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Connecting the Disciplines Advances Knowledge and Oregon's Economy

BBMI's fMRI machine

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Nanomaterials, Human Products

A National Science Foundation grant awarded to Mark Lonergan, associate professor of chemistry, will help answer a major question confronting nanotechnology scientists, the development and use of technology at the molecular scale. **read more >>**

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Technology Transfer

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Mark Lonergan

Key Support for Project SUPPORT

Mike Bullis and Deanne Unruh

Preventing one youth from reentering a correctional facility saves the state tens of thousands of dollars annually, says UO College of Education professor Mike Bullis. Bullis' research found that youth eligible for special education services were reincarcerated at statistically significantly higher rates than nondisabled youth. **read more >>**

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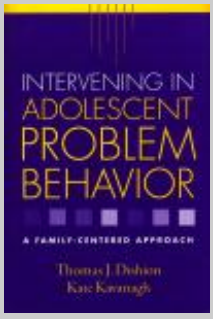
UO graduate student Melanie Hauser conducts an experiment

A grant awarded to two UO chemistry professors will ease budget pressures on local schools while encouraging interest in science. The $560,000 National Science Foundation (NSF) grant will pay for UO graduate students to teach science in elementary schools and help their teachers learn how to use science experiment kits. **read more >>**

Preventing Adolescent Drug Abuse



Adolescence is a time when many parents feel they can "let go" of their children, but that is precisely the wrong approach, according to Thomas J. Dishion and Kate Kavanagh in their new book, Intervening in Adolescent Problem Behavior: A Family-Centered Approach. **read more >>**

Bacteria Research Looks at Cancer Link

A bacterium known as H. pylori colonizes the stomachs of over half the world's population. In most infected individuals, H. pylori is a benign gastric resident. In certain cases, however, it becomes a serious pathogen and even carcinogen, causing gastritis, peptic ulcers, gastric adenocarcinoma, or mucosal-associated lymphoid tissue lymphoma. **read more >>**

Karen Guillemin

Helping Communities Avoid Natural Disasters

Oregon communities are subject to a variety of natural hazards ranging from earthquakes and floods to wildfires. Beyond managing a crisis when natural disasters happen, a contract awarded to University of Oregon's Community Service Center aims to help communities avoid disaster losses altogether. The $180,000 contract with Oregon Emergency Management is helping to fund applied research and development and implementation of disaster action plans to reduce risk in Oregon communities. **read more >>**

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Today, the university is about to make the next evolutionary step in collaborative research that promises to reap benefits far beyond the university's borders.

Historically, academic departments have largely functioned independently of one another, providing little opportunity for faculty interaction. Recognizing that scientific discovery often takes place at the boundaries of traditionally defined disciplines, UO faculty members sought long ago to facilitate and increase collaboration.

In 1959, the university created the Institute of Molecular Biology, bringing together biologists, chemists, and physicists. The campus' compact size, along with science buildings that integrate office and lab space used by different fields of study further encouraged collaboration.

"The university's interdisciplinary approach attracts nationally renowned faculty members," said Tom Stevens, institute director. "They can intermingle seamlessly, taking advantage of the expertise around them to extend the limits of their knowledge. The method also encourages students to cross departmental boundaries to follow their curiosities and amplify their learning."

This cross-pollinating of ideas has produced more than thirty research institutes and centers, including two major initiatives that have put UO research on the map.

The Brain, Biology, and Machine Initiative combines research in cognitive neuroscience, molecular biology, genetics, and computational science. Researchers' examination the cognitive and anatomical functions of the brain could have far reaching applications in medicine and education.

The heart of the initiative is the functional magnetic resonance imaging (fMRI) machine installed in 2002. It has generated more than twenty studies in areas as varied as stroke rehabilitation and improved learning

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and opened the door to other disciplines.

The Materials Science Institute is home to a new initiative, Multiscale Materials and Devices, which connects UO physics and chemistry researchers with engineering faculty members at Oregon State University and researchers at Portland State University.

Collaboration is helping UO researchers build momentum in nanotechnology, the development and use of technology on a molecular scale. They have discovered thermoelectric materials that could provide energy efficient, refrigerant-free cooling solutions, and biomolecular lithography, a candidate for use in the miniaturization of electronic circuits and computers.

The next step of collaboration is integrating academic and industrial researchers. "The opportunity for discovery will be greater than the sum of the parts, as scientists from different disciplines and experiences visit campus and share knowledge," said James Hutchison, director of the Materials Science Institute.

The future for collaborative research is so promising that the 2003 Oregon Legislature allocated $9.5 million in bond funds for Multiscale Materials and Devices as a component of the UO's Integrative Science Complex. State, university, and industry leaders hope such broadbased collaboration can ignite innovation and creation that will help light the way to a brighter economic future for Oregon.

Read more: **http://www.molbio.uoregon.edu/lifesci/**
http://materialscience.uoregon.edu/

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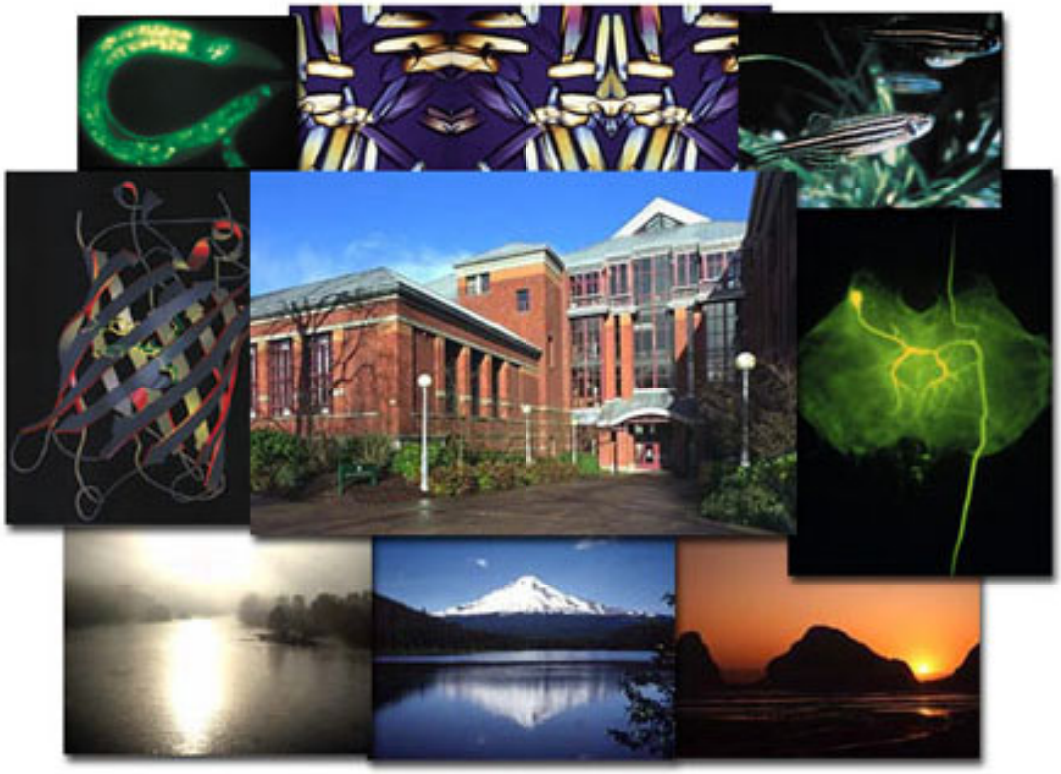

