INQUIRY

Information from the frontiers of knowledge

A magazine highlighting research at the University of Oregon

Fall 2000, Volume VI, Number 2

A Message About Research

When the News Goes Online

The Internet has journalists asking questions about their own profession

Graduate Education and Academic Research

Enormous contributions from student researchers

Back Issues

About INQUIRY...

Return to University of Oregon News and Calendar Page.

INQUIRY

Fall 2000

A Message About Research From

Rich Linton
Vice Provost for Research and Graduate Studies
Dean of the Graduate School

Five University of Oregon faculty researchers are featured in these pages -- each pursuing a different line of inquiry, each making a valuable contribution to the sum of human knowledge. But while its members may represent the most visible part of university research, the faculty is by no means the only contributor to it.

As the new vice provost for research and graduate studies, I think it is especially timely for me to acknowledge the importance of graduate students to the research mission of the UO. For those within the academy, this linkage seems fundamental to the life and vitality of the research university. However, for many people outside the world of higher education, the contributions of graduate students to academic research are less well understood and, perhaps, undervalued as a consequence.

The articles on page four of this publication spotlight the work of our graduate student researchers. One featured graduate researcher is helping to develop a new and environmentally friendly chemistry, while another is providing each county in Oregon with a useful tool for planning its future. These are only two of thousands of UO graduate students working on research projects that have both short- and long-term benefits for the citizens and businesses in our state.

Back to INQUIRY home page

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INQUIRY

Fall 2000

Special Delivery

Advances in networked computing will change tomorrow's Internet

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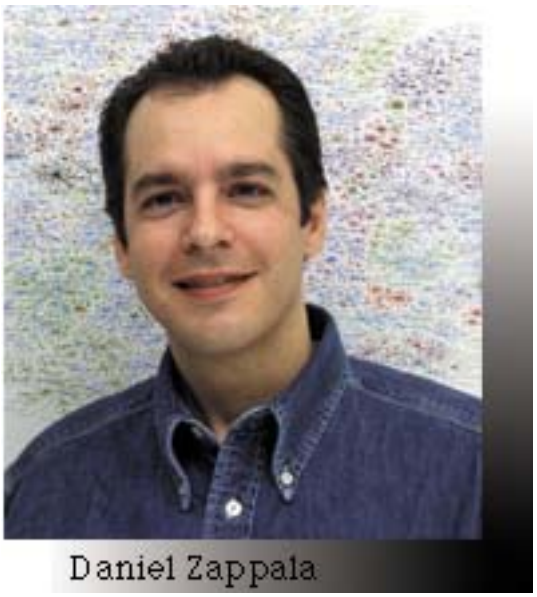
.With advances such as e-mail, e-commerce, and e-education, the Internet -- especially the World Wide Web -- in recent years has transformed innumerable human activities and sparked the economy by creating whole new industries and hundreds of thousands of jobs. But according to researchers at the frontiers of computer networking, this is only the beginning.


Daniel Zappala

."Extensive high-speed computer networks have been built in the past few years and are continuing to be built," says Daniel Zappala, assistant professor of computer and information science (CIS) at the University of Oregon. "Once these networks reach into people's homes, they will enable a whole new generation of applications and services to be carried over the Internet."

.One expected innovation is that someday individuals from around the world will gather together, via the Net, to meet one another and exchange ideas -- each from the comfort of his or her own home or business. Zappala imagines this application of the network augmenting or replacing some business meetings, as well as expanding the accessibility of democratic processes from city hall and school board meetings to congressional hearings.

.The goal is to empower group communication. To do this, high-volume back-and-forth exchanges of bandwidth-eating video and audio information have to take place. A technology called "multicasting" allows this to happen in a highly efficient way.

."The challenge of multicast is scaling up the amount of communication going over the Net to large numbers of people without clogging up the system," Zappala says. "Multicast lets 10 or 10,000 people view a single video source rather than requiring each individual to download a personal copy. A

successful multicast technology will vastly increase the carrying capacity of the Web and its usefulness."

.Rapid innovation also is changing the quality of service available on the Internet. In the future, Zappala explains, the Internet will have several levels of service with differing costs associated with each. Some Net users might want to send and receive high-quality video and be willing to pay a premium for it. Others, using only e-mail and the Web, would likely choose lower-priority service and lower rates.

."It will be a lot like choosing express delivery versus standard postal service," Zappala notes. "The mechanisms by which people will pay for the various kinds of new Internet services is another area where a significant amount of research is being conducted."

.Zappala came to the UO in the fall of 1997 and served as a cofounder of the Network Research Group. He and three other researchers -- Virginia Lo, Andrzej Proskurowski, and Art Farley -- are exploring ways to expand Internet services using multicast technology.

.The Network Research Group is supported by a $1 million grant from the National Science Foundation. This funding is being used to equip a state-of-the-art research laboratory consisting of customized, reconfigurable PCs and routers for use in network development and prototyping.

."We've built a fantastic community of people interested in networking," Zappala says, pointing to the team of CIS faculty members, graduate students, and undergraduates who collaborate on the research.

.The efforts of Zappala and his colleagues extend beyond networking research to the development of cutting-edge courses in networking. With the support of a grant from Intel Corporation, Zappala is helping to develop the "UO Networking Curriculum," a set of courses that trains students in the principles and practice of networking. The Intel grant is helping the researchers establish a new instructional laboratory where students will get hands-on experience with networking, parallel computing, and distributed operating systems.

."The Intel Networking Laboratory will give students valuable experience building networked applications," says Zappala.

.These experiences will prepare students for a job market hungry for workers trained in networking engineering, administration, and applications. The U.S. Department of Commerce projects that Oregon's technology workforce will triple in the next six years -- with networking being one of the most intense areas of growth. Zappala affirms the strong market for those with network training, noting that recent UO CIS graduates now hold positions at Cisco, Microsoft, Bell Laboratories, and other tech industry heavyweights.

.But Zappala, whose credentials could have landed him a lucrative job in private industry, chose to teach and conduct research at a university. Why?

."Companies often must be backwardly compatible; that is, they build on existing programs and infrastructure. Rarely do you get an opportunity to be continually thinking about something new without worrying about selling a particular product. My job as a researcher is to think up what's not there, to make wholly new stuff -- better applications and services that push networked computing into new territory."

Back to INQUIRY home page

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Skip to main content

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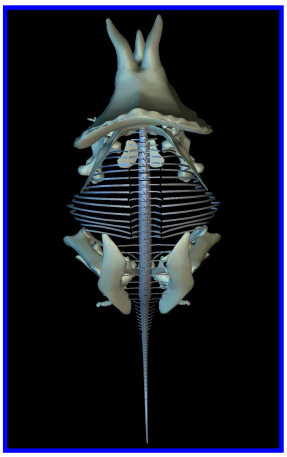
- Research
- Education
- People
- Activities
- Announcements



Bioinformatics Research Published in *Nature*


CIS graduate student, Bryan Kolaczkowski, and UO assistant professor of biology, Joe Thornton, used a small supercomputer to simulate the evolution of thousands of gene sequences on a hypothetical evolutionary tree. (cont.)

Colloquium Honors Work of Prof. Andrzej Proskurowski


The Department recently hosted a special Colloquium honoring CIS theory faculty Dr. Andrzej Proskurowski on the occasion of his birthday. (cont.)

Welcome to New AI Faculty Dejing Dou


The CIS department welcomes our newest faculty member, Assistant Professor Dejing Dou, whose research focuses on practical as well as theoretical aspects of Artificial Intelligence, Databases, Biomedical Informatics and the Semantic Web. (cont.)

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NuRoG Network Research Group @ University of Oregon

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People

Courses

Overview: We carry out interdisciplinary research in the field of computer networks with specializations in peer-to-peer computing, network security, multimedia streaming, network measurement and forensics, communication models, network algorithms, sensor networks, routing and quality of service. We are members of the PlanetLab Consortium and affiliated with the University of Oregon Advanced Networking Technology Center, home of the Route Views Project.

Prospective Students: Explore our website to see if our research in networking interests you. Send us email if you have any questions and let us know if you are applying to the program

UCIS University of Oregon Computer and Information Science

UNIVERSITY OF OREGON

Research supported by

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Virginia M. Lo, Associate Professor

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Teaching

Winter Term 2005: CIS 415 Operating Systems
Fall Term 2004: CIS 314 Computer Organization
Fall term 2004: CIS 607

Trust-based Resource Mgmt in Grid and P2P Environments Spring Term 2004: NRG seminar Winter Term 2003: CIS 415 Operatings Systems
Winter Term 2003: CIS 607 Seminar on P2P Computing Fall Term 2003: CIS 629 Computer Architecture
Fall Term 2003: CIS 415 Operating Systems

Biographical Sketch: Virginia Lo received her Ph.D. from the University of Illinois at Urbana-Champaign in 1983. Her research interests are in the areas of resource management for parallel and distributed computing systems, and networking. Her work has been supported by grants from the National Science Foundation, OACIS, and Intel. She has been a faculty member at the University of Oregon since 1985.

