

# down to earth

Department of Geology and Geophysics, University of Utah

Fall 2000

## Message from the Chair...

We're back! This edition of Down to Earth marks the rebirth of the old GG News Letter – the official 'rag' of the Department of Geology and Geophysics. The newsletter is published to keep you, our students, staff, faculty, alumni and other friends, advised of the many exciting developments within the department. Tiffani Copyak is our official reporter this year. Her appointment marks a new era for news gathering and reporting in the department. We are going to be pleasantly aggressive in getting the word out, so don't be surprised if Tiffani tracks you down for 'the story'! We will publish two editions a year, so please contact Tiffani or my office if you have news of interest. We would especially like to hear from our alumni.

This marks the second year of my term as Department Chair. There are many new developments to report – many more than can be covered in one newsletter. A few examples include the rapid growth of Geological Engineering, the recent field trip to New Zealand, our student internship program, and the acquisition of an imaging spectrometer that belongs in a Star Trek script. The Dean continues to work on support for our new building. He has obtained \$10 M, half-way towards the final construction cost! I also want to acknowledge the generosity of those individual and corporate donors who provide support for our students and department. These folks provide student scholarships and fellowships, and also allow us to expand our academic programs through field trips and other endeavors!

Read on – Tiffani has prepared a number of articles that provide you with just a sample of what's going on in the department. If you want to know more – please drop by or contact my office.

Ron Bruhn, Chair

University of Utah  
Department of Geology and Geophysics  
135 South 1460 East Room 717  
Salt Lake City, UT 84112

phone: (801) 581-7162  
<http://www.mines.utah.edu/geo>  
email: [gg\\_chair@mines.utah.edu](mailto:gg_chair@mines.utah.edu)

## Editor's Note...

The fall semester Geology and Geophysics Department Newsletter has provided me with the chance to understand the depth of our department. Our department is continually striving to better the world through education and research. As students, we should not become so involved passing on through to our final destination, wherever that may be, without appreciating the journey. The newsletter is a great way to acknowledge our progress and experiences here at the University of Utah.

The spring semester newsletter is already underway. My goal is to share my appreciation of this incredible department with each of you. I can only be successful with your help in communicating all the great strengths of the department. I hope to hear from you all soon.

Tiffani Copyak  
Newsletter Editor

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## Development

Endowment and other funds provided by alumni and friends continue to grow, and are fundamental to ensuring a dynamic future for the department. This year these funds have allowed us to provide a scholarship for each of our undergraduate students with a GPA of 3.0 and better, supported a number of our graduate students, and provided funding for field trips and research opportunities. A number of new funds have been established over the last several years, including the Orlo Childs Field Trip Fund, the Norma Eardley Program for Women in Geology and Geophysics, the Matt Mikulich Geophysics Scholarship, the William P. Nash Geochemical Instrumentation Fund, and others.

The purpose of this column is to introduce you to some of the people who have made such support for our students and programs possible. This time we discuss the newest endowment fund, which will provide continuing support for the Distinguished Lecture Series.

### Guy F. Atkinson Distinguished Lecture Series

The Myrtle L. Atkinson Foundation established a new endowment fund to support the department's weekly lecture series. Income from the fund will help pay for the travel expenses of visiting lecturers, whose experiences and ideas will further enrich the academic environment of the department. The fund was established in the name of Guy



F. Atkinson (1875-1968), the founder and chairman of the Guy F. Atkinson Co., and grandfather of one of our alumni.

Mr. Atkinson's career spanned the grand era of construction in the U.S. One of his first projects was construction of buildings at Fort Douglas above the University of Utah campus. The list of company projects is impressive indeed! Notable dams and hydroelectric projects include Grand Coulee, Dalles, McNary and Bonneville Dams in the U.S., Mica Dam in Canada, Mangla Dam in Pakistan and Macagua Dam in Venezuela. Mining facilities include the Newmont Gold Facility in Carlin, Nevada, and geothermal facilities include the Coso Geothermal Plant, China Lake California. Significant bridges include the Verrazzano Bridge across Narragansett Bay, the Dumbarton

Bridge across the San Francisco Bay, and the Talmadge Memorial Bridge, Savannah, Georgia. Major underground transit facilities include those in Seattle, Los Angeles and New York. Noteworthy buildings include the Lincoln Center, U.N. Headquarters, Yankee stadium and the Oakland Coliseum.