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- Marine Biology
- Neuroscience
- Structural Biology

Faculty Listed Alphabetically

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Center for Ecology & Evolutionary Biology | Institute of Molecular Biology | Institute of Neuroscience | Oregon Institute of Marine Biology

webmaster@molbio.uoregon.edu

materials science institute
University of Oregon

The Materials Science Institute is an interdisciplinary institute of the University of Oregon. Founded in 1985 as a State Center of Excellence, the purpose of the Institute is to study the structure and properties of materials, to educate in the sciences of materials, and to serve Oregon as a resource in these sciences. Since 1985 the Institute has more than tripled the size of its research program, developed four new graduate programs in materials, and contributed to the State's prosperity through collaboration with more than 25 Oregon companies.

- NSF Summer Research Experience for Undergraduates (REU)
- CHIP Camp
- PolyCamp
- Rock Camp

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- Master's Programs
- Internships
- GK-12 Fellowship Program
- UO Women in Graduate Science

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- News
- Seminar Schedule
- Chemistry Department
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- CAMCOR - Center for Advanced Materials Characterization in Oregon
- Internships
- Corporate Contact
- MSI Retreat
- Nobel Symposium

Contact Information:

Mailing Address:
Materials Science Institute
1252 University of Oregon
1371 E 13th St, Room 163
Willamette Hall
Eugene OR 97403

FAX:
(541) 346-3422

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Technology Transfer on the Rise

Technology transfer is climbing to new heights as UO researchers set records for the number of new inventions disclosed during the last fiscal year. New license and option agreements and the amount of licensing income increased for the eighth consecutive year.

These records reflect the university's growing success in moving research innovations to commercialization and, ultimately, in harnessing its expanding research programs as a source of diversification for the state's economy.

Researchers publicly unveiled a record thirty-six new inventions in the fiscal year that ended June 30. That's more than five times the number of inventions reported just four years ago. The university completed twenty-five licensing agreements, more than double the number in 2002.

Technology licensing revenue last year totaled more than $1.77 million, a whopping 230 percent increase from the previous fiscal year's totals. This year's growth came from expanded UO innovation and licensing as well as inclusion for the first time of the long-established licensing of career information systems created by the highly ranked College of Education.

Significantly, the university reinvested and distributed most the licensing revenue to the university's inventors, departments, and laboratories to help support on-going research and patent yet more UO innovations, which will prime the pump for future technology transfers.

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UO Research Record: Nearly $78 Million in Funding

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Of the $77.8 million in grants and contracts received by the university, more than 70 percent is for research, 21 percent for community service, and 8 percent for instruction.

Projects include researching causes of cancer, preventing adolescent substance abuse, teaching science in elementary schools, and developing the science of nanotechnology. Grants also underwrite postdoctoral research, pay for specialized equipment, and recruit world-class faculty members. Many awards help communities pay for planning or special projects. (See details about specific project stories in this newsletter.)

Awards and contracts earned by UO faculty members help Oregon's economy by bringing new revenue into the state. For every $1 million in sponsored research, forty jobs are supported, according to the U.S. Department of Commerce.

This year's 3.6 percent increase reflects an upward trend in grants and awards experienced by the university over the past decade. Since 1992, the amount of sponsored research has increased 67 percent. Total awards for that time exceed half a billion dollars.

Higher education officials often point to research contracts and grants as a key benchmark of university success. The University of Oregon ranks among the nation's leading universities in research funding generated per faculty member.

"For our faculty to perform so well on the heels of a 30- percent growth year and at a time when other financial support has decreased is a testament to the collective strength of our researchers," said Richard Linton, vice president for research and graduate studies. "Not only does their work contribute significantly to the global body of scientific knowledge, their studies enhance UO's position as a leading public research university."

Sponsored research funding is particularly significant to the university in the context of falling state contributions. The university received $69.6 million in general fund money from the state of Oregon in FY 2003, $8 million less than it received in sponsored research funds.

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The university is a world leader in green nanotechnology, part of Multiscale Materials and Devices (MMD) research that promises to revolutionize products and processes in areas from electronics to medicine. UO's Brain, Biology, and Machine Initiative addresses the most fundamental questions about the human mind.

MMD funding includes $4.75 million in bonds supported by the Oregon lottery, which is reserved for economic development initiatives. Its use for this higher education project indicates the project's importance to Oregon's economy.

Read more: **http://oga.uoregon.edu/OGAUpdate.html**

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Nanomaterials, Human Products

Mark Lonergan

A National Science Foundation grant awarded to Mark Lonergan, associate professor of chemistry, will help answer a major question confronting nanotechnology scientists, the development and use of technology at the molecular scale.

Nanotechnolgy has widespread applications in medicine, transportation, electronics, and space exploration. Using the unique properties of materials at the nanoscale, UO researchers are developing products that could help industry rethink manufacturing processes and make changes that minimize the use of hazardous materials, increasing safety for humans and the environment.

How people will be able to use such small products is a major question facing nanotechnology researchers. Lonergan's $180,000 grant seeks to answer very fundamental questions about connecting nanoscale materials to human-scale products. Since many materials behave differently at the nanoscale, the research seeks to identify those differences and to help scientists take the next step toward application of nanotechnology.

Read more: **http://www.uoregon.edu/~chem/lonergan.html**

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Mark C. Lonergan

Associate Professor
Physical & Materials Chemistry

Member, Materials Science Institute
Lonergan Lab

B.S., University of Oregon, summa cum laude, 1990. Ph.D., Northwestern University, 1994 (Mark A. Ratner and Duward F. Shriver). Postdoctoral: California Institute of Technology, 1994-96 (Nathan S. Lewis). Honors and Awards: National Science Foundation Predoctoral Fellow, 1990-93; A.A. Noyes Postdoctoral Fellow, 1995; ACS/Proctor Gamble Graduate Award in Physical Chemistry, 1995; Dreyfus New Faculty Award, 1996; National Science Foundation CAREER Award, 1997. At Oregon since 1996.