Research Interests:

Networking (P2P Computing, Scheduling, Communication, Multicast) and Parallel and Distributed Computing (Scheduling, Resource Management, Parallel I/O)

Recent Papers

Peer-to-peer Computing

- Cluster Computing on the Fly: This work involves the development of a P2P architecture to support Internet-wide cycle sharing communities. Our emphasis is on application-specific scheduling under a P2P cycle sharing model.
  - D. Zhou and V. Lo, Cluster Computing on the Fly: Resource Discovery in a Cycle Sharing Peer-to-Peer System, GP2PC Workshop 2004, CCGrid 2004.
  - V. Lo, D. Zhou, D. Zappala, Y. Liu, and S. Zhao, Cluster Computing on the Fly: P2P Scheduling of Idle Cycles in the Internet, IPTPS 2004 and in Springer Verlag LNCS 3279, Peer-to-Peer Systems III, Geoffrey M. Voelker and Scott Shenker (Eds.).
- Massively Multiplayer Games: Cheat-proof, low latency protocols and scalable event-ordering.
  - C. GauthierDickey, D. Zappala, V. Lo, J. Marr, Low-Latency Cheat-Proof Event Ordering for Peer-to-Peer Games, NOSSDAV, June 2004.
  - C. GauthierDickey, D. Zappala, V. Lo, A Fully Distributed Architecture for Massively Multiplayer Online Games, NetGames, August 2004.

Virtual Topologiees for Multiparty Communications

This work involves the development of efficient fault tolerant protocols for intradomain and interdomain multi-party communication. Research supported by NSF ANI9977524 and by NSF

NCR9714680.

- D. Zappala, V. Lo, C. GauthierDickey, The Multicast Address Allocation Problem,to appear in Computer Networks Journal, 2004.
- D. Zappala, C. GauthierDickey, and V. Lo, Modeling the Multicast Address Allocation Problem, Proceedings IEEE Globecomm 2002.
- V. Lo, D. Zappala, C. GauthierDickey, and T. Singer, A Theoretical Framework for the Multicast Address Allocation Problem, Proceedings IEEE Globecomm 2002.
- D. Zappala, A. Fabbri, and V. Lo, An Evaluation of Shared Multicast Trees with Multiple Cores, Journal of Telecommunication Systems, March 2002.
- M. Livingston, V. Lo, K. Windisch, D. Zappala, Cyclic Block Allocation: A New Scheme for Hierarchical Multicast Address Allocation in the First International Workshop on Networked Group Communication, NGC99 , Nov. 17-20, Pisa, Italy.

Resource Management for Parallel and Distributed Computing Systems.

This work focuses on the scheduling of resources (processors, processes, and I/O) in systems ranging from message-passing multicomputers to loosely-coupled workstation-based distributed systems. We have developed algorithms and software tools for allocation, mapping, placement, scheduling and migration, with extensions to support fault tolerance, heterogeneous environments, and real time constraints. (Research previously supported by NSF MIP91-08528.)

- V. Lo and J. Mache, Job Scheduling for Prime Time vs. Non-Prime Time, Proceedings of the 4th IEEE International Conference on Cluster Computing (CLUSTER 2002).
- J. Mache, V. Lo and S. Garg, Job Scheduling that Minimizes Network Contention due to both Communication and I/O, Proceedings of the 14th International Parallel and Distributed Processing Symposium, IPDPS'00, 2000.
- B. Nitzberg and V. Lo, Collective Buffering: Improving Parallel I/O Performance, in {\em Readings in Disk Arrays and Parallel I/O}, Edited by R. Buyya, H. Jin, and T. Cortes, IEEE Society Press, expected publication date 2001.
- J. Mache, V. Lo and S. Garg, How to Schedule Parallel I/O Intensive Jobs, Proceedings of the 6th Conference on Parallel and Real-Time Systems, PART'99, 1999
- J. Mache, V. Lo and S. Garg, Parallel I/O Traffic Calls for New Job Scheduling Strategies, Proceedings of SC99 - 12th ACM/ IEEE Conference on High-Performance Networking and Computing (refereed poster exhibit), 1999
- J. Mache, V. Lo, M. Livingston and S. Garg, The Impact of Spatial Layout of Jobs on Parallel I/O Performance, Proceedings of the 6th Workshop on I/O in Parallel and Distributed Systems, FCRC'99, 1999
- B. Bose, B. Broeg, V. Lo, Lee Distance, Gray Codes, and the Torus, {\em International Journal of Telecommunication Systems (Special Issue on High Performance Computing and Interconnection Networks)}, Volume 10, 1998.
- V. Lo, J. Mache and K. Windisch, A Comparative Study of Real Workload Traces and Synthetic Workload Models for Parallel Job Scheduling, Proceedings of the 4th Workshop on Job Scheduling Strategies for Parallel Processing, IPPS '98, also published in "Job

Scheduling Strategies for Parallel Processing" edited by Dror G. Feitelson and Larry Rudolph, Springer-Verlag LNCS Vol 1459, 1998

- V. M. Lo, W. Liu, B. Nitzberg, K. Windisch, Noncontiguous Processor Allocation Algorithms for Mesh-Connected Multicomputers, {\em IEEE Transactions on Parallel and Distributed Systems}, Volume 8, No. 7, July 1997.

Personal Interests

My family. and my extended family. My interests: mah jong (see my new children's book Mahjong All Day Long, co-authored with my sister, published by Walker and Company; origami, and more origami, ethnic music, and foreign films, bicycling, hiking, soccer.

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January 15, 2004

Andrzej Proskurowski, Professor

old picture

new picture

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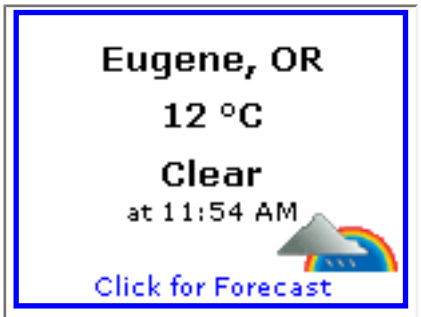

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email: andrzej_at_cs.uoregon.edu

(My schedule for this quarter .)

Educated at Warsaw University of Technology, Stanford University, and the Royal Institute of Technology in Stockholm, where he earned his doctorate in 1974, Dr. Proskurowski has been on Computer Science faculty at the University of Oregon since 1975. Here, he divides his time in suitable proportions between teaching, research, and other activities befitting a faculty member of an AAU institution in the beautiful Pacific Northwest. Dr. Proskurowski's research has been supported by grants from the Office of Naval Research, the National Science Foundation, and the National Academy of Sciences. As a Fulbright scholar, he has lectured in Finland. Supported by national research foundations he has collaborated abroad with researchers in Australia, Canada, Czech Republic, France, Hong Kong, The Netherlands, Poland, Spain and Sweden.

visits since October 1, 2003

Return to CIS home page.

Art Farley, Professor

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Research Projects

- Communication Network Design
  Design of optimal networks having favorable properties for various communication tasks, e.g., broadcasting or gossiping, and for various reliability parameters.

- Qualitative Reasoning
  Investigation of methodologies for representing and reasoning about physical, social, and economic systems in a qualitative, rather than quantitative, manner. Study of their application to diagnosis and incremental design.

INQUIRY

Fall 2000

20,000 Years of Forest Fires

Projected for the Northwest: warmer, drier summers -- and more forest fires

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.While the hundreds of fires that blazed across much of the western United States last summer may be seen as frightening, life-threatening disasters, they are also completely natural, according to Cathy Whitlock, a University of Oregon geography professor who studies long-term patterns of fires.


Cathy Whitlock

."Natural," she explains, means they occur regularly when considered within a larger historical and biological context of ever-changing climatic conditions.

.Whitlock is a paleoecologist. By examining ancient environments over periods of thousands of years, she discovers patterns that become apparent only when taking the long-term view.

."Our ultimate goal is to develop a better understanding of the long-term environmental history of the western United States," she says.

.The history Whitlock and her colleagues seek to discover is recorded in the sediments at the bottom of mountain lakes. Using makeshift drilling platforms of plank-joined boats or canoes, her research team extracts tube-shaped sediment cores -- two inches in diameter and up to a hundred feet in length -- from the lake floors. They then bring their information-laden samples (see inset photo) back to their laboratory at the UO for careful analysis. As the researchers examine successively deeper layers of the sediments, they discover information about the environment as it existed farther and farther back in time.

."We are trying to retrieve and interpret an extraordinarily subtle record that exists in nature,"

Whitlock explains. "A core drilled vertically through these layers of mud retrieves a record that can extend back in time to the origin of the lake."

.Because she works in remote mountainous areas, her equipment, all hand-powered, is carried into the research site in backpacks, on packhorses, or -- in the case of extraordinarily difficult terrain -- in a helicopter.

.So far, her research group has studied more than forty-five lakes in Yellowstone, the northern Rocky Mountains, the Cascade and Coast Ranges of Oregon and Washington, and the mountains of northern California.

.What have they found?