## Faculty Notes

### Erich U. Petersen Co-leads Short Course: Field Mapping in Porphyry Copper Systems

*By Erich Petersen*

Drs. Erich Petersen, William X. Chavez, Jr. (NMT) and David Braxton (Utah, MS 97) lead a three-day Society of Economic Geologists (SEG)-sponsored Field Mapping Course in Porphyry Systems in Arequipa, Peru. The course was conducted in the Cerro Verde and Santa Rosa open pit mines just 30 Km south of Arequipa, Peru's second largest city. Geologists representing five Latin American countries and six companies participated. Two students from San Agustin University (Arequipa) also participated. The course covered all aspects of mapping. On Day 1 we had an overview of the geology and pit tour in the morning. In the afternoon we began mapping structures along the south wall of the Cerro Verde Pit. On the second day we concentrated on lithology. The afternoon was devoted to leached cap interpretation. On the last day we concentrated on characterization of the economic mineralization and more leached cap interpretation. A visit to the famous breccias on Cerro Negro capped the course. The course was a tremendous success and will serve as a model for similar outreach courses by SEG in the future. A photo essay can be found on the web at: <http://www.mines.utah.edu/pyrite/mappingcourse>.

### Geodynamics of the Yellowstone Hotspot

*By Bob Smith*

Bob Smith and colleague Gene Humphreys, Oregon University, have been awarded a 3-year, \$960,000 collaborative grant for their research on the Yellowstone hotspot by the NSF Continental Dynamics Program. At the University of Utah, the research will be done in the Earthquake and Active Tectonics research group and will support seismic and GPS field experiments, new equipment and computers, student support, computer modeling, etc.

The goals of the project are to understand the postulated plume-plate interaction process and how it effects seismicity, topography faulting and volcanism. The project will also provide information on the relationship between the earthquakes and intraplate deformation of the Intermountain region and how the northwestern U. S. fits into the dynamics of North American plate deformation.

The field projects are centered at the seismically and volcanically active Yellowstone volcanic field. The effects of the hotspot are hypothesized to extend up to 300 km away from it including the eastern Snake River Plain and the surrounding faults of the Intermountain Seismic Belt. They will compliment the seismic and GPS monitoring of Yellowstone by the University of Utah supported by the USGS Volcano Hazards Program.

GPS - GPS observations of the Yellowstone hotspot include installation of a 13-permanent station network and a 160-station field campaign. The GPS field campaign was completed September 2000. These measurements will help resolve the vertical and horizontal deformation field of the greater Yellowstone area and the relation to deformation of the entire western U.S. and to the plate boundary processes of this region. Dynamic and kinematic modeling, constrained by both GPS and seismic data will be supplemented by Quaternary fault slip data, regional seismicity, stress, volcanic history, topography, etc. to obtain a realistic model of the plume-plate interaction and its effect on surface geology. Christine Puskas, a graduate student, is working on this aspect of the project.

Seismic - Seismic imaging and earthquake recording will be done using an 82-station seismic array surrounding Yellowstone, installed fall '99 and summer '00. It will operate until Spring '01. In addition data from 6 regional seismic networks (Yellowstone, Montana, Snake River Plain, Tetons, and Utah) are being recorded in real-time in the UUSS lab on a new seismic recording system called Antelope. These measurements will define the geometry of the mantle plume beneath the lithosphere and the magmatically modified crust using seismic tomography. The real-time seismic data are archived and disseminated to users via the Internet from the IRIS Data Management facility. Graduate student Greg Waite will work on this aspect of the project.

Summer 2000 Field Project: University of Utah folks participated in the summer 2000 GPS, portable seismic and Yellowstone seismograph network included: Christine Puskas, Jill Krukoski, Greg Waite, WuLung Chang, Adam Hoyt, Dave Drobeck, Chuck Meertens and Bob Smith. Professor Ron Harris of BYU joined the experiment and contributed his own GPS receivers and a team of six BYU undergraduate students. Other collaborators include Ken Dueker and Tony Lowry Colorado University; Paul Tackley, UCLA; Suzette Payne, Idaho National Engineering and Environmental Laboratory; Neil Ribe, Univ. of Paris; Mike Perkins, University of Utah; Bob Christiansen, USGS; and Anita Grunder, Oregon State Univ.