Research Interests:

Our research program is based on the discovery and quantitative understanding of interfacial electron transfer processes that depend on applied bias in a complex, nonlinear and often asymmetric way. This pursuit is at the heart of efforts to identify and control novel systems that enhance and/or mimic the behavior of conventional semiconductor interfaces, which form the basis for nearly all present day microelectronic devices. An important element of our approach is to understand how the unique chemistry of "new" materials manifests itself in interfacial charge transfer processes. Our studies over the past five years have focused on conjugated or "conducting" polymers where we have been working on three major projects that all draw in some way on the unique redox (doping) chemistry of conjugated polymers relative to more traditional inorganic conductors. Three major areas of research are: (1) Electron transfer at inorganic semiconductor | conjugated polymer interfaces; (2). Polyelectrolyte mediated redox chemistry and inter-faces between dissimilarly doped conjugated polymers; (3) Electron transfer at nanostructured semiconductor interfaces. For more information, see the lab web site at http://wwwuoregon.edu/~lnrgn

Selected Publications

M. C. Lonergan, "A Tunable Semiconductor Diode Based on an Inorganic Semiconductor | Conjugated Polymer Interface," Science 278, 2103-2106 (1997).

F. E. Jones, B. P.Wood, J.A. Myers, C. Daniels-Hafer, and M. C. Lonergan, "Current transport and the Role of Barrier Inhomogeneities at the High BarrierÊ n-InP | Poly(pyrrole) Interface," J. Appl. Phys. 86, 6431-6441 (1999)

B. L. Langsdorf, X. Zhou, M. C. Lonergan, "Kinetic Study of the Ring Opening Metathesis Polymerization of Ionically Functionalized Cyclooctatetraenes," Macromolecules 34, 2450-2458 (2001).

M. C. Lonergan and F. E. Jones, "Calculation of Transmission Coefficients at Non-Ideal Semiconductor Interfaces Characterized by a Spatial Distribution of Barrier Heights," J. Chem. Phys. 115, 443-455 (2001).

C. Daniels-Hafer, M. Jang, S.W. Boettcher, R. Danner, and M.C. Lonergan, "Electrochemical Tuning of Charge Transport at the interface between Indium Phosphide and a Polypyrrole-phosphomolybdate Hybrid", J. Phys. Chem. B 106, 1622-1636 (2002).

M.C. Lonergan, C.H. Cheng, B.L. Langsdorf, X. Zhou, "Electrochemical Characterization of Polyacetyelene Ionomers, and Polyelectrolyte Mediated Electrochemistry Toward Interfaces Between Dissimilarly Doped Conjugated Polymers", J. Am. Chem. Soc. 124, 690-701(2002).

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Key Support for Project SUPPORT

Mike Bullis and Deanne Unruh

Preventing one youth from reentering a correctional facility saves the state tens of thousands of dollars annually, says UO College of Education professor Mike Bullis. Bullis' research found that youth eligible for special education services were reincarcerated at statistically significantly higher rates than nondisabled youth.

In 1999, the Oregon Youth Authority, Department of Education, Vocational Rehabilitation Services, and University of Oregon teamed up to address the transition from correctional facilities to the community. Project SUPPORT has already helped over 300 incarcerated Oregon youth with disabilities find stability in their communities. Now, the U.S. Department of Education has awarded Project SUPPORT $250,000 each year for three years to expand to Multnomah and Lane Counties.

Evaluation results demonstrate SUPPORT participants are employed or enrolled 68 percent of the time in a six-month period says UO research associate Deanne Unruh. The collective savings to society make transition services a wise investment: The U.S. Department of Justice suggests that cutting convicted juvenile "return" rates by just 4 percent over five years would save $65 million and reduce violent crimes.

Read more: **http://education.uoregon.edu/faculty/bullis.htm**

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Michael Bullis
Professor, Secondary Special Education and Transitions Research
Area of Special Education
College of Education
5261 University of Oregon
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Area of Special Education email

Dr. Bullis earned his Ph.D. from the University of Oregon in 1983 in special education and rehabilitation, specializing in research methods. He also is a nationally certified rehabilitation counselor. Before returning to the UO in 1995, he was a research associate at the University of Arkansasâ€™

Rehabilitation Research and Training Center on Deafness and the Associate Director of the Teaching Research Division of Western Oregon University.

Since 1986, Dr. Bullis has been awarded and managed 30 externally funded research and model demonstration projects, totaling more than $15 million, focusing on high-risk (those with emotional disorders or who are in the correctional system) adolescents.

EDUCATION

Ph.D., University of Oregon, 1983
M.S., Purdue University, 1978
B.P.E., Purdue University, 1973

Photographed at the University of Oregon College of Education

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Nurturing an Interest in Science

UO graduate student Melanie Hauser conducts an experiment

A grant awarded to two UO chemistry professors will ease budget pressures on local schools while encouraging interest in science. The $560,000 National Science Foundation (NSF) grant will pay for UO graduate students to teach science in elementary schools and help their teachers learn how to use science experiment kits.

Professors David Johnson and David Tyler are coordinating the program. As part of the program, elementary students conduct experiments to help them better understand that science doesn't just come out of books, but is about observation and discovery. Teachers get a practical demonstration in use of the science kits, provided by NSF, and a graduate student in the classroom to answer questions.

Six Lane County elementary schools are in the program this year. The grant may be extended for an additional five years, which would bring the program to every elementary school in Lane County.

Read more: **http://materialscience.uoregon.edu/GK12/Overview.html**

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The National Science Foundation GK-12 Program at the University of Oregon pairs with the Lane County School Districts to improve Math and Science Education in area schools!

New! Check out Lane County's Corps of Discovery 2005 Science Fair!

Program Overview

With funding from the National Science Foundation, the University of Oregon's GK12 Science Outreach Program provides eleven graduate students from Chemistry and Physics as resources for teaching physical hands-on science and mathematics in seven elementary schools in Lane County. The fellows spend 8-10 hours a week assisting with a variety of in school activities. Additional science demonstration resources are available from the Lane Education Service District and the University of Oregon.

GK12 Program Objectives:

- Increase student knowledge and appreciation of math and physical science.
- Provide fellows experience in delivering science and math education.
- Increase student achievement.
- Enhance teachers' knowledge of physical science and mathematics content.
- Provide assistance with Oregon's requirement for "scientific inquiry work samples."
- Enhance science teaching using science kit-based instruction.
- Improve fellows' communication skills, enhance content knowledge and develop teaching skills.
- Prepare fellows for careers that encourage or require community outreach.
- Increase adoption of kit-based science curricula.

