quarter on a geophysical survey of the Ross Sea floor off the coast of Antarctica. I am also working with Jim Boles on a fluid movement and diagenesis project in the Santa Ynez Mountains.

Tonya Del Sontro
GPMS (Interdepartmental Graduate Program in Marine Science), Bruce Luyendyk, advisor
I am a first year Masters student in the Marine Science Program, but based in the Geology Department. My thesis, although not fully formed, will involve the hydrocarbon marine seeps found off the coast of California, specifically in the Santa Barbara Channel. These natural

phenomena is the cause of tar balls found on the southern California beaches, as well as oil slicks on the ocean surface and an increase of methane gas concentration in the air.

Marlene Duffy
MS Program, Ed Keller, advisor
I study hydrocarbon seeps in the Upper Ojai Valley, CA. These are similar to the La Brea Tar Pits except that here there are layers of hydrocarbons as opposed to La Brea where everything is mixed together. More specifically, I am working on quantifying emissions of both liquid and gaseous hydrocarbons in this location and from a geomorphology point of view I am interested in identifying the various forms the hydrocarbons take to create a unique landscape.

Mason Dykstra
Ph.D. Program, Cathy Busby, advisor
I am working on an Upper Cretaceous, deep marine (mid- to lower-slope) channel-levee complex (a complex consisting of channel deposits flanked laterally by levee deposits) built within and out of a submarine canyon.

RESEARCH EXPERIENCE FOR UNDERGRADUATES

Twenty-two undergraduate students are involved in research administered through ICS.
Five undergraduate students are involved in administrative work through ICS.

Catherine Schindler worked for the Portable Broadband Instrument and the Santa Barbara Array, which has nine operational stations throughout the city of Santa Barbara. She also deployed portable analog recorders and power supplies for the recorders in San Luis Obispo County for the San Simeon Earthquake in December 2003.

The Institute administered three National Science Foundation sponsored Research Experiences for Undergraduates (REU). Research Experiences for Undergraduates grants fund travel costs and stipends for undergraduates while engaged in research:

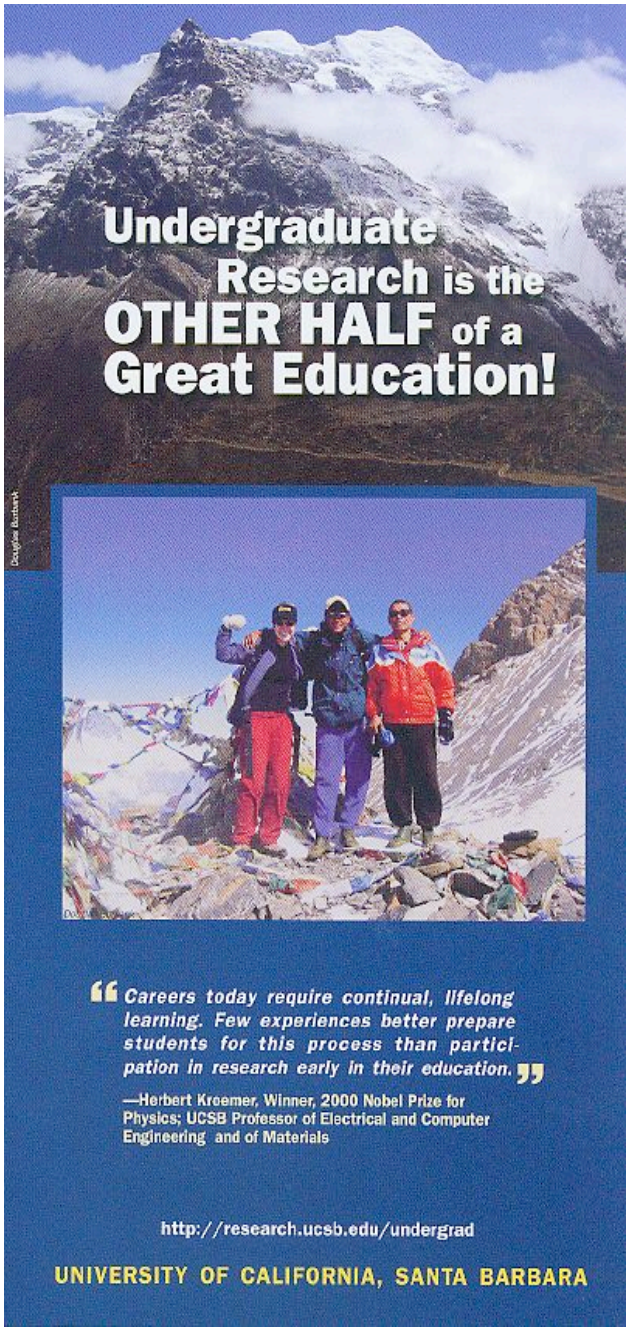
- Professor Burbank secured an REU research project on Scaling and Displacement for Thrust Fault in New Zealand. Undergraduates will assist Professor Burbank and Graduate Student Researcher Colin Amos with field research in the Southern Alps of New Zealand. Study changes in fault scarp morphology along a thrust front and use a differential GPS survey tool to make detailed 3-D images of the fault.