Database and GIS - All the digital data pertinent to the project such as maps of faults and their slip rates, earthquakes, high resolution topography, volcanic history, etc. along with the results from the GPS and seismic field projects will be compiled in a GIS data base. From this user interface, data will be readily available for numerical modeling. Jill Krukoski, also a graduate student, will assist with this part of the project.

Modeling and Interpretation - After all the data are developed, geodynamic and kinematic modeling of the system will be done to simulate plume-plate deformation and magmatic processes. We plan to use new 3-D finite-element plastic-elastic, fault-stress interaction, stress fields from focal mechanisms of earthquakes, etc. Collaborators in volcanic processes, plume dynamics, regional tectonics, etc. will participate in the interpretation.

Outreach and Education - The project has an education component that will involve science workshops and a final workshop for college and high school science teachers and the press. The first science workshop was held at the University of Utah Spring 1999.

The Yellowstone hotspot project website (for detailed information, maps, schedules, etc.) can be viewed at: [www.mines.utah.edu/~ggcmpsem/UUSATRG/CD-Yel/ys-geodyn.html](http://www.mines.utah.edu/~ggcmpsem/UUSATRG/CD-Yel/ys-geodyn.html)

## Bioerosion in Spain

*By Tony Ekdale*

Dr. Tony Ekdale participated in the Third International Bioerosion Workshop in Barcelona, Spain, in late August. This research conference focused on the very special adaptations of many kinds of marine organisms (from bacteria to sponges to clams to parrot fish) that are capable of boring into coral and indurated rock. The conference was convened by Dr. Jordi Maria de Gibert, who was a recent post-doctoral researcher in our department for two years, along with some of his colleagues at the University of Barcelona. The meeting attracted paleontologists and marine biologists from all over the world. Dr. Ekdale, one of only two Americans in attendance, presented results of his research on the evolutionary innovations of bioeroding animals in Lower Ordovician hardgrounds in Utah and southern Scandinavia. Following the conclusion of the workshop, Dr. Ekdale and Dr. Gibert were able to do some field work on Cretaceous and Tertiary trace fossils in the central Pyrenees.

## Students in the Field

### New Zealand

*By Tony Ekdale*

During Spring Semester 2000, eleven GG graduate students initiated and designed a special topics course on the geology of New Zealand, called "Field Seminar in Earth Systems: New Zealand", which culminated in a two-week field trip to New Zealand after the end of the school year in May. The students included Julie Bernier, Scott Grasse, Matt Gregory, Holly Bennett, Becky Kessler, Jill Krukoski, Bob Lamond, Mark Loewen, Dave Marchetti, Ian Schofield and Jim Weigel. Dr. Tony Ekdale was the course instructor and field trip leader. Most of the cost of the field trip was subsidized by special funds from the Department of Geology and Geophysics, the College of Mines and Earth Sciences, and a generous private donor. The students themselves paid for the balance of their expenses.

The course was designed in a seminar format and was organized according to the field trip route. Each person in the class prepared an oral presentation and wrote a guidebook chapter on an interesting geologic locality in New Zealand, and then that person subsequently served as "trip leader for a day" during the field trip.

On New Zealand's North Island the class studied and visited the extensive Waitemata turbidite sequences north of Auckland (New Zealand's largest city), the extinct volcanoes of the Auckland area, the spectacular geothermal sites around Rotorua, Taupo and Wairaki, the active volcanoes of Tangariro National Park, and the neotectonic setting of Wellington (New Zealand's capital). Then the intrepid explorers took to the sea and crossed the stormy Cook Strait (a three-hour voyage on a large car ferry) to the South Island, where their first stops involved a few of New Zealand's famous Marlborough wineries.

On the South Island the group visited the well-exposed Cretaceous-Tertiary boundary at Chancet Rocks, the majestic Kaikoura coastline, the extinct volcanoes of Banks Peninsula, New Zealand's highest peaks in Mount Cook National Park, the idyllic Lake Wanaka nestled high in the Southern Alps, and the otherworldly rain forest of Haast Pass. From Haast the crew took to the air in small planes to explore Mount Aspiring (an awesome alpine glacial horn) and Milford Sound (a beautiful fjord carved deeply into remote mountainous terrane) from the vantagepoint of the eagles. Then the group proceeded up the wave-tossed west coast to Franz Josef and Fox Glaciers, the unusual Punakaiki "Pancake Rocks" and Cape Foulwind, and then headed through Buller Gorge and across Lewis Pass (stopping for a night to soak in the therapeutic hot springs) to Christchurch, which was the point of departure for home.