Potential In-school Activities for Fellows:

- Provide K-5 teacher workshops on content underpinnings.
- Serve as content resource specialists and assist with their instruction.

School Districts in Lane County use science kits from a variety of sources for inquiry based, hands-on science instruction. Please click here for the list of physical science kits.

- Serve as a science specialist and STEM (science, technology, engineering and math) coordinator for assigned school.
- Provide demonstrations and other content resources to teachers and students.
- Help teachers with "scientific-inquiry" based work samples developed from kit materials.
- Be a scientist in the classroom and, thus, model how a scientist looks at the world.
- Develop activities (puzzles, challenges, etc.) that integrate both math and science skills.
- Mentor students in science fair project development.

2003-04 Partner Schools

Creslane Elementary in Creswell, OR
Applegate Elementary in Eugene OR
Lorane Elementary in Lorane, OR
Marcola Elementary in Marcola, OR
River Road Elementary in Eugene, OR
Howard Elementary in Eugene, OR
Westmoreland Elementary in Eugene, OR

2004-05 Partner Schools

In addition to working with the schools from 2003-04, we are also working with the following new schools.

Crow Middle School/High School in Crow, OR
Creswell Middle School in Creswell, OR
Jefferson Middle School in Eugene, OR
Fern Ridge Elementary School in Veneta, OR
Elmira Elementary Schoolin Elmira, OR
Laurel Elementary School in Junction City, OR
Trent Primary School in Pleasant Hill, OR
Sisters Elementary in Sisters, OR

For more detailed information, please visit our Blackboard page at: **http://blackboard.lane.k12.or.us/webapps/login**
For guest access, use the following:
ID: funscience
password: funscience

Did you host a GK12 Fellow in your classroom? If so, we want to hear about it. Please fill out the survey and return it to us.

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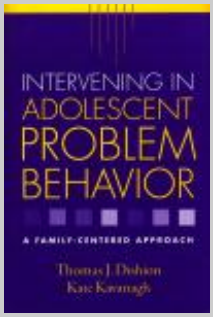
Preventing Adolescent Drug Abuse



Adolescence is a time when many parents feel they can "let go" of their children, but that is precisely the wrong approach, according to Thomas J. Dishion and Kate Kavanagh in their new book, Intervening in Adolescent Problem Behavior: A Family-Centered Approach.

The Adolescent Transitions Program pioneered by Dishion and Kavanagh in Portland public schools, is a national model. The National Institutes of Health awarded the team $1.6 million last year to continue their research on early, family-centered prevention of drug use with 1,000 Portland families.

Dishion is research director at the UO Child and Family Center, and Kavanagh is intervention director for the Project Alliance office in Portland.

"The natural inclination is for parents to let the reins go as their kids get older," explained Kavanagh. "But adolescence is the time to hold on with 'long arms.' If they get into trouble they need parents as a resource."

The book also points out that kids in group treatment often teach each other new ways to be bad. "Those situations offer a very real potential for making kids worse," emphasized Dishion.

Read more: **http://cfc.uoregon.edu**

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Welcome to the Child & Family Center

The Child and Family Center (CFC) is an institute within the University of Oregon. The Center staff is dedicated to understanding and promoting mental health and resilience within families across cultural communities. CFC emphasizes research on social emotional-development from infancy through adolescence, as well as innovation in assessment, prevention, and intervention services for children and families. CFC seeks to collaborate with local, tribal, state, national, and international organizations and researchers engaged in similar efforts to understand and promote mental health in children and families.

- **PEER Preconference**
- **2003 Annual Report**
- **2002 Annual Report**
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Bacteria Research Looks at Cancer Link

Karen Guillemin

A bacterium known as H. pylori colonizes the stomachs of over half the world's population. In most infected individuals, H. pylori is a benign gastric resident. In certain cases, however, it becomes a serious pathogen and even carcinogen, causing gastritis, peptic ulcers, gastric adenocarcinoma, or mucosal-associated lymphoid tissue lymphoma.

Through her research, Karen Guillemin, assistant professor of biology, is trying to determine why the bacteria makes some people so sick while it has no effect on others. She received a $600,000 grant last year from the American Cancer Society to further that investigation.

Her research focuses on a correlation between certain genes and cell formation. Genetic factors of both the human and the bacteria play a part in causing disease, as each genome responds to and is regulated by the other. Guillemin is examining whether these genes cause damage in the host cells and, if so, how that occurs. Her research aims to identify the molecular nature of the bacteria-host dialogue that determines disease outcome.

Learn more: **http://www.molbio.uoregon.edu/facres/guillemin.html**

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Faculty Profile

UNIVERSITY OF OREGON
INSTITUTE OF MOLECULAR BIOLOGY

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Research Interests

We are interested in how bacteria interact with their animal hosts in disease and in normal development. Our focus is *Helicobacter pylori* which colonizes the stomachs of over half the world's population. In most infected individuals *H. pylori* is a benign gastric resident, however in certain cases it becomes a serious pathogen and even carcinogen, causing gastritis, peptic ulcers, gastric adenocarcinoma, or mucosal-associated lymphoid tissue lymphoma. The disease outcome is determined by both host and bacterial genetic factors in a complex interplay, as each genome responds to and is regulated by the other. We would like to understand the molecular nature of the bacterial-host dialogue that determines disease outcome.

Bacterial manipulation of host cells

We have examined the effect of *H. pylori* infection on cultured gastric epithelial cells both at the morphological and transcriptional levels, using videomicroscopy, cell biological approaches and DNA microarray technology. The bacteria attach to the gastric cells and cause extensive changes in the host cell cytoskeleton (Figure 1B) and host gene expression. With bacterial mutants lacking known or putative virulence factors we have been able to dissect the contributions of individual bacterial proteins to the host cell response. For example, *H. pylori* lacking the *cagA* gene, which encodes a protein injected by the bacteria into host cells, fail to cause cell elongation (Figure 1C) and do not induce host cell expression of a number of cytoskeletal genes upregulated by wild type bacteria. Further cell biological studies will help elucidate the molecular nature of these factors' effects on host cells.