- Karen Vasko participated in Professor's Burbank's research project on Geomorphic-Geodynamic Coupling at the Orogen Scale: A Himalayan Transect in Central Nepal. She assisted Graduate Student Researcher Beth Pratt-Situala for eight weeks with stratigraphic analysis, glacial geologic mapping, and cosmogenic radionuclide sample collection as well as how to operate a laser range finder, hand-held GPS, and inclinometer. During the last few weeks she developed a stratigraphic study of her own giving her the opportunity to apply her sedimentary and geomorphic knowledge to determine the genesis of the deposits and whether they display the same climate forcing mechanism found other regions.

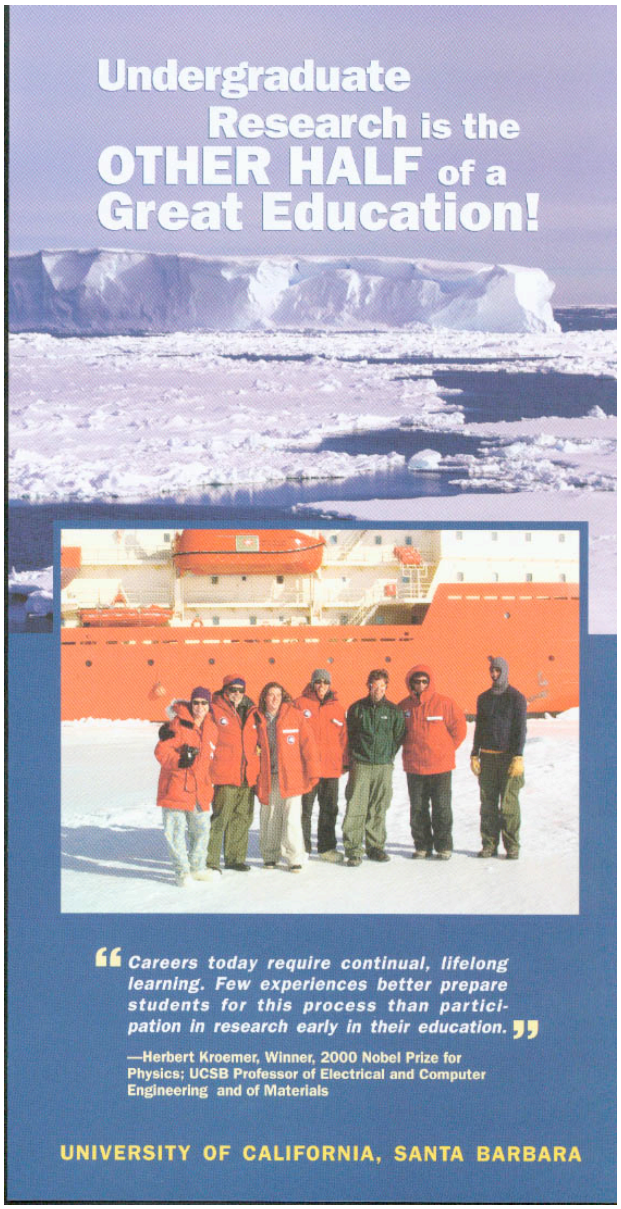
- Professor Luyendyk secured an REU for six undergraduates to gain experience with a marine geology and geophysical investigation in the eastern Ross Sea. This undergraduate research experience takes place in Antarctica aboard the RVIB Nathaniel Palmer, the cruise will last for twenty eight days and Professor Luyendyk's team will attempt to acquire single-channel and multi channel seismic, piston cores, multibeam and deep towed chirp sonar and side scan sonar.