The field trip was a wonderful educational experience - both geologically and culturally - and everyone who participated in it left the enthralling "Land of the Kiwi" with fervent hopes of returning soon!

### Andes Transect Field Trip

*By Erich Petersen*

The SEG-CMES student chapter together with our co-chapters at New Mexico Tech and UT, Austin organized our sixth 13-day international academia-industry field trip this time to visit the ore deposits of Peru. The trip was led by Drs. Erich Petersen and William X. Chavez, Jr. Participating from Utah were Chris Martin, Thad and Kadee Roberts, Hector Suarez, and Ralf Hafen. Professional geologists from Canada, USA, Peru, Ecuador, Argentina, Brazil, Australia and Chile accompanied our group. These geologists from Noranda, Rio Tinto Zinc (RTZ), Western Mining, Inmet, and Phelps Dodge provided invaluable advice to those students that are headed for a career in the minerals industry.

Our goal was to visit continental and oceanic magmatic hydrothermal systems and sedimentary basin hydrothermal systems. Our central Peru transect took us to the zinc mines of San Vicente (MVT analogue), the polymetallic (Ag, Pb, Zn, Cu) deposits of Casapalca, the volcanogenic massive sulfide deposits of Perubar (sphalerite, barite) and Raul Condestable (chalcopyrite). We also visited the Oroya smelter now run by the Doe Run Company. It is one of the largest custom smelters in the world producing twenty products. The Central Peru transect took us to elevations over 16,000' from sea level in about 4 hours. In another four hours we descended from a glacial terrain to the upper tropical jungle.

In southern Peru we visited the porphyry copper deposits of Cerro Verde, Cuajone and Toquepala. The leached cap exposed at these deposits serve as exquisite examples of the effects of meteoric water systems acting on high sulfide host-rocks. Arequipa, Peru's second largest city, and site of our basing point for the southern transect has a desert climate and is located only 30 Km from the Cerro Verde deposit. The Misti volcano provides a dramatic backdrop.

A more extensive description of our trip will be published in the SEG Newsletter. You can visit our website at <http://www.mines.utah.edu/pyrite/peru2000>. Our trip next year will be to visit the ore deposits of Spain and Portugal. Sign-up early! Become an active member in the SEG Student Chapter.

## Graduate Students

### Department of Geology and Geophysics Uncovers Utah's First T. Rex and New Species of Horned Dinosaur

By Mark Loewen

This past summer saw a rejuvenation of the University of Utah's vertebrate paleontology field excavations. A field crew from the Department of Geology and Geophysics and the Utah Museum of Natural History excavated a large carnivorous dinosaur from the North Horn Formation of Central Utah. Scott Sampson, Assistant Professor in the Department of Geology and Geophysics, directed the dig and preliminarily attributed the bones to *Tyrannosaurus rex*. *Tyrannosaurus* was the only large carnivorous dinosaur living at the time the North Horn Formation (Late Cretaceous) was deposited.

The tyrannosaur site was discovered by GG lab technician Quintin Sahratian while working as field assistant for Rose Difley. Rose is a masters student working under the direction of Tony Ekdale on the trace fossils and biostratigraphy of the North Horn Formation. Since 1996, Rose worked periodically with the Utah Geological Survey and volunteers from Utah Friends of Paleontology to collect bones exposed on the surface. This summer saw the first quarrying operations at the site. Over 40 bones of the giant carnivore were carefully exposed, jacketed in burlap and plaster and removed from the quarry. Unfortunately, the specimen was not as complete as hoped, with only about 12% of the total skeleton represented. Nonetheless, it is a significant find and volunteers at the museum are presently preparing the bones.

The field crew also worked in the newly created Grand Staircase Escalante National Monument in Southern Utah. Among the most exciting discoveries were several specimens of horned dinosaur (i.e., close relatives of *Triceratops*), likely representing at least two new species. One particularly interesting site, found on a remote desert butte and fittingly named Death Ridge, produced a great diversity of fossils including: a partial skull frill of a horned dinosaur, large bony plates from the skin of a giant crocodile, and a partial skeleton of a duck billed dinosaur. Another site produced bones from yet another horned dinosaur including a beautifully preserved eye socket topped with an impressive 8-inch long horn.