.Changes over time in the number and kinds of pollen in the sample tell the story of changes in vegetation. Tiny chunks of charcoal tell the story of fires, just as ash tells of a volcanic eruption. Each observation a researcher makes is a piece of the puzzle that the team puts together to create an understanding of how the environment evolved thousands of years ago. Combining careful laboratory analyses and powerful radiocarbon dating techniques, the researchers piece together a very accurate history of a specific location dating as far back as the last Ice Age, approximately 20,000 years ago.

.Their findings indicate that during the past 2,000-3,000 years much of the northwestern United States was relatively cool and wet, reducing the likelihood of fires in any given year. In contrast, about 8,000 years ago, the climate was warmer and drier than today; fires occurred frequently. For the past 2,000 years, large burns have occurred every two to four hundred years in mountainous areas and subalpine forests.

."The impression that you get over and over again in studying forests over long periods of time is just how dynamic they really are," she says. "Forests are constantly changing and are exquisitely sensitive to climatic variations."

.This sensitivity to changes in climate will likely result in huge changes to western forests in the coming decades, Whitlock says. Current projections suggest a future of warm, dry summers in the northwestern United States as a result of the buildup of greenhouse gases in the atmosphere. Thus it is likely that fires will become more frequent and perhaps more severe than they are at present -- and the effort to suppress them will become increasingly difficult and costly.

."The coming changes in climate and the effects they will have on vegetation could be enormous. Having a clear idea of what's gone on in the past -- what's natural, if you will -- will help us make sensible and informed decisions as we take up the challenge of dealing with the future."

Back to INQUIRY home page

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Professor Cathy Whitlock
Department of Geography
University of Oregon

On leave: AY 2004-2005

Vacalauquen, Argentina

Research (look under paleoecology, future vegetation changes, paleoclimatic analysis) | CV | How to contact me
Dept. of Geography | University of Oregon

Course web pages:

Fall 2003: Geog 4/523 The Geography of Natural Disturbance

Winter 2004: Geog. 4/530 Long-term Environmental Change

Other information:

- Go to UO Environmental Change Research page; look under "Paleoecology", "Future vegetation changes" and "Paleoclimate Analysis".
- Go to my Curriculum Vitae page
- Back to UO Department of Geography page

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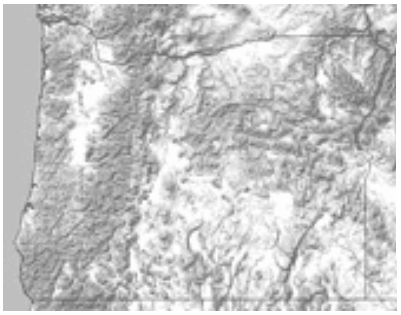

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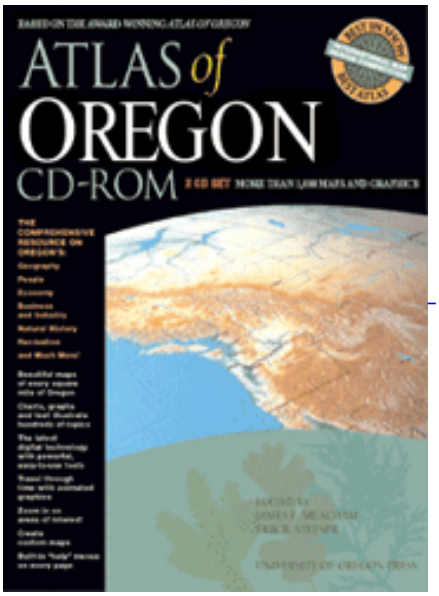

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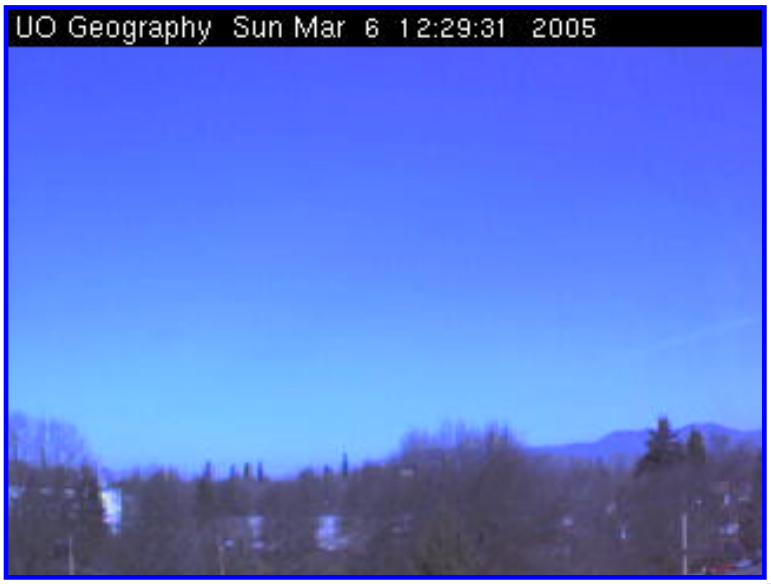

Department Weathercam [click to enlarge]

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INQUIRY

Fall 2000

Understanding the Active Earth

Sliding continents, volcanic activity and more taking place beneath our feet

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Gene Humphreys

.Imagine yourself holding a rock the size of a bowling ball. Heavy, right? Now think of all the rock, dirt, mud, clay, and other materials that make up a continent. For most people, this is a weight so staggeringly large as to be incomprehensible. Not so for University of Oregon geologist Gene Humphreys. To him, the continents are "the light stuff, the scum floating on the top of the pond."

.Professor Humphreys explains that the continents float atop the heavier materials that make up the interior of the Earth. These gargantuan masses traverse the globe at an extremely leisurely pace. This slow dance of pond scum is known to geologists as plate tectonics.

."In what appears to humans as a slow-motion progression taking millions of years, the plates crunch into one another or pull apart," Humphreys says. "Sometimes one plate slides over another, as is happening right now not far off the Oregon coast where the huge North American Plate is pushing westward over the Juan de Fuca Plate."

.A part of the pond scum of special interest for Humphreys these days is the Yellowstone area of western Wyoming. The area's famed landmarks, such as the bubbling mud pots and the Old Faithful geyser, are indicators of underground volcanic activity.

."But it isn't easy to know what's happening at depths of up to 400 miles underground," Humphreys says. "So geologists have had to develop some very clever ways to monitor what's going on down there."

.One method uses the shock waves that reverberate through the Earth in the aftermath of earthquakes.

."The Earth gets about one earthquake of magnitude 5.5 or 6 each day," Humphreys says. "Using supersensitive instruments called seismometers, geologists listen in on these quakes. From these measurements we can image what's underground in much the same way that a doctor learns about a patient's internal organs with an x-ray, MRI, or CAT scan."

.The shock waves generated by an earthquake propagate in a very predictable pattern, like the ripples that spread across a smooth pond after a stone has broken the surface. But in the Earth, the speed of a wave is affected by the kinds of materials it passes through. By carefully combining information from various listening stations and analyzing it, geologists image the Earth's "internal organs" to obtain a greater understanding of the otherwise hidden world of underground activity.

.Currently Humphreys has an array of seventy seismographic listening stations deployed around the Yellowstone area.

."The more stations we have, the more data we have to work with. This gives us a more detailed image of the area of interest," he says.

.Specifically, Humphreys is using the listening array to answer a question about the mechanics that are at work beneath Yellowstone -- and possibly at other hot spots of geologic activity around the globe such as the Hawaiian Islands.

."We've raised as many questions as we've answered," he says, "but that's how science usually works; each new set of questions drives our understanding a little bit farther forward."

.That forward progress is about to get a big push from the upcoming U.S. Array Project, according to Humphreys, an early contributor to the enterprise.

. "U.S. Array will have a huge array of seismometers across the country, then they'll take a super high-resolution image of each geographic area." he says. "In about a decade U.S. Array will take our understanding of continent-scale phenomena to an unprecedented level.

.What a continent is, how it was made, and what controls its behavior are some of the most fundamental questions in geology -- and ones that have proven to be elusive. U.S. Array will provide the data for us to answer these questions. This is a very exciting time in geology."

Back to INQUIRY home page

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Department Home

Research Synopsis:

GENE HUMPHREYS

Professor, Geological Sciences

At Oregon since 1985

Ph.D., 1985, California Institute of Technology

M.S., 1978, University of California, Riverside

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RESEARCH INTERESTS

THE SNAKE RIVER PLAIN EXPERIMENT: P-WAVE TOMOGRAPHY

- The Experiment
- Inversion Method
- Physical State
- Implications

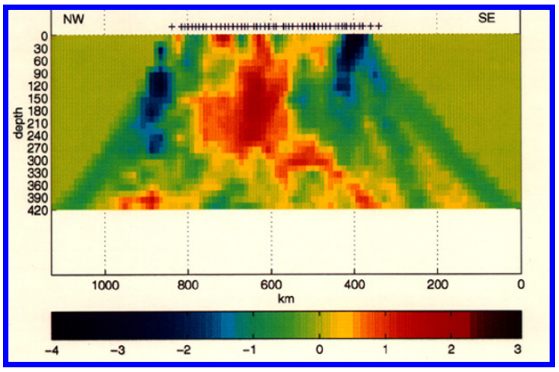
TECTONIC AND MAGMATIC PROCESSES ACTIVE IN THE WESTERN U.S.