For the third year in a row the research projects administered at the Institute have been featured by the Office of Research publication on undergraduate research opportunities. This year's Office of Research Publication of Undergraduate Research featured professor Burbank's student in Nepal.

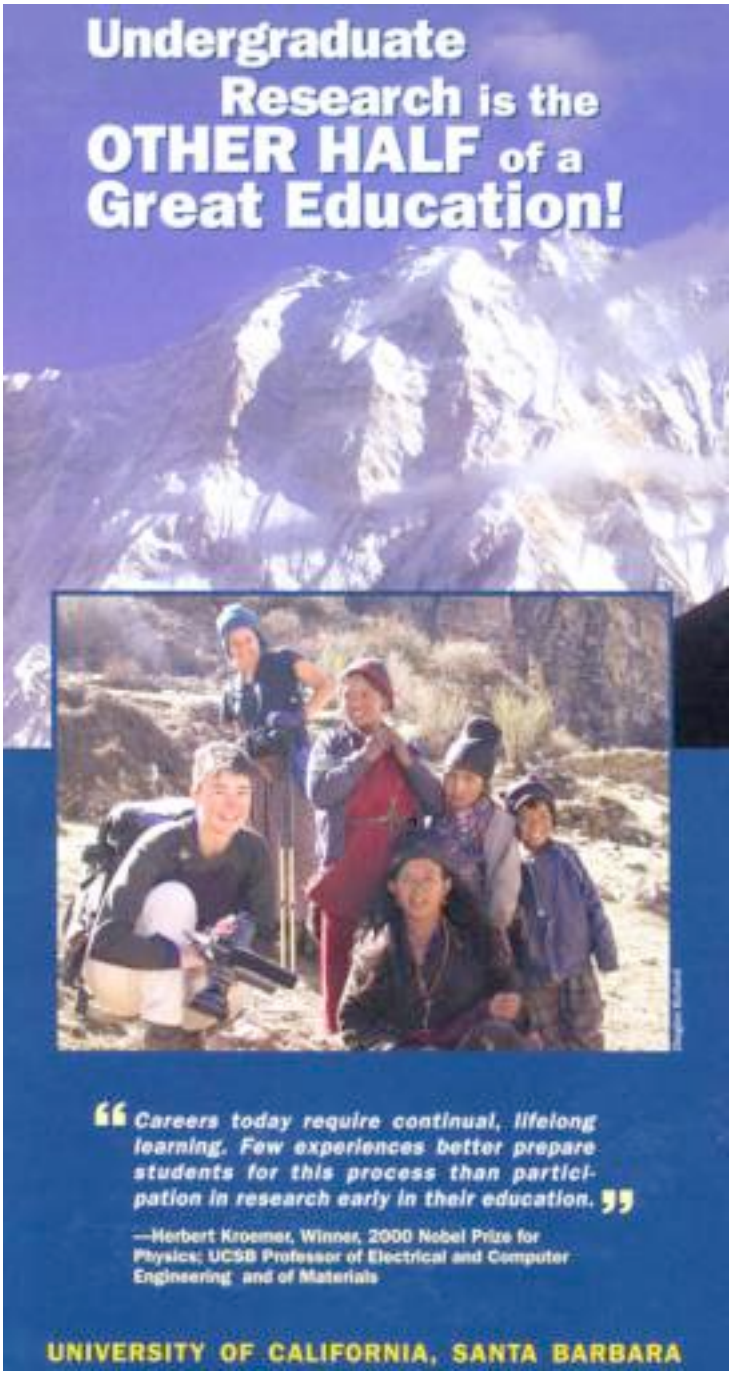
SCEC Interns:
The SCEC intern we had this summer was Jack Tung, a geology student from Cal State Los Angeles. He worked on processing of the San Simeon earthquake aftershock data collected using the SCEC portable instruments and also assisted with a field experiment at the Garner Valley site.



Cover: Awesome research Monsoon-drenched Himalayan gorges and wind-swept alpine desert on Tibet's southern plateau were natural laboratories for undergraduate Karen Vasko in spring 2004. The senior's research project documented effects of the previous year's catastrophic flood, which displaced boulders more than 15 feet in diameter. Vasko also was field assistant to Beth Pratt, \a graduate student mentored by UCSB geology professor Douglas Burbank, director of the Institute for Crustal Studies. Burbank leads an eight-university team studying interactions between climate, erosion, and mountain building in the world's highest mountains. As Vasko helped install devices to monitor river flow, sediment loads, snow melt, and air temperature, she went from tropical rivers to glaciers at 18,000 feet. (Inset: Karen Vasko and two Nepalese assistants reach an alpine pass festooned with prayer flags.)



Cover: Extreme Research Very cool by any measure, a four-week expedition to Antarctica gave five undergrads, two graduate students and their faculty mentor a chance to explore new areas of the ocean floor in the minus 15-degree Antarctic summer of January 2003. Prepping for National Science Foundation-supported research in the coldest, windiest, highest, driest continent on earth included medical exams, full dental tune-ups, and a mandatory geophysics course. Led by Bruce Luyendyk, professor of Geological sciences and principal investigator in UCSB's Institute for Crustal Studies, the research team prepared for drilling from the Ross Ice Shelf that will answer questions about the evolution of the East and West Antarctic ice sheets, Antarctic climate, global sea level, and tectonic history of the West Antarctic rift system.



Cover photo: ***7,8000-Mile Field Trip*** Nepal's Annapurna mountain range in the Himalayas was junior Michelle Garde's research lab for eight weeks in spring 2002. Garde (left, in back) was field assistant to Beth Pratt (left, foreground), graduate student working under the supervision of Douglas Burbank, geology professor and director of the Institute for Crustal Studies. Burbank is leading an eight-university team studying inter actions between climate, erosion, and mountain building in the world's highest mountains. Garde also did her own research, which produced "valuable information on the history of a colossal, 5000-year-old landslide and rates of erosion in this mountainous region," according to Burbank. (The family in this photo was herding sheep near Tibet where the researchers were camping.)

PUBLIC SERVICE ACTIVITIES

The Press

UCSB Geologists tracking aftershocks, *Santa Barbara News Press, December 23, 2003*.

Oneworld School Project was featured this month in <***http://www.geotimes.org/current/printTOC.html***>*Geotimes*, a geology news magazine. You can check out the preprint for the article at:
http://www.oneworldschoolproject.org/Nov04Education_Geotimes.pdf

Possible P/T impact crater
<http:www.geotimes.org/july04/NN_Ptimpact.html> *Geotimes*, a geology news magazine.

Schools

Outreach Listing:

http://beckerantarctica.crustal.ucsb.edu/educators_students.html
Especially for Educators and Students
Meteorite Mysteries, The Search for Space Rocks
Luann Becker, an Antarctic scientist, will team up via satellite phones with NASA's Digital Learning Network (DLN) team of experts to share her search for a piece of space in the blue and white world of Antarctica! Selected schools from across the country will have the opportunity to participate in a highly interactive experience with astronauts and scientists as they search for meteorites, learn to work as a team in extreme environments, and help to answer questions about life on other planets!

Wednesday, December 10, 2003
Friday, December 19, 2003
12:30 to 1:20 Central Time
Ask The Scientist
Preactivities and Lessons

The Academic Outreach Office in the College of Letters and Science Educational Resources Catalog for K-12 Schools.
Title: Earthquake Presentation
Presenter: Variable/ Institute for Crustal Studies (ICS)
Description: Institute for Crustal Studies researchers will give presentations on earthquakes to schools in the local area. Depending on the class size, presentations can be made in the classroom or at UCSB. Students will learn about different types of earthquakes and will have the opportunity to record their own earthquake. A limited number of presentations are available each year. Scheduling: For more information or to schedule a presentation, contact Giulia Brofferio, ICS, 893-8281, giulia@crustal.ucsb.edu. Intended Grade Level: All

The Institute has an outreach website. http://www.crustal.ucsb.edu/ics/outreach/

The quiz found at, http://www.crustal.ucsb.edu/ics/outreach/understanding/quiz/, has received 167,000 hits by 36,008 different users from January 2003 to September 2003.

Geology Graduate Student Researcher Beth Pratt-Situala has organized Nepali-California school exchange. Along with her geological PhD research in Nepal, ICS graduate student, Beth Pratt-Situala, has been promoting an exchange between three 6th grade classes in Goleta and 3 schools in Nepal. Prior to leaving for a fall 2002 field season, she visited each Goleta school twice to give slide shows and talks about Nepali geology and culture. The Goleta students and teachers wrote letters to the Nepali students and donated books and art supplies. Maplink (a Goleta-based map warehouse) donated >$300 worth of map seconds. In Nepal she and Doug Burbank visited three schools in the Project field area, delivered the letters and supplies, and talked to the students and teachers. The reception was overwhelmingly friendly. The schools there have very few teaching supplies so all was appreciated. The teachers seemed especially interested in acquiring more science supplies. The Nepali students wrote back to the California students.

Upon return to California, Beth delivered the letters to the Goleta schools and talked more about the science and culture of Nepal. The Goleta students have written a second set of letters for delivery to Nepal during Willy Amidon's spring 2003 field season. This outreach effort has evolved into One World School Project.

Oneworld School Project passed its first anniversary, officially incorporated on October 28, 2003. Many of you last heard from us during the March Fundraising Drive. It was very successful! You helped us raise $4000, which goes a long way in Nepal.

In fact, it went further than we imagined. Not only were we able to supply all the basic science materials that the two schools had asked for, but we had money left over to build cabinets to hold the equipment and to buy furniture for a small-dedicated science lab in the Khudi village school. The next phase will be to actually help the communities build proper large laboratory rooms that can hold an entire class of children. The equipment which both schools now have includes: microscopes, slide sets, hand lenses, dozens of biology charts/models, thermometers, barometer, lenses, prisms, magnets, compasses, pulleys, balances, voltmeter, dynamo, standard acids/bases, standard chemistry glassware, pH paper, science books, and world maps.

The letters have continued to go back and forth between the Nepali and American students. The latest packet just arrived with a returning geologist and couple days ago. Students on both sides of the Pacific have taken disposable cameras home to make visual-diaries of their regular lives. to send their pen pals.

Oneworld School Project was featured this month in <***http://www.geotimes.org/current/printTOC.html***>*Geotimes*, a geology news magazine. You can check out the preprint for the article at:
http://www.oneworldschoolproject.org/Nov04Education_Geotimes.pdf

Check out our newly revamped webpage at:
www.OneworldSchoolProject.org

Oneworld School Project received tax-exempt status from both the IRS and the State of California, and everyone who donated will be receiving receipts before tax time rolls around.

Thanks to everyone

We will keep you updated when we undertake another fundraiser.

ICS Geo-Toys at the Museum of Natural History

Saturday October 11, 2003, the EMVC, used the ICS quake crank, fault block model, slinkiest, and the foam fold model at the "Museum Rocks" Fair during Earth Science Week at the Santa Barbara Museum of Natural History. Our purpose at the fair was give young kids and their parents' easy-to-grasp geological concepts using simple animations, puzzles, toys, and other visually oriented media. The ICS toys helped us immensely in this prospect. Participating in this event was Tanya Atwater, Tim Tierney, Carrie Glavich, Barry Graham, and Beth Pratt-Situala. During the 3-hour event, it is estimated that at least 50-100 parents and children observed and played with these geo-toys while visiting our booth. The public gave the most attention to the quake crank toy, despite the fact that other booths had similar models. The fault block model, though not getting as much hands on attention by the public, was used by us much more often to visually get specific points across. The foam fold model was used similarly. The slinkies received less attention but was still used somewhat by the children. Altogether, the ICS toys were a success and contributed greatly to the overall success of the EMVC booth at the fair.

Ellwood School Science Night

Goleta Ellwood Elementary School Science night utilized ICS and Geological Sciences Department outreach material. The sixth grade class manned each toy and explained its function and the science behind it to parents and fellow students.