Field operations lasted from late May until the day before school began in August. Mike Getty, paleontology collections manager at the museum, ran the field operations with the help of graduate students Mark Loewen and Bucky Gates. Undergraduate students Thad Roberts and Eric Lund also participated in the dig, as well as numerous

museum volunteers. Bob Lamond and Rose Difley assessed the site for trace fossils, but neglected to stop by the camp for refreshments.

Aside from back breaking labor in the desert heat, the field experience had highlights such as nightly campfires when everyone else had a fire ban (it's all in who you know), daily swimming in Joe's Valley Reservoir, and gourmet meals prepared by the field crew for the volunteers. All in all, it was an extremely productive summer, and anticipation is high for next season.

### The Amazing Flying Paleontologists

By Bob Lamond

Two paleontology graduate students recently had an opportunity to view the geology of Utah from a slightly higher perspective than normal, thanks to a pair of east coast dinosaur buffs. For his 10<sup>th</sup> birthday present, Elizabeth Moore and her son William flew all the way from Massachusetts to learn about dinosaurs. Following an e-mail enquiry to the department, Mark Loewen and Bob Lamond volunteered to lead a tour of Utah paleontology on the 1<sup>st</sup> and 2<sup>nd</sup> of September. After one full afternoon exploring the Museum of Natural History at the University of Utah, the group was in the mood to visit some outcrops and an actual dinosaur quarry. Much to Mark and Bob's surprise, Mrs. Moore had rented a helicopter for the day, and the foursome flew off to visit Dinosaur National Monument, near Vernal, Utah. Following an afternoon there, the group returned to Park City, viewing the gorgeous scenery of northern Utah along the way. Highlights included a flyby of Mount Timpanogos, flights through Provo and Little Cottonwood canyons, and an overflight of the Bingham copper mine.

The Moores flew back east the following day, having experienced a small taste of Utah geology and paleontology, and leaving two graduate students with 'lofty' memories of the state. Who said paleontology doesn't pay?

### I Dreamed of (trace fossils in) Africa

By Bob Lamond

This past summer three geologists conducted summer fieldwork in the remote, harsh climate of northern Kenya. Professor Frank Brown accompanied students Patrick Gathogo and myself, Bob Lamond to the western shores of Lake Turkana. This area is best known for its fantastic hominid and land mammal bearing sediments. The rocks range in age from 4 million to 1 million years old, and so provide a picture of this area of Kenya when proto-humans were first evolving.

## Undergraduates & Research

Patrick Gathogo is from Kenya, and has worked in the Turkana Basin for the last few years helping Meave Leakey with the geology of her finds. This year, Patrick was conducting an independent mapping project on the west side of the lake. This project will serve as the field camp component for his undergraduate degree at the University of Utah.

I was on the expedition in order to examine the trace fossils preserved in the basin. Because of the fame of the larger animals, invertebrate fossils and their traces have largely been ignored even though they can be very useful in interpreting past climates and environments. The data collected on this trip will be used to write my Master's degree thesis.

Dr. Frank Brown has been returning to Lake Turkana on and off for the past thirty years. This year he successfully balanced the roles of researcher, tour-guide, mechanic and water hauler depending on the needs of the day. He introduced us to many locations rarely seen by geologists, and managed the day to day logistics of our remote camp.

Northern Kenya is experiencing very harsh conditions, with a severe drought and localized banditry creating hardship for the local Turkana people. Luckily for us, apart from near heat stroke, a falling tree branch on one of our field assistants, and a few run-ins with scorpions, spiders and the odd crocodile, there were no serious hazards encountered. Our field vehicle was straight out of the movie "The Gods Must Be Crazy!" and it kept us in suspense every day as to what the new problem would be!

We spent three weeks gathering data on the west side of the lake. Following this, we were flown over to the east side to join up with the Leakey expedition and Ben Passey, another University of Utah undergraduate student, and tour some of the geology there. There, we saw gorgeous outcrops, rife with the pristine bones of large mammals, all just waiting to be brushed off and shipped out. There is a reason that so many workers have traveled so far to study this area!

Unfortunately, all good things must end, and we left the field to return home. Six weeks went by all too fast and now, looking back at the slides and writing this article, it all seems like a dream.