THE SNAKE RIVER PLAIN EXPERIMENT: P-WAVE TOMOGRAPHY

Rebecca Saltzer and Gene Humphreys

The Experiment

For six months in 1993, we operated a 550 km array of broadband seismometers with a 10 km average spacing in a line perpendicular to the track of the Yellowstone hotspot. The array of seismometers spanned the entire width of the "tectonic parabola" which defines the active region of faulting and seismicity shaped in a wake-like pattern around Yellowstone. The array geometry allows resolution of the upper mantle velocity structure on the cross-section of the Snake River Plain region through which the Yellowstone hotspot passed 6 to 8 million years ago. A total of 375 earthquakes (M_b > 4.4) were recorded, from which 5000 usable P-wave residuals will be derived.



Travel times are reduced with the Iasp91 radial earth model. Residuals (3500) are then demeaned as a first order correction for differences between source events, as well as to minimize the effects of mantle differences outside the region of interest. Crustal corrections, as determined from receiver function analysis, are applied.

Inversion Method

The traveltime residuals (difference between actual and predicted travel times) were inverted for velocity structure using a SIRT algorithm. Block dimensions are 20 km wide by 30 km deep. (The image shown has been interpolated to block sizes that are half those dimensions). Model smoothness was increased by imposing 40% nearest neighbor covarience during inversion.

Physical State

We attribute the imaged structure primarily to variations partial melt content that are modulated by variations in mantle composition. Our reasoning hinges on the fact that the relatively high-velocity (blue) regions in the figure lie beneath relatively thin crust that stands at great elevation, implying that this higher velocity upper mantle is buoyant. Such upper mantle is created by depletion of basaltic component; it cannot be relatively cool. If the above reasoning is true, then the only reasonable because for the great depression of velocity beneath the Plain is the presence of partial melt. This inferred partial melt zone

extends to depths of over 150 km.

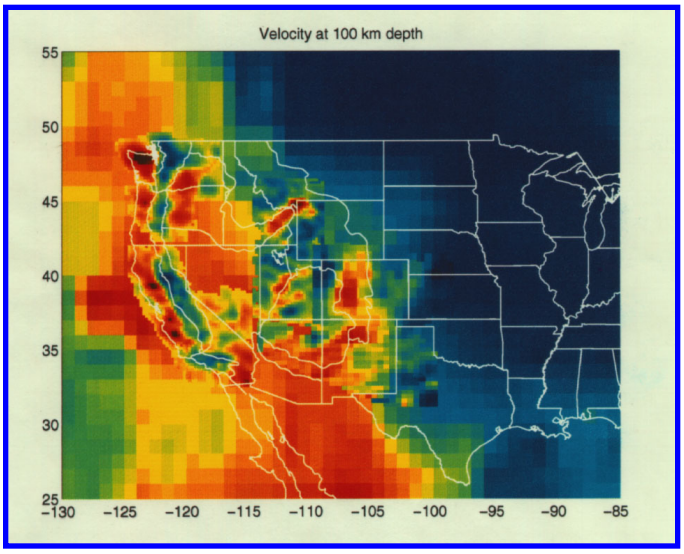
Implications

Mantle plume models predict that the plume ponds at the base of the lithosphere in a layer about 100 km thick. Movement of the lithosphere over the asthenosphere then will drag this flattening plume material away from its source, producing a widening parabola downstream that has been modeled to be about 500 km wide at the location of our experiment. However, our image shows a low-velocity anomaly that is far narrower (at most 200 km wide) and far deeper (up to 300 km deep) than is predicted by mantle plume models. We are therefore considering an alternative explanation for the observed structure, in which melt buoyancy convectively overturns an elongated roll within the asthenosphere (similar to the "gravity rolls" inferred near mid-ocean ridges). Melt is released above the ascending arm, and the depleted residuum is pushed aside. Orientation of the convective system is provided by North America motion with respect to the lower mantle, and magmatic propagation is attributed to upwelling at the NE end of the roll, where the depleted upper asthenosphere is dragged to the SW by the motion of North America.

TECTONIC AND MAGMATIC PROCESSES ACTIVE IN THE WESTERN U.S.

Gene Humphreys and Ken Dueker

The figure below is a composite of recently produced seismic images of the structure beneath North America. Relationships on many scales are recognized between the upper mantle structure and patterns of present and past magmatic and tectonic activity. Click on image to enlarge. Several examples are discussed below that are attributed to the region's current setting, its pre-existing structure, and to a dynamic self organization within the asthenosphere.



Composite image of upper mantle seismic structure at 100 km depth beneath the greater North America region. Blue is high velocity mantle and red is low velocity mantle. The continental scale image is from the multi-bounce S-wave modeling of Grand (1994).

Such information provides important clues to the processes of continental deformation and differentiation: on asthenospheric convection and the resulting active supply of melt, heat, and buoyancy; on compositional segregation of continental lithosphere; on modifications to potential energy and lithospheric strength, and their relations to "plate" and locally created forces; and on how these tectonic and magmatic processes interact. Seismic imaging provides resolved structural information directly indicative of the scale, location, and relative intensity of activity within the upper several hundred kilometers of the Earth. By using scaling relations to aid in understanding the physical state of the upper mantle, and including observations of isostasy, tectonism, magmatism, and geologic history, well reasoned hypotheses of the processes underlying continental activity may be proposed.

At the longest wavelengths considered here, the 100 km depth shown in the figure includes cratonic "tectosphere" east of the Great Plains, and asthenosphere beneath the elevated western U.S. This basic structure is attributed to Laramide orogenic penetration into and disruption of a Precambrian lithosphere by a flat-subducting slab, which presumably thinned the lithosphere that presently is elevated. Slab removal at the end of the Laramide and the consequent influx of east Pacific asthenosphere to shallow depths beneath the western U.S. is associated with profound magmatism, extension, and a maintenance of high elevations. This post-Laramide activity, then, appears to have resulted from processes originating beneath the lithosphere. The tectonic and magmatic activity that was vigorous in the mid-Tertiary currently is waning, though elevations remain high. The image of the asthenosphere shown in the figure (at a depth through which the flat-subducting slab of Laramide age is thought to have passed) reveals small-scale structures of seismic magnitude as great as that found on the continental scale. It seems apparent that the asthenosphere over this broad region has indeed been very active since the Laramide.

At a regional scale, structures are organized into two geographic domains: a marginal

domain, about as wide as California, where high-velocity structures are elongate and correspond to tectonic patterns; and an interior domain, where low-velocity structures are NE-elongate and correspond to patterns of young magmatism. A separation of western U. S. deformation into toroidal and poloidal fields defines the same two domains. Because poloidal and toroidal deformation originate from fundamentally different tectonic processes, correspondence between tectonic style and asthenospheric character suggests a fundamental interaction between the lithosphere and asthenosphere. Pacific-North America transform accommodation occurs across a broad continental shear zone (that has been, and in the Pacific Northwest continues to be, an oblique convergent margin). In contrast, the broad interior region, including the Basin and Range and most of Rocky Mountains, is dilating by moving away from stable North America in a direction that is nearly normal to Pacific-North America relative motion. The toroidal deformation of the marginal domain is indicative of forces created remotely and guided to western North America through the plates, whereas the elevated interior, deforming poloidally, signifies locally created forces. Thus, we conclude that the general conditions for tectonic and magmatic activity resulted from early Cenozoic thinning of the lithosphere, and the regionalized organization of upper mantle structure results from ongoing plate interaction near the continental margin and local, non-plate tectonic processes beneath the interior.

Local magmatic and tectonic activity correlates with individual upper mantle features. Transform accommodation shows the influence of both strength variations and the action of locally-created forces. Shear in central California, being concentrated on the San Andreas fault and eastern California shear zone (near the California-Nevada border), avoids the high-velocity (and presumably higher strength) upper mantle of the Sierra Nevada. In southern California, the high-velocity Transverse Ranges anomaly is interpreted as descending lithosphere whose flow maintains convergence in the Transverse Ranges and the "big bend" orientation of the the San Andreas fault. High-velocity structure beneath the Cascades is attributed to the sinking Juan de Fuca slab. Beneath the broad continental interior, low-velocity structures correspond with the Jemez, St. George and Yellowstone magmatic lineations. The association of magmatism with zones of inferred asthenospheric partial melt indicates convective activity driven by melt buoyancy. The tendency for NE alignment suggests an orientation control provided by absolute plate motion, such as asthenospheric simple shear. And the 300-400 km wavelength indicates an asthenospheric thickness of roughly 150-200 km.

In summary, we conclude that the structures imaged at 100 km depth beneath the western U.S. map patterns of small-scale convection (and subduction of the Juan de Fuca plate)

occurring beneath the thin lithosphere of the western U.S. In the cases of Juan de Fuca subduction and lithospheric descent beneath the Transverse Ranges, the sinking of thermal boundary layer is consistent with standard notions of convection. Melt buoyancy within the asthenosphere drives convection beneath the magmatic trends of the western U.S. interior. Melt segregation differentiates the continent through crustal growth and mantle depletion. Depletion of the upper mantle creates a relatively buoyant and viscous (and therefore stable) chemical boundary layer. The organization of convective patterns into regional domains represents processes that influence orientation: plate interaction near the margin and plate motion over the deeper mantle for the continental interior.

The block size has been interpolated from 120 by 120 km to 60 by 60 km. Resolution of this image is variable, but is approximately 300 km. Overprinting Grand's image are regional array inversions from five separate inversions in the western U.S.: the Washington-Oregon, California-southern Nevada, and Idaho-Utah-western Wyoming P-wave images of Humphreys and Dueker (1994), the northern Arizona-New Mexico P-wave image of Slack et al. (in review; similar to Davis et al., 1993), and Colorado S-wave image of Lee and Grand (in prep.).

Several problems had to be addressed in order to superimpose these images: P and S images are of differing magnitudes; magnitudes are not well constrained; and the average velocity of each regional image is essentially unknown. To handle these problems, we rescale the inversions and shift each image into concordance with Grand's image. More specifically, the range of each of the regional images and the Grand image has been normalized to \(+-1 (this assumes that P and S velocity variations differ only by a multiplicative constant, and that each inversions resolves a similar dynamic range). Then, a constant has been added to each regional array inversion that minimizes its "color mismatch" with Grand's image. (N. Arizona-New Mexico, 0.3; California-S. Nevada, 0.4; E. Idaho-Utah, 0.2; Washington-Oregon, 0.4; Colorado, 0.0).

Note that because most of the western U.S. upper mantle is slow, most of the regional images have been made slower (have had positive numbers added to them), with the California-Oregon-Washington region being slowed down the most, and the Colorado inversion being left unshifted. Actual total range in resolved P-wave velocity is about 8%. Using standard scaling relations, red regions are partially molten and blue regions are subsolidus.

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Back to the Faculty Home Page

Back to the Department of Geological Science's Home Page

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INQUIRY

Fall 2000

Home Is Where the Start Is

New study to shed light on how the home environment shapes children

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.It isn't surprising when parents who enjoy reading raise a child who shares their passion for books. But how much of the child's behavior is shaped by genetics and how much by environment? A researcher at the University of Oregon is shining new light on the age-old question of nature-or-nurture by studying the special circumstances of families with adopted children.

Kirby Decker and Anna

."Adoptive families are a wonderful natural laboratory," says Assistant Professor Kirby Deater-Deckard, a developmental psychologist with special training in behavioral genetics. "Their home environments are the same as those of other families but with one important difference: the parents and children are genetically unrelated. We can learn a great deal by studying that situation."

.Deater-Deckard wants to better understand how a child's home environment promotes healthy social and emotional development as well as growth in such educationally important areas as literacy and language skills.

.Funded by the National Science Foundation, the three-year study is called the Northeast-Northwest Collaborative Adoption Projects (N2CAP). Deater-Deckard is focusing on the region west of the Mississippi, while a colleague at Wesleyan University in Middletown, Connecticut, is conducting the same research in the east.

.The project has two parts, the first of which involves in-depth study of 300 families nationwide with adopted children between the ages of four and twelve. Members of Deater-Deckard's team will visit the families and assess the family environment. They will take special note of such things as the use of reading materials and the ways parents and children speak to and interact with one another.

."We are also focusing on the nature of each parent-child relationship. We're videotaping family interactions as well as interviewing parents and asking them to complete our questionnaires," Deater-Deckard explains.

.In the second part of the study Deater-Deckard is seeking to gain broader, baseline information from a larger group of participants. His team will gather data from about one thousand families by way of a survey available by mail or over the Internet. These families may become part of a registry of adoptive families that will be useful for future studies. One of the researchers' long-term goals is to continue monitoring the children in these families to track their development over time."

.His research team will compare its results with those of previous studies conducted on related families.

."Many, many research projects have explored how the home environment affects development, but this is one of the few to do so in a manner that excludes the genetic factor. In recent years there has been an explosion of research demonstrating the importance of genetics. This work will provide an important complement to that effort by illuminating the contribution of the home environment."

.Results of this research should be interesting and of practical value to a wide variety of groups. Educators, for example, are interested in learning about how the home environment helps to prepare children for success at school. Social service providers want to know what elements of family life promote positive outcomes -- especially for at-risk kids. The research should also provide new insight into discipline strategies, and factors affecting the emotional bonds between parents and their children.

."Solid scientific data can help adoption agencies and parents who are thinking about adopting a child to better understand the factors that contribute to successful adoptions," Deater-Deckard says.

.In the great majority of families participating in the study, the adopted child comes from a country outside the United States.

."Our study should also tell us a great deal about the special issues involved in international adoption," he says.

.For more information about the N2CAP study, go here. You can also reach N2CAP via e-mail at n2cap@psych.uoregon.edu, or call toll free (877) 909-6650.

Back to INQUIRY home page

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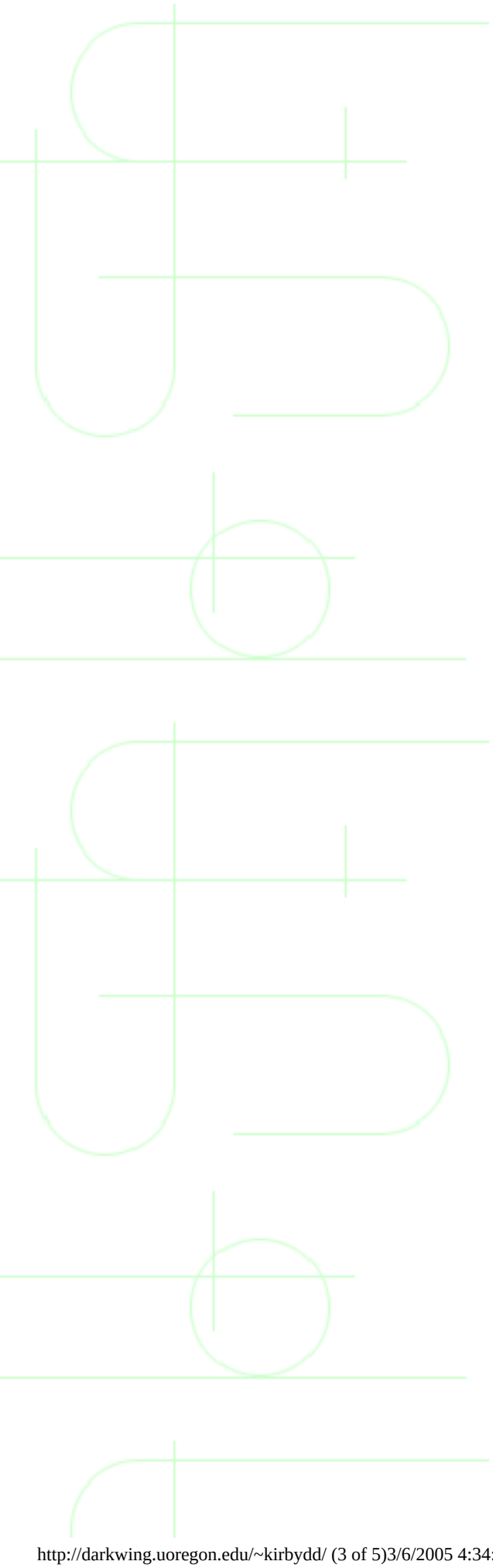
- Curriculum Vitae
- Gene Environment Process Lab
- Courses

Kirby Deater-Deckard, Ph.D.



The Department of Psychology at the University of Oregon

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INQUIRY

Fall 2000

When the News Goes Online

The Internet has journalists asking questions about their own profession

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John Russial has been watching carefully as technology changes the way news is gathered and distributed. Currently an associate professor of journalism and communication at the University of Oregon, Russial spent seventeen-years as a reporter and editor, including twelve years at the Philadelphia Inquirer. His interest in technology's effect on journalists and journalism has led him to create a course called Cyberjournalism in which students explore how the profession is evolving from the printing press to the World Wide Web.

Q: How have newspapers gotten into Web-based journalism?

A: A few years ago everything was "shovelware" -- newspapers simply dumping their print material onto the Web. Now it is, well, mostly shovelware. It was a quick way to gets a newspaper's brand identity out there onto the Web and protect the paper's interests, but increasingly there's the expectation that the Web will offer something more than what's available in print.

Q: Such as?

A: Many sites are using audio and video, but even a cursory glance through major news websites shows that these are add-ons -- not fundamental to the message as they are, say, in TV news. The folks who have argued, somewhat breathlessly, that all media will converge on the web yesterday with audio, full-motion video, two chickens in every pot, etc., have been premature in their predictions.

Q: When might the convergence happen?

A: My guess is that it won't happen for at least several years. Bandwidth is increasing, but so is demand for bandwidth. The infrastructure doesn't seem to be in place to handle data-intensive features such as video and audio.

Q: How is the shift from the old-fashioned print newsroom to the online news business going?

A: This change is a huge challenge for news organizations. The solutions to date are all over the map. They range from total integration of print and online versions to near-total separation.

Q: What kind of problems occur when this integration doesn't happen?

A: One example is editing inexperience. There's often a mismatch between the experience level in print and on the Web. The problem arises in the rush to hire individuals with web expertise, even though they might lack traditional journalism training and experience. But can these folks who are getting lucrative stock options make solid news judgments? Can they spell? Some dot-coms are trying to address this problem -- with a fair bit of success -- by raiding talent from traditional news media.

Q: What impact has the Web's practically unlimited space had on journalism?

A: Some publications have made good use of the "unlimited news hole" by creating special subsites. A good example is the Indianapolis Star Tribune's online site, which has created areas dealing with auto racing and Indiana basketball, both of which have strong appeal outside the paper's traditional coverage area.

Some web usability gurus make the point, however, that because reading on the Web is more difficult than reading print, it doesn't make sense to think of writing longer stories. They say writers have to think about writing shorter stories and packaging information more clearly.

Q: How are newspapers adapting to the Internet's demand for twenty-four-hour-hour coverage?

A: Some of the online startups, such as C/Net, have created interesting models. They run almost like wire services -- a deadline every minute.

Newspaper websites are playing around the edges of this idea -- updating stories occasionally. But working that way requires a big change in culture for newspapers -- and more important, in organizational structure. Traditionally, papers have staffed their operations to meet the needs of a production cycle based on once-a-day delivery.

.News sites on the Web whose parents are in electronic media -- CNN, for example -- seem to have a much better handle on this. They're used to writing and rewriting on the fly all day, every day.

Back to INQUIRY home page

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What's New?

Anonymous donor funds Portland center, scholarships

LSDT Online

Payne Awards for Ethics in Journalism -- nominations due February 25th

2005 Johnston Lecture announced

2005 Ruhl Lecture announced

Bryce Zabel, '76, produces "Lights, Camera, Oregon" campaign kickoff event

SOJC to host Colloquium 2005 in Applied Media Ethics

Prospective students
Current students
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Alumni & Friends
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Career Services
SOJC Publications
Awards & Events
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Copywriter Dana Valikai (left) and Co-Creative Director Andrew MacKenzie of Allen Hall Advertising work on developing concepts for television, radio and print advertising for the upcoming Governor's Campaign Against Methamphetamine Abuse. Since 1983, Allen Hall Advertising, a student-run advertising agency, has provided advertising services for clients on and off campus. Recent clients include the Lundquist College of Business New Venture Competition, the US Forest Service, Digital Duck and Ironworks Gym. Hands-on experience is guaranteed.

Photo by Laura Taylor, undergraduate student.

Related Links:

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Advertising at the School of Journalism and Communication

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Featured Link:

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INQUIRY

Fall 2000

Graduate Education and Academic Research -- The Essence of Inquiry

Graduate student researchers gain knowledge and experience while making major contributions


Rich Linton

.Over half of the basic research conducted in America takes place on college and university campuses, and a large portion of that work is carried on the shoulders of graduate students.

."Graduate students are simultaneously receiving advanced training and making major contributions to the discovery and application of new knowledge through collaboration with faculty mentors," says Rich Linton, the University of Oregon's new vice provost for research and dean of the Graduate School. Linton oversees the UO's graduate degree programs, which number more than seventy. These programs serve more than 3,200 graduate students, 1,200 of whom are employed as graduate teaching fellows (GTFs) involved in teaching and research.


Name: Kenneth Kato

Department: Planning, Public Policy and Management

.Linton began serving in his new position in August. Before coming to the UO he held academic positions in North Carolina for twenty-three years, first as a faculty member at the University of North Carolina at Chapel Hill, and since 1986 as a research administrator for the sixteen-campus UNC system. Most recently, he served as the chief research officer and director of sponsored programs for the UNC system.

."Graduate teaching assistants contribute significantly to the university's instructional mission, for example, through their work as classroom lecturers, discussion-section leaders, graders, or laboratory instructors," Linton explains. "As a consequence, faculty members have additional time for research activities, which is especially critical as the pace of discovery rapidly accelerates in the digital information age."

Degree: Master of Community and Regional Planning

Research: Working in the UO InfoGraphics Laboratory on a pilot project sponsored by the Oregon Department of Land Conservation and Development, Kato developed a CD-ROM formatted Rural Lands Database for four Oregon counties. The database gathers a vast amount of information from scores of different sources in one user-friendly location. With it, planners can quickly create custom-built countywide and regional maps that present information on important topics such as land use, soils, forests, and croplands.

What's next? As a research assistant in the UO geography department, Kato is now extending the database project to include all thirty-six Oregon counties.

Graduate research assistants in the sciences work in partnership with faculty mentors, often as the beneficiaries of external grants awarded to faculty investigators. These grants frequently include funds for graduate student salaries, tuition, and other benefits. Graduate researchers in the humanities more typically pursue individual scholarship while working closely with a faculty adviser.

For most disciplines, the doctor of philosophy degree (Ph.D) is thought of primarily as a research degree. A Ph.D. requires at least several years of work to produce a scholarly dissertation that demonstrates the student's capability tof making independent contributions to knowledge through original scholarship.

"This work often provides other direct benefits to society, such as improving the understanding of the natural or human environment, providing a basis for new technologies, or stimulating economic development," Linton notes.

Graduate education that includes research is also valuable in that it prepares the next generation of scientists and engineers to conduct the nation's research and development (R&D), whether it be in universities, industries, or government laboratories. U.S. investment in R&D now exceeds $200 billion annually.

"Much of the nation's applied R&D is performed by industry, and graduate education is a critical contributor here too," Linton says. "For example, more than half of the nation's recent Ph.D. recipients in physical science and engineering fields were employed in industry."

Name: Scott Reed

Department: Chemistry

Degree: Ph.D. candidate

Research: An innovative approach to a mature science, "green chemistry" uses methods that reduce the potential for hazard in chemistry by finding creative ways to minimize the human and environmental impact without stifling scientific progress. Green chemistry experiments were first introduced to undergraduate instructional laboratories in the UO's pilot green chemistry lab in 1998 -- a lab Reed and other UO graduate students helped to design. For this work, Reed received the American Chemical Society's prestigious Kenneth G. Hancock Memorial Student Award in Green Chemistry.

What's next? Developing a workshop to be offered next summer at the UO that will present green chemistry teaching methods to

educators from other institutions. He's also looking into various postdoctoral fellowships.

.On campus, graduate students and research assistants are advancing knowledge in every department -- from incubator activities for start-up companies in the UO business school's entrepreneurship program to investigations into molecular biology sponsored by the National Institutes of Health.

.The University of Oregon receives about $60 million annually in sponsored-program funding involving competitively awarded grants and contracts. This funding is primarily for research in the sciences, education, and social science, but extensive research programs are taking place throughout the UO. For example, students seeking professional degrees in journalism, architecture, or law, might extend their academic training with research activities.

."The fusion of graduate education with research is of fundamental importance to our nation in maintaining its leadership and competitiveness in the international marketplace," says Linton. "The UO remains dedicated to its mission as a research university, and thus to the development of its graduate students and graduate programs."

Back to INQUIRY home page

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University of Oregon
Graduate School

Welcome to the University of Oregon Graduate School Web Site

Graduate Studies at the University of Oregon

Graduate Programs and Certificates

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Current Students

Faculty and Staff

We have designed our web site to provide information to both prospective and currently enrolled graduate students as well as members of the faculty and staff at the university.

If you are a prospective graduate student, we look forward to welcoming you to the University of Oregon. The Graduate School web site provides information for prospective graduate students regarding our more than 70 graduate programs, application procedures, and other information related to graduate education at the University of Oregon.

As a currently enrolled UO graduate student or a member of the faculty or staff, we hope that you find the information you are looking for on our web site. We have provided links to make it easy for you to find information regarding Graduate School academic procedures and policies, administrative information, funding resources, a calendar of events and workshops, and forms.

If you need additional information, please do not hesitate to contact the Graduate School staff at (541) 346-5129 or gradsch@uoregon.edu.

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News and Events

OUS-SYLFF Graduate Fellowships for International Research

APRU Doctoral Student Conference

GTFF Collective Bargaining Agreement 2004-2006

GRADUATE SCHOOL
Graduate Degree Programs

Through the Graduate School, the University of Oregon offers studies leading to advanced degrees in the liberal arts and sciences and in the professional fields of architecture and allied arts, business, education, journalism and communication, and music. Program offerings are listed below with the degree offered (**M** = Master's; **D** = Doctoral) to the right of the major in the table below.

Specific program requirements for the majority of these degrees appear in the departmental web sites which are linked to the major names. The general requirements of the Graduate School are stated on the Graduate School Requirements web page.

The major schools and colleges offering advanced degrees at the university are:

- School of Architecture & Allied Arts
- College of Arts & Sciences
- Lundquist College of Business
- College of Education
- Graduate School: Interdisciplinary Programs
- School of Journalism & Communication
- School of Law
- School of Music
- Certificates

	School / College	Major Code	Major	Degree
UP				TOP
			School of Architecture and Allied Arts	
1.	AA	ARCH	Architecture	M
2.	AA	ART	Art	M
3.	AA	ARH	Art History	MD
4.	AA	AMGT	Arts Management	M
5.	AA	ARTC	Ceramics	M
6.	AA	CRP	Community & Regional Planning	M

7.	AA	ARTF	Fibers	M
8.	AA	HP	Historic Preservation	M
9.	AA	IARC	Interior Architecture	M
10.	AA	LA	Landscape Architecture	M
11.	AA	ARTM	Metalsmithing & Jewelry	M
12.	AA	ARTD	Multimedia Design	M
13.	AA	ARTP	Painting	M
14.	AA	ARTO	Photography	M
15.	AA	ARTR	Printmaking	M
16.	AA	PPM	Public Policy and Management	M
17.	AA	ARTS	Sculpture	M
18.	AA	ARTV	Visual Design	M
UP				TOP
College of Arts & Sciences				
19.	AS	ANTH	Anthropology	MD
20.	AS	APYH	Applied Physics	M
21.	AS	AST	Asian Studies	M
22.	AS	BI	Biology	MD
23.	AS	CH	Chemistry	MD
24.	AS	CLAS	Classics	M
25.	AS	COLT	Comparative Literature	MD
26.	AS	CIS	Computer & Information Science	MD
27.	AS	CWR	Creative Writing	M
28.	AS	EALL	East Asian Languages & Literatures	MD
29.	AS	EC	Economics	MD
30.	AS	ENG	English	MD
31.	AS	ENV	Environmental Studies	M
32.	AS	ESSP	Environmental Sciences, Studies, and Policy	D
33.	AS	FR	French	M
34.	AS	GEOG	Geography	MD

35.	AS	GEOL	Geological Sciences	MD
36.	AS	GER	German	MD
37.	AS	HIST	History	MD
38.	AS	HPHY	Human Physiology	MD
39.	AS	INTL	International Studies	M
40.	AS	ITAL	Italian	M
41.	AS	LING	Linguistics	MD
42.	AS	MATH	Mathematics	MD
43.	AS	PHIL	Philosophy	MD
44.	AS	PHYS	Physics	MD
45.	AS	PS	Political Science	MD
46.	AS	PSY	Psychology	MD
47.	AS	RL	Romance Languages	MD
48.	AS	R&ES	Russian and East European Studies	M
49.	AS	SOC	Sociology	MD
50.	AS	SE	Software Engineering	M
51.	AS	SPAN	Spanish	M
52.	AS	TA	Theater Arts	MD
UP				TOP

Charles H. Lundquist College of Business

53.	BA	ACTG	Accounting	MD
54.	BA	DSC	Decision Sciences	MD
55.	BA	DSCB	Decision Sciences: Business Statistics	MD
56.	BA	DSCP	Decision Sciences: Production & Operations Management	MD
57.	BA	FIN	Finance	MD
58.	BA	MGMT	Management	MD
59.	BA	MGB	Management: General Business (MBA)	M
60.	BA	MKTG	Marketing	MD
UP				TOP

College of Education

61.	ED	CDS	Communication Disorders & Sciences	MD
62.	ED	CFHS	Counseling, Family and Human Services	M
63.	ED	CPSY	Counseling Psychology	D
64.	ED	EINT	Early Intervention	MD
65.	ED	EDLD	Educational Leadership	MD
66.	ED	SPSY	School Psychology	MD
67.	ED	SPED	Special Education	MD
68.	ED	SPRH	Special Education: Rehabilitation	D
69.	ED	T&L	Teaching and Learning	M
UP				TOP
Graduate School				
70.	GR	IAIM	IS: Applied Information Management	M
71.	GR	IFLR	IS: Folklore	M
72.	GR	IIP	IS: Individualized Program	M
73.	GR	IT1	Teaching One Subject	M
UP				TOP
School of Journalism & Communication				
74.	JO	JCS	Communication and Society	MD
75.	JO	J	Journalism	M
76.	JO	JAD	Journalism: Advertising	M
77.	JO	JMAG	Journalism: Magazine	M
78.	JO	JNE	Journalism: News-Editorial	M
UP				TOP
School of Music				
79.	MU	DANC	Dance	M
80.	MU	IMT	Intermedia Music Technology	M
81.	MU	MCOM	Music Composition	MD
82.	MU	MCND	Music: Conducting	M
83.	MU	ME	Music Education	MD
84.	MU	MHIS	Music History	MD

85.	MU	MJS	Music: Jazz Studies	M
86.	MU	MUP	Music Performance	MD
87.	MU	MPP	Music: Piano Pedagogy	M
88.	MU	MTHE	Music Theory	MD
UP				TOP

CERTIFICATES

School of Architecture and Allied Arts

89.	AA	MSS	Museum Studies	GCERT
90.	AA	NFPM	Not-For-Profit Management	GCERT
91.	AA	TTA	Technical Teaching in Architecture	GCERT

College of Arts and Sciences

92.	AS	R&ES	Russian and East European Studies	GCERT
93.	AS	WST	Women and Gender Studies	GCERT
UP				TOP

College of Education

94.	ED	ECDS	Communication Disorders	GCERT
95.	ED	ESUP	Continuing Administrator/Superintendent	GCERT
96.	ED	EHL	Early Childhood/Elementary Special Education	GCERT
97.	ED	EEI	Early Intervention/Early Childhood Special Education	GCERT
98.	ED	EESO	English Speakers Other Language (ESOL)	GCERT
99.	ED	EESB	English Speakers Other Language/Bilingual	GCERT
100.	ED	EADM	Initial Administrator	GCERT
101.	ED	ITCH	Integrated Teaching	GCERT
102.	ED	MSED	Middle/Secondary Education	GCERT
103.	ED	ESHL	Middle/Secondary Special Education	GCERT
104.	ED	EMUS	Music Education	GCERT
105.	ED	ESPY	School Psychology	GCERT
106.	ED	EEC	Early Childhood	GCERT/ Inactive
107.	ED	EELM	Elementary	GCERT
108.	ED	ERET	Reading Education Teaching	GCERT/ Inactive

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This page is maintained by Richard F. Hadley, Computer Support Specialist for the Graduate School.

Last Update: February 8, 2005

[U of O]

Department of Planning Public Policy & Management University of Oregon

This page last updated January 25, 2005

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Planning Public Policy & Management

Graduate Studies
Public Policy & Management: Master of Public Administration (MPA)

Graduate Studies
Community & Regional Planning

Graduate Studies
Not-For-Profit Management Certificate

Department Information
Planning Public Policy & Management

Internship Program
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Graduate Studies Funding
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IPRI
Institute for Policy Research and Innovation

Affiliated with the Department of Planning, Public Policy & Management

Department of Planning Public Policy & Management
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Eugene, OR 97403-1209 USA
Phone: 1.541.346.3635 Fax: 1.541.346.2040
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university of oregon school of architecture and allied arts

UO InfoGraphics Lab

CARTOGRAPHY • GIS • GRAPHICS

The **InfoGraphics Lab** is located in the Department of Geography (163 Condon Hall). The Lab works on a variety of supported projects with faculty, campus offices, and government agencies. Integration of GIS and graphic design tools with cartographic design is a focus of the Lab's work.

- **Cartography and Graphic Design**
  Atlas design and production
  Agency reporting and mapping support
  Multimedia and dynamic presentation design
  Campus publications

- **Geographic Information Science**
  GIS Framework data research and development
  Planning GIS database products
  Human Geography and Archeology GIS mapping support
  Campus GIS development

- **Teaching and Research Support**
  Graduate researchers and undergraduates on staff
  Faculty research support - multiple departments
  Coordinates GI Science course and curriculum development

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Jim Meacham, Lab Director
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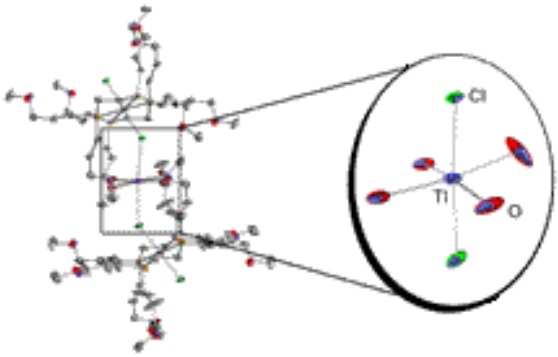

UO Lab Discovers Method to Assemble 1-D Coordination Polymers

Researchers in the Tyler lab recently demonstrated how "arrested" chloride abstraction reactions can be used to assemble 1-D coordination polymers.
PDF: Arrested chloride abstraction from trans-$RuCl_2(DMeOPrPE)_2$ with $TlPF_6$; formation of a 1-D coordination polymer having unusual octahedral coordination around Thallium(I). Nathaniel K. Szymczak, Fusen Han and David R. Tyler, Dalton Transactions, 2004, 3941 - 3942.
Learn More...

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1253 University of Oregon
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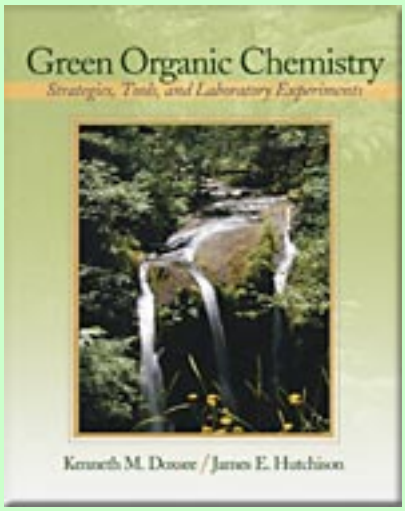
541-346-4601

Photo of Mt. Hood by Bernd Mohr.
WEBMASTER: lynde@uoregon.edu

UO Home Page

Green Chemistry
At the University of Oregon

We are currently accepting applications for our Green Chemistry in Education Workshop 2005 - see *the NSF Center for Workshops in the Chemical Sciences website:* *click here for application*



To find out more about our textbook, "*Green Organic Chemistry - Strategies, Tools and Laboratory Experiments*" published by Brooks-Cole Publishing, 2004; *click here*

Green Chemistry At Oregon | Green Organic Lab | Green Chemistry Resources | Who's Who in Green Chemistry

The Green Chemistry Program at
the University of Oregon has enjoyed financial support from the Environmental Protection Agency and the American Chemical Society.

Green Chemistry News at Oregon

Newsbriefs on the Greening of our department.

What is Green Chemistry?

The principles of green chemistry focus on reducing, recycling, or eliminating the use of toxic chemicals in chemistry by finding creative ways to minimize the human and environmental impact without stifling scientific progress.

Chemical synthesis which takes into account environmental considerations in the selection of reactants and reaction conditions is growing in importance as both industrial and academic researchers become aware of the environmental and economic advantages of an environmentally benign or "green" approach. The principles of a green approach are not covered in traditional chemistry courses, perhaps contributing to its slow growth as an area of academic research.

Finding creative ways to reduce hazard and waste has been the goal of many academic labs across the country. In recent history, the trend has been toward "microscale" methods; using smaller quantities of reactants to minimize the impact.

In contrast, green chemistry focuses on using less toxic reactants in the first place, thus reducing the need to use microscale methods. Students in a green chemistry lab can use quantities more typical of an industrial setting than their counterparts in a microscale lab. Finding realistic solutions to environmental concerns in academic labs should prove to be a boon to industry as they look for employees ready to meet the demands of the future of science.

At Oregon, we are setting the stage for becoming a national center devoted to green chemistry education and research by developing innovative educational materials and research programs based on green chemistry principles.

Green Chemistry at Oregon • Green Organic Lab • Green Chemistry Resources • Media Coverage

UO Chemistry Department

Webmaster: lynde@oregon.uoregon.edu

The story behind our Green Organic Lab

(For a graphic outline of our green organic lab curriculum, check out our slide show.)

In 1998-99 a green lab was offered as an alternative to the normal organic lab sequence at the University of Oregon. This two-term sequence, taught by Jim Hutchison and Ken Doxsee consisted of two sections with twelve students each. Additionally, three teaching assistants, Marvin Warner, Scott Reed, and Brad Wan worked with the students in the lab and continue to optimize and test new green laboratory experiments. For the 1999-00 year, the green lab was expanded to a class of 30 students, to further test the experiments, conduct monitoring of waste production and air monitoring. Today, all organic labs are taught in the green format in our new green organic lab.

The goal in designing this course was two-fold. We sought to teach students the core organic synthesis laboratory skills while demonstrating, first hand, the benefits of an approach that uses greener reagents, reaction conditions and products. Our belief is that the introduction of greener experiments will improve safety, allow for the routine use of macroscale techniques, and provide an ideal context for the discussion of chemical safety.

One of the challenges in developing this course was developing new laboratory experiments, as there are very few examples in current lab manuals. Our criteria for identifying green experiments for this new curriculum were that each experiment:

- Illustrate green chemical concepts (e.g. recycling, hazard reduction, solvent reduction)
- Teach modern reaction chemistry and techniques
- Complement the lecture course and provide a platform for discussion of environmental issues in the classroom
- Be accomplished by students given the time (3 hours) and material constraints of a typical student organic laboratory
- Is adaptable to either macroscale or microscale methods

- Uses inexpensive, greener solvents and reagents
- Reduces laboratory waste and hazards
- Each term of the lab course consists of 7 labs that were either designed from scratch or modified from existing labs to meet the above criteria.

Home • Green Chemistry at Oregon • Green Chemistry Resources • Media Coverage

UO Chemistry Department

Press Release: June 2000

Scott Reed Wins Prestigious Green Chemistry Award

A University of Oregon doctoral student is the recipient of this year's Kenneth G. Hancock Memorial Student Award in Green Chemistry. Scott Reed, a fifth-year doctoral student in chemistry, won the award for his role in developing the world's first organic green chemistry instructional laboratory for undergraduates at the UO. Offered by the American Chemical Society to just one student per year, the award carries tremendous prestige for those working in the growing area of green chemistry - in part, because it was presented in conjunction with the Presidential Green Chemistry Award in Washington D. C. this summer.

Reed said winning the Hancock Award added legitimacy to the project. "They (the committee) appreciate that one of the best ways to make a conceptual change in chemistry is to change the way we educate people," he said.

Green chemistry methods seek to reduce the potential for hazard in chemistry by finding creative ways to minimize the human and environmental impact without stifling scientific progress. While green chemistry principles are occasionally taught in organic chemistry classrooms, green chemistry experiments did not make it into instructional laboratories until the UO's pilot green chemistry lab in 1998, a lab Reed and other graduate students helped design.

Reed got interested in the project after his advisor began researching green chemistry as a way to reduce reliance on the limited lab safety equipment necessary to protect students from the toxic chemicals used in traditional organic lab. Reed's advisor, Professor Jim Hutchison, solicited the help of fellow professor Ken Doxsee to help design the curriculum.

Interested in environmental chemistry since he was an undergraduate at Bard College, the project immediately appealed to Reed. His role was to research and modify experiments to work within the space and time restrictions of an instructional lab setting. A very big challenge, as it turned out. "For every lab we changed, there was a lot of effort involved," said Reed.

Though green experiments existed in the literature, none of them was tailored to the time restrictions of a student lab. The challenge, said Reed, was to find experiments that would teach the same skills and techniques as a traditional lab, but use more benign chemicals to illustrate those concepts. "The first and foremost thing we did in the course was teach chemistry," he said.

While it is unusual for graduate students to be involved in curriculum-development, Reed applied for and was awarded a special fellowship through the Department of Education, which provided him funding to focus on designing new experiments. Although work on his doctoral project sometimes had to be put on the back burner, Reed says the experience was worth the extra effort and will forever

influence the way he looks at chemistry.

"Anyone who's doing chemistry is pulling chemicals off the shelf and anyone can use the concepts of green chemistry in deciding what they pull off the shelf," he says. "Someday, green chemistry will just be the way chemistry is done."

One of Reed's more note-worthy accomplishments is the adaptation of an experiment to synthesize adipic acid, a chemical used to make nylon. Typically, nitric acid is used as the oxidant. An unfortunate byproduct is nitrous oxide, a chemical that contributes to ozone depletion. The green version substitutes a low concentration of hydrogen peroxide as an alternative to the nitric acid, making the experiment much less hazardous. Reed modified and optimized the experiment for the teaching laboratory. The experiment has been accepted by the **Journal of Chemical Education** for publication this year.

The UO plans to eventually convert all organic chemistry labs to the green format and Professor Hutchison hopes students of green chemistry will carry their new knowledge with them to work. "We really believe that the experiments students learn will help plant the seed to use these kinds of chemistry in industrial settings," says Hutchison. Perhaps they can teach their co-workers to think a little harder about what they pull off that shelf.

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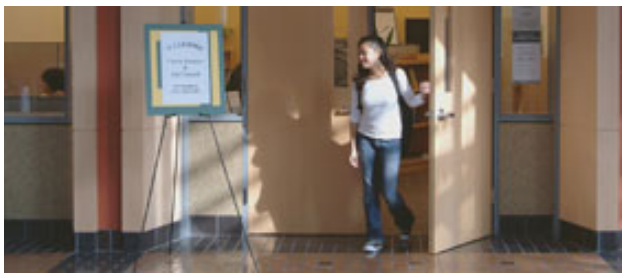

New Tutoring Center Location Breeds Success

The Lillis Business Complex is more than a new state-of-the-art facility. It is a functional part of the curriculum, a physical presence that plays a major role in the unique approach to business education at the University of Oregon's Charles H. Lundquist College of Business. Read More...

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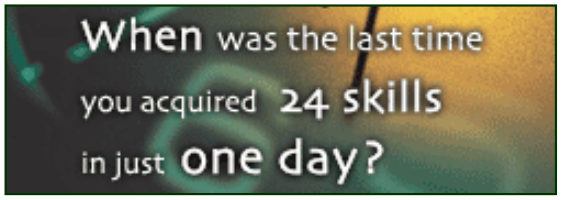

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