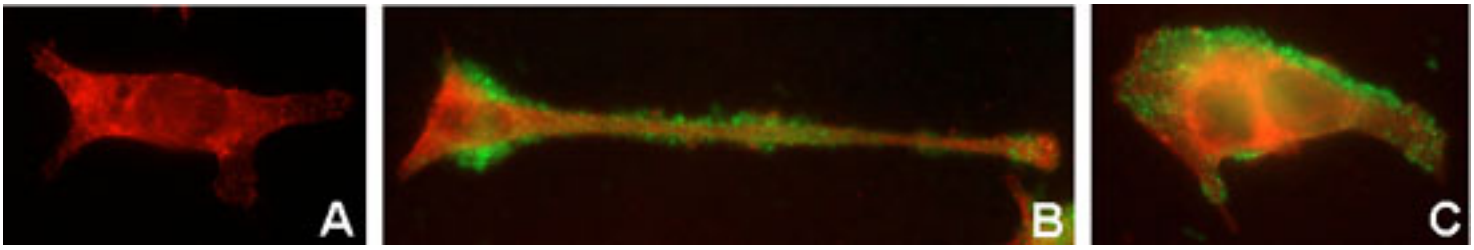

Figure 1 Cell shape changes induced in gastric epithelial cells (AGS) by *H. pylori*. **A.** An unifected gastric epithelial cell. **B.** A gastric epithelial cell infected with wild type (G27) *H. pylori* for 24 hours becomes elongated. **C.** A gastric epithelial cell infected with a *cagA* isogenic mutant for 24 fours fails to elongate.

Bacterial adaptation to host cells

To examine the bacterial perspective in the interaction with host cells, we have constructed *H. pylori* DNA microarrays to monitor bacterial gene expression elicited by different growth conditions. We can manipulate the host cell milieu to monitor how bacteria sense and respond to host cells. Using bacterial genetics we can test whether bacterial genes upregulated in the presence of host cells function in aspects of the bacterial-host interaction. The importance of bacterial and host factors will be further investigated using mouse models of *H. pylori* associated diseases and mouse somatic genetics.

Bacterial-host interactions in development

Colonization by bacteria is an important event in normal development and is required for maturation of the gastrointestinal tract, the immune system, and for establishment of proper digestive physiology. We are interested in investigating the role of the commensal flora in zebrafish development by examining the developmental programs of animals grown axenically or with defined flora.

Selected Publications

Mueller A., J. O'Rourke, J. Grimm, K. Guillemin, M.F. Dixon, A. Lee, and S. Falkow (2003) Distinct gene expression profiles characterize the histopathological stages of disease in Helicobacter-induced mucosa-associated lymphoid tissue lymphoma. PNAS **100**:1292-7.

Guillemin, K., N. Salama, M. Amieva, L. Tompkins, and S. Falkow (2002) Cag pathogenicity island specific responses of gastric epithelial cells to *Helicobacter pylori* infection. PNAS **99**:15136-41.

Guillemin, K., S. Falkow, and N. Salama. *Helicobacter pylori Functional Microbial*

Genomics, p. 291-319. *Functional Microbial Genomics, vol. 33. Ed.* Wren, B. and Dorrell, Academic Press Limited, London.

Bjorkholm B.M., J.L. Guruge, J.D. Oh, A.J. Syder, N. Salama, K. Guillemin, S. Falkow, C. Nilsson, P.G. Falk, L. Engstrand, and J.I. Gordon (2002) Colonization of germ-free transgenic mice with genotyped *Helicobacter pylori* strains from a case-control study of gastric cancer reveals a correlation between host responses and HsdS components of type I restriction-modification systems. J Biol Chem **277**:34191-7.

Bjorkhom, B., A. Lundin, A. Sillen, K. Guillemin, N. Salama, C. Rubio, J.I. Gordon, P. Falk, and L. Engstrand (2001) Comparison of genetic divergence and fitness between two subclones of *Helicobacter pylori*. Infect Immun **69**:7832-8.

Salama N., Guillemin, K., T.K. McDaniel, G. Sherlock, L. Tompkins, and S. Falkow (2000) A Whole Genome Microarray Reveals Genetic Diversity Among *Helicobacter Pylori* Strains. PNAS **97**: 14668-73.

Updated: March 2005
Contact: webmaster

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Helping Communities Avoid Natural Disasters

Oregon communities are subject to a variety of natural hazards ranging from earthquakes and floods to wildfires. Beyond managing a crisis when natural disasters happen, a contract awarded to University of Oregon's Community Service Center aims to help communities avoid disaster losses altogether. The $180,000 contract with Oregon Emergency Management is helping to fund applied research and development and implementation of disaster action plans to reduce risk in Oregon communities.

The Disaster Mitigation Act of 2000 requires communities to take steps to reduce the risk of natural disasters. Led by Research Associate Andre LeDuc, a team of UO researchers and students assists communities throughout the state in identifying potential hazards, such as floods or wildfires, investigate past natural disasters, and develop an action plan the communities can implement to avoid future disasters.

The UO team provides technical resources, coordinates training, and assists with the development of plans to increase the community's capacity to implement the mitigation plan and meet the new federal requirements.

This is the second year for the Predisaster Mitigation program. This year the teams will work with Deschutes and Columbia Counties and the city of Medford. Last year assistance was provided to Douglas, Clackamas, Grant, Baker, Union, Wallowa, and Tillamook Counties and cities of Beaverton and Hillsboro.

Read more: **http://www.uoregon.edu/~csco**

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Technology Transfer

Graduate School

The COMMUNITY Service Center

A consortium of programs providing community service through partnerships between Oregon universities and communities.

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Biologist Resurrects 600-Million-Year-Old Gene

Sea slug, *Aplysia californica*

By successfully resurrecting a gene that existed 600 million years ago, evolutionary biologist Joe Thornton has brought a bit of Jurassic Park to the University of Oregon. Thornton's research demonstrates that estrogen was the first steroid hormone to evolve, dating back to the early eons of animal evolution, far earlier than previously thought.

Thornton's findings, published in the September 19 issue of Science, has important implications for evolutionary theory and environmental health. The strategy of resurrecting ancient genes promises major advances for evolutionary biology, because it allows the function of long-extinct molecules to be studied experimentally.

The paper's coauthors are UO research assistant Elle Need and David Crews, a collaborator at the University of Texas. It was funded in part by the National Institutes of Health.

First, the team isolated the gene for a steroid hormone receptor from a modern mollusk, the sea slug Aplysia californica. Steroid hormones control reproduction, behavior, and many other processes in humans and other vertebrates. Each hormone interacts with a specific protein called a receptor in the cells of hormonally responsive tissues.

Thornton's finding that steroid hormone receptors exist in distantly related invertebrates indicates that the majority of animal species inherited these molecules from their ancient common ancestor, broadening the scope of damage that hormone-disrupting chemicals in the environment may cause. Most chemical testing and regulatory programs are focused on vertebrates and take little account of impacts on other kinds of animals.

Thornton turned to the ancestral gene from which all of today's steroid receptors evolved. Applying innovative statistical techniques to a large number of modern-day receptors, Thornton's group inferred the DNA sequence of the ancestral gene. They used biochemical methods to synthesize the gene and transferred it into cells they cultured in the lab, which were made to produce large quantities of the ancient receptor protein. A series of experiments on the ancestral receptor showed that it responds only to estrogens and that other hormones evolved more recently.

Thornton's evolutionary research program is a natural outgrowth of his passion to protect the environment and reduce the effect of chemicals on human health. His book on global chemical pollution, *Pandora's Poison: Chlorine, Health, and a New Environmental Strategy* (MIT Press), was called "a masterpiece" and "a landmark book" by the scientific journal Nature.

Office of Research and Graduate Studies

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Technology Transfer

Graduate School

Thornton joined the UO Department of Biology as an assistant professor in fall 2002 from Columbia University's Earth Institute. Graduate and postgraduate biology students are working with Thornton to trace the specific changes in the gene that allowed it to evolve affinity for new hormones and to reconstruct other ancient members of this gene family to determine the exact sequence of events by which our modern hormones and receptors evolved.

Read more: **http://www.uoregon.edu/~joet**

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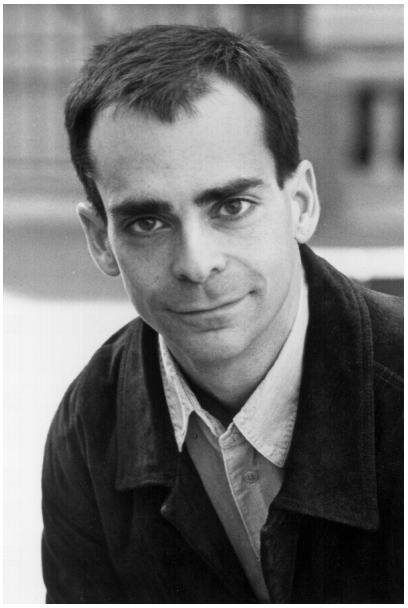
Joe Thornton, Ph.D.



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NEW!

October 2004: Our paper in *Nature* , "Performance of maximum parsimony and likelihood phylogenetics when evolution is heterogeneous." pdf of the paper

October 2004: U of O news release on the Nature paper

May 2004: Our report in *Nature Reviews Genetics* , "Resurrecting ancient genes: experimental analysis of extinct molecules." pdf of the paper

May 2004: Wall Street Journal story on resurrecting ancient genes, based on the *Nature Reviews Genetics article.*

Sept 19, 2003: Our report in *Science* , "Resurrection of the ancestral steroid receptor: ancient origin of estrogen signaling." pdf of the paper

News release on the Science paper

U of O web story on the Science paper

Portland Oregonian newspaper story on the Science paper

Nature Genetics feature on the Science paper

RESEARCH

Molecular macroevolution

How do we explain the origin of hormones and other biological molecules? Within and among genomes, genes are organized hierarchically in families, due to a continuing process of gene duplication, speciation, and sequence divergence. From this organized genomic diversity arises the physiological and developmental complexity of all living things. I combine genomic, phylogenetic, and functional analyses to understand the processes and dynamics by which change at the level of DNA has caused the expansion of gene families and the emergence of novel gene functions. I am also concerned with problems of environmental health and policy and the role of science in democratic decisionmaking.

Our research falls into three major areas:

- Molecular evolution of the endocrine system. We study in detail the evolutionary history of the nuclear receptors, a superfamily of ligand-activated transcriptional regulators that play critical roles in animal development and endocrinology. NRs include receptors for such important hormones as estrogens, androgens, progestins, thyroid hormones, retinoids, and ecdysteroids.
- Gene family evolution. We develop novel phylogenetic techniques for studying gene family and protein evolution.
- Analysis of the science and politics of global chemical pollution. This work serves as a case study in how a democratic society can deal with the uncertainty and hidden politics of scientific knowledge of environmental issues.

These issues are linked, because one of the most important ways that industrial pollutants damage the health of humans and wildlife is by interacting with hormone receptors and disrupting the endocrine system, leading to a variety of effects on reproduction, development, immunity, behavior, and carcinogenesis. Nuclear receptors also exemplify a fundamental biological issue - the emergence of molecular complexity - that has important implications for both evolutionary theory and environmental policy.

Evolution of the nuclear receptor superfamily

How have new hormones evolved? How have new interactions between hormones and

their receptors emerged? How have they reached the remarkable degree of specificity observed in today's organisms?

The nuclear receptors (NRs) offer an elegant and important system for studying the evolution of biological complexity using genomic data. This large family of related transcription factors, many of them ligand-regulated, mediate the biochemical activity of steroids and most other fat-soluble hormones, vitamins, and other signaling molecules. NRs regulate development, reproduction, behavior, metamorphosis, and the maintenance of homeostasis in a wide range of animal phyla, and they can be inappropriately activated or inactivated by some synthetic pesticides and industrial chemicals. Hormones and receptors aptly illustrate the problem of the evolution of complex integrated systems: neodarwinian models of gradual elaboration and optimization do not fully explain how multi-part systems, in which the function of each element depends on the prior existence of the others, have come into existence. What, for example, is the selection pressure that drives the evolution of a new hormone unless there is a receptor to transduce its signal; conversely, what is the function of a novel receptor if its hormone already exists?

Our empirical research has two goals: to reconstruct the mechanisms and dynamics by which genomic change has produced the functional diversity of the nuclear receptors, and to understand the implications for the evolution of gene families and integrated molecular systems in general. Specifically, we pursue the following strategies:

- Isolate and sequence NR genes from taxa that, because of their position in the metazoan tree of life, provide critical evolutionary information. For example, we are studying lamprey, sharks, hagfish, and mollusks. We recently discovered an estrogen receptor in the mollusk *Aplysia californica* , indicating that steroid receptors are far older and more widespread than previoiusly thought.
- Resurrect ancestral receptors in order to empirically test evolutionary hypotheses. We infer the sequences of ancestral receptors, chemically synthesize the genes that code for them, express them in cultured cells, and study their functions. With this approach, we have recently shown that the ancestral steroid receptor was specifically activated by estrogens..

- Reconstruct the history of the nuclear receptor superfamily and the mechanisms and dynamics by which change at the genetic level has produced the remarkable diversity of function that characterize this group of proteins. We employ molecular phylogenetic and evolutionary techniques in a new high-performance parallel computing cluster.

- Characterize the function of the receptors we isolate using cell culture and molecular endocrinological techniques.

- We are developing an experimental selection system for hormone-receptor evolution. We will examine the dynamics and constraints by which receptors evolve affinity for novel hormones resistance against exogenous endocrine disrupters.

To date, we have shown that there were already five major classes of nuclear receptors at the time of the protostome-deuterostome divergence at least 600 million years ago, that several important groups of receptors -- notably the steroid receptors and the thyroid or retinoic acid receptors -- were formed by the shuffling of domains from more ancient members of the family, and that structure-function relationships can be predicted by a detailed analysis of amino acid evolution on the phylogeny of vertebrate steroid receptors. We have shown that the steroid hormone receptors are hundreds of millions of years older and much more widely distributed in the animal kingdom than previously thought. We are excited by our finding that the ancestral steroid hormone receptor was an estrogen receptor: repeated duplications of this gene produced new receptors which diverged in sequence and evolved affinity for stepping-stone steroids like testosterone and progesterone, which were present as intermediates in the synthesis of estrogens before they had bona fide signaling functions.

In the future, we expect to extend these approaches to study the evolution of the hormones themselves by investigating the diversification of the gene families of enzymes that catalyze steroid hormone synthesis.

Gene family phylogenetics: methods and applications

We are interested in techniques for understanding gene family evolution using phylogenetic methods. We currently involved in several projects to develop new methods, find new applications for existing ones, and to characterize the reliability of available techniques for phylogenetic inference..

- Parametric vs. nonparametric phylogenetic methods.. Parametric methods for inferring phylogenies, like maximum likelihood and Bayesian techniques, assume a considerable degree of homogeneity in the evolutionary dynamics among taxa and positions in a gene sequence. Biological knowledge indicates clearly that this assumption is incorrect, but the question is whether heterogeneity in the evolutionary process compromises the performance of parametric methods. We are using a simulation approach to examine

the robustness of parametric and a nonparametric method (maximum parsimony) to evolutionary heterogeneity.

- Gene classification and annotation. As whole genome sequences become available, a major challenge for biologists is to develop efficient tools to classify genes, infer their functions, and understand their history. With collaborators at the American Museum of Natural History (AMNH), I have developed a rapid phylogenetic technique to classify and annotate new gene sequences based on evolutionary relationships, to predict their functions, and to identify sequence and structural changes that have allowed novel functions to evolve. The method, which has been demonstrated using the homeobox gene family, appears to be more accurate and theoretically sound than current similarity-based techniques. In my laboratory, we will validate this method on a large ensemble of gene families and develop collaborations to deploy the method in conjunction with major protein family databases.

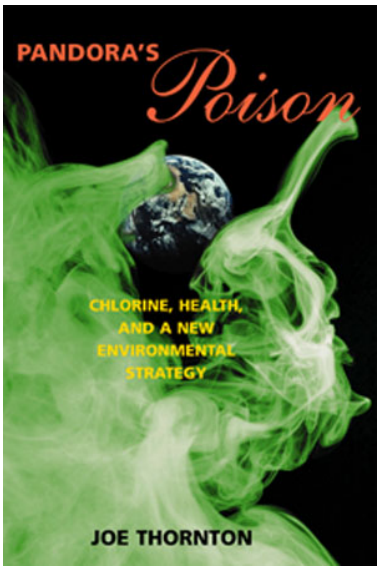
- Evolution of infectious disease. With colleagues at Columbia University and the AMNH, I am developing and applying phylogenetic techniques to the evolution of infectious disease, particularly the role of lateral gene transfer (LGT) in pathogen evolution. Methods for evaluating phylogenetic incongruence will be adapted and applied to a large sequence database from pathogenic and non-pathogenic bacteria in order to test specific hypotheses about LGT events. Our goal is to evaluate the role of LGT in the emergence of pathogencitiy and to identify sequence changes that enabled specific functions to emerge in proteins that are critical to pathogenicity.

- Evolution after gene duplication. With John Postlethwait and John Conery at the University of Oregon, we are involved in a project to examine the fate of duplicate genes, using the complete genomes of zebrafish and pufferfish. Our aim is to characterize how frequently duplicate genes become pseudogenes, evolve entirely novel functions, or distribute in a complementary fashion the functions of the ancestral gene from which they descend.

Global chemical pollution

Review in *Nature* of *Pandora's Poison*

How can scientific knowledge be created and deployed to support policies that protect both natural systems and democratic principles? Global environmental hazards challenge the current political culture's most basic assumptions about science - specifically the expectation that science can provide a complete and apolitical description of nature. My research focuses on the science and policy issues raised by persistent organic pollutants (POPs), a class of globally distributed synthetic chemicals that pose large-scale, long-term threats to human and wildlife health. This research, exemplified in my book Pandora's Poison, has a practical and a theoretical objective:



- My first goal is to understand the implications of the complexity and diversity of animal endocrine systems for efforts to regulate and manage endocrine disrupting chemicals. I have explored the ways in which these biological characteristics refute the assumptions of the current policy framework - particularly that our knowledge is detailed and reliable enough to allow regulation of each chemical based on individual risk assessments. I am developing proposals for a more precautionary policy that can help prevent endocrine disruption by the hundreds of chemicals now produced deliberately or accidentally.

- My second goal is to provide the analytical basis for international reductions in the production and use of persistent synthetic chemicals. I study the the extent of global contamination, its impacts on public and wildlife health, the sources of these pollutants, and the availability of cleaner products and processes. I propose specific policy solutions to address the major inadequacies of the current system, and I evaluate the technological and economic feasibility of a large-scale program of conversion to cleaner production processes.

- My third goal is to articulate a general strategy for producing and deploying scientific knowledge that is consistent with principles of democracy and global environmental protection. The current framework for environmental science and policy assumes that science can provide an objective and complete picture of the hazards of human activities. But the scope and complexity of major environmental hazards -- POPs in particular -- often outstrip the tools available to the sciences; further, scientific assessments of POPs are shaped by hidden judgments about political and ethical issues, and the apparent objectivity of science protects these assumptions from scrutiny and democratic debate. I have developed a new framework for environmental science and policy, called the Ecological Paradigm, to address these problems. A precautionary approach designed to ensure that decisions about the technologies of production protect the global environment, the Ecological Paradigm begins to move decisions about industrial technology and the interpretation of scientific information into their proper sphere of democratic politics. In my current research, I am refining the practical details and theoretical justification for the Ecological Paradigm and generalizing it to other major environmental issues.

More about Pandora's Poison

SELECTED PUBLICATIONS

Thornton J. Resurrecting ancient genes: experimental analysis of extinct molecules. Nature Reviews Genetics 5:366-375, 2004.

Thornton JW, Need E, Crews D. Resurrecting the ancestral steroid receptor: ancient origin of estrogen signaling. Science, Sept. 19, 2003.

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Thornton JW, Kelley DB. Evolution of the androgen receptor: structure-function implications. *BioEssays* 20:820-829, 1998.

Abstract | Steroid Receptor Alignment

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1996.

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SOFTWARE

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TEACHING

Evolution, Biology 380 (Winter 2004).

Molecular Phylogenetics, Biology 410/510 (Spring 2003).

Molecular Evolution (Not currently offered)

CURRICULUM VITAE

Joe Thornton's curriculum vitae

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Wyden: Champion of Science

U.S. Senator Ron Wyden accepts award from UO President Dave Frohnmayer

The University of Oregon and the Science Coalition honored U.S. Senator Ron Wyden (D-OR) in August as a Champion of Science for his support for basic scientific research that leads to new discoveries and applications that benefit society. President Dave Frohnmayer presented the award to Wyden.

Senator Wyden has strongly supported university programs that train scientists and engineers as a means of stimulating industry in Oregon and nationwide. He was instrumental in the 2002 National Science Foundation reauthorization that laid out a plan to double the NSF budget within five years. Wyden, who authored the Twenty- first Century Nanotechnology Research and Development Act, is strongly committed to ensuring that women are represented in the field of science. Wyden is also a 1976 graduate of the UO School of Law.

The Science Coalition is an alliance of more than 400 organizations that encourage a strong partnership between the federal government and research universities to advance science.

Read more: **http://wyden.senate.gov/media/photos/science.html**

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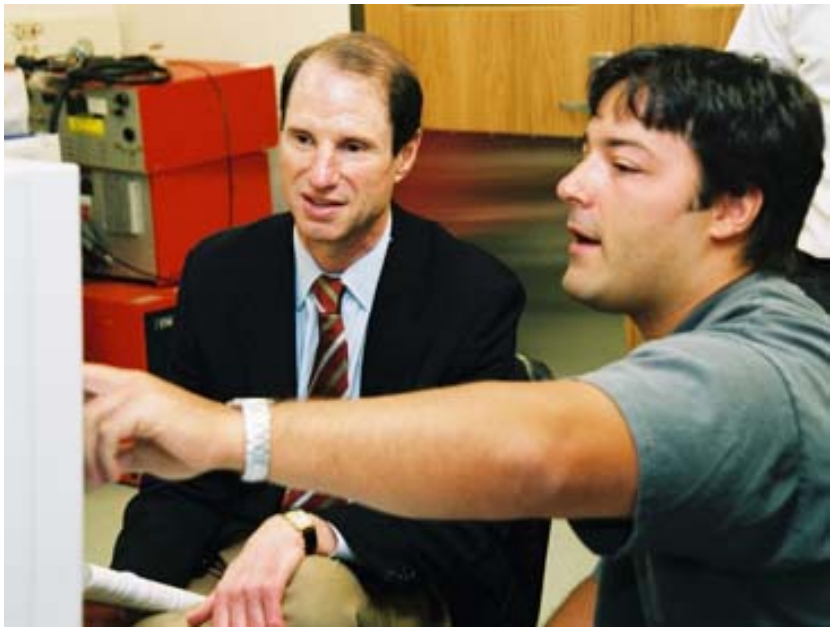
Wyden Receives Award For Being 'Champion of Science'

August 2003

PHOTOS BY JACK LIU

Left: University of Oregon President Dave Frohnmayer presents Ron with the Science Coalition's Champion of Science Award. The Science Coalition presented Ron with the award for his efforts to accelerate nanotechnology research in Oregon through his legislation, "The 21st Century Nanotechnology Research and Development Act." He was also praised for helping to increase funding for The National Science Foundation and for recognizing and working to break down barriers for women studying and working in math, science and engineering. Link to Wyden's October 3, 2002 remarks on women in science.

The National Science Foundation estimates that over the next decade, America will need 800,000 to 1 million nanotechnology workers



"I think when you look out here, when you look out at the laboratories and look out at the young people who are doing this great work with semiconductors, this, my friends, is the face of Oregon's future. This is what it's going to be all about in the effort to create more high-skilled, high-wage jobs."
--U.S. Senator Ron Wyden

Right: Greg Kearns, a graduate student at the Materials Science Institute, explains the process of fabricating a transistor.

Upper left & right: Ron discusses the importance of research funding to Oregon's economy with students, faculty, and business leaders. Attendees, including Ron Adams, Oregon State University's Dean of Engineering (above photo, second from the left), discussed the research partnerships between University of Oregon and Oregon State University.

Left: Dr. Geraldine L. Richmond, professor of chemistry at the University of Oregon, shares a laugh with Ron.

Link to more information:

· Learn More About Nanotechnology Research at The University of Oregon or Oregon State University

· View Wyden's Legislation & News on Nanotechnology

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Points of Pride

Here's a look at some of the ways University of Oregon enriches lives and communities.

Conserving energy. Faculty members and students at UO's BetterBricks Lab in Portland help residential and commercial building owners reduce electrical energy costs by up to 60 percent through use of daylighting. Read more: **http://www.betterbricks.com**

Preserving cultures. The new Many Nations Longhouse, scheduled to open in 2004, is a partnership between the university and Oregon's nine federally recognized tribes. It will be a valuable state resource in sustaining and celebrating regional Native American cultures. Read more: **http://longhouse.uoregon.edu**

Changing an industry. The University of Oregon is a world leader in green chemistry, devising methods to cut or eliminate waste from manufacturing processes and foster use of better materials. Read more: **http://www.uoregon.edu/~hutchlab/greenchem/**

Sensible and sensitive. Architecture students from the University of Oregon created an urban design for the cities of Troutdale, Gresham, Fairview and Wood Village that provides an economic framework for new industrial development while preserving nearby sensitive environmental areas. Read more: **http://arch-guest.uoregon.edu/programs/portland-program/portland.html**

Guidance for community goals. Graduate students from the UO's Community Service Center helped officials from Jackson County, Oregon, develop a master park plan that included a vision for the system over time and a business plan for increasing revenue and long-term operation. Read more: **http://www.uoregon.edu/~csco**

UO Home Page > **Office of Research and Graduate Studies** > **Inquiry**

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Office of Research and Graduate Studies

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Contact: Pauline Austin, (541) 346-3129 paustin@oregon

University of Oregon Native American Initiative

http://www.uoregon.edu/~natinit/initiative.htm

A May 10, 2003 groundbreaking ceremony for the Many Nations Longhouse marked another milestone for the University of Oregon's Native American Initiative, a comprehensive effort to **enhance recruiting and retention of Native American students and faculty, increase academic and social support for native students, and foster a core of programs that will make the UO a major center for American Indian education