### Timber Lakes Landslides

*By Tiffani Copyak*

Dan Neuffer has been busy mapping landslides in the Timber Lakes Development near Heber City Utah. With the use of aerial photos, topographic maps, and field observations the landslide deposits, landslide scarps, bedrock contacts and groundwater features are studied. The unconsolidated glacial till of the Keatley Volcanics and possibly the underlying formations are the host of the landslides. After the preliminary mapping is complete, Dan will use geotechnical programs to model and determine the stability of the landslides. Dr Ron Bruhn is advising the undergraduate research, but Dan is also working with Barry Solomon, Mike Hylland, and Frank Ashland from the Utah Geological Survey and Tony Kohler from the Wasatch County Planning office. Dan's research is funded by Wasatch County and the Timber Lakes Property Owners Association.

When Dan isn't in class or in the Timber Lakes Development, he can be found with his wife in the mountains, especially during ski season. Dan is newly married to a new member of our department, Courtney Courtney and Dan both come from Gardnerville, Nevada just east of Lake Tahoe.

Dan plans to graduate in the Spring of 2002. He will then either begin working with a geo-engineering firm, further his education to a master's degree, or take off with his wife to British Columbia and become ski bums.

### Field Camp 2000

*By Tiffani Copyak*

Tent? Check. Sleeping Bag? Check. Field Pants. Check? These are just a few items students packed as they prepared for the four week long course, Field Camp. The course led by faculty member Dr David Dinter was held from May 22<sup>nd</sup> – June 21<sup>st</sup>, 2000. Graduate students Henny Cathey and Ann Mattson joined the gang to share their knowledge of geology and give the class a more hands on approach. Recent undergraduates Gosia Skowron and Teresa Cockayne guarded the camp as Camp Managers. Two weeks were spent outside of Parowan, Utah where the camp was raided by presumed locals, the outhouses were not properly emptied, and Jessica Moore took a fall that sent her to the hospital. The second leg was held in the Raft River Range, where life was a little less eventful. The Naf Mercantile Store served as camp headquarters providing a restaurant, pool hall, grocery store and lonely farmers! The GG Field Camp course is required by all Geology, Geophysics and Geological Engineering Students.

## DEPARTMENT ROUND-UP

Welcome all New Students!  
New faces are all over the Browning Building

### Love is in the Air...

(and it's very contagious)

Congratulations to the Newlyweds!  
Scott Sampson to Toni Simmons  
Jennifer Smith to Reid Hogge  
Dan & Courtney Neuffer

### Staff Highlights

**Kim Atwater** has become the department expert on world travel after returning from trips to Italy and China.

**Mickey Begent** is the new computer administrator. He is now located in 715 WBB.

**Jennifer Ollis Brown** is expanding! A baby boy is due before the new year.

**Jennifer Hogge** graduated this past semester with a degree in psychology. She is headed towards graduate school next year.

**Deanna Johnson** is working towards her accounting degree.

A big Thank You to **Donna Thomas!** Your Awards Dinner Idea was a huge success.

### Scholarships & Fellowships

Congratulations to everyone who received scholarships and fellowships for the 2000-2001 academic year!  
Keep up the good work.

Marshall Bartlett	Margarett McGriff
Kyle Beloy	Lonnie Mercer
Brian Bollin	Heather Mickelson
Tracy Breinholt	Britt Miller
Andrew Burr	Jessica Moore
Dustin Christianson	Daniel Neuffer
Tiffani Copyak	Suzanne Nguyen
Michelle Coulam	Aaron Norton
Travis Crosby	Benjamin Passey
Adam Davison	David Petersen
Stephanie Earls	Thad Roberts
Chad Fuller	Natalie Sather-Bay
Philip Gardner	Douglas Schmitt
Joanne Gisseman	Elizabeth Siebeneck
Theresa Hilbert	Timothy Sodergren
Rebecca Kessler	Cathie Stumpenhous
Kelly Kore	Kevin Sullenberger
Jill Krukoski	Melissa Uibel
Robyn Kurz	Joshua Walker
Alesha Mangan	James Weigel
Andrew Manning	Pengfei Zhang
Melissa Masbruch	

**Professor Michael Zhdanov** has received one of the most prestigious awards of the Russian Academy of Natural Sciences, the Honorary Award for Outstanding Achievements in the Development of Science and Technology, for his contribution in the theory and practice of electromagnetic geophysical methods. The Award, which includes an Honorary Diploma and a special Order, was presented at the Annual Meeting of the Academy at the Moscow State University, in October 2000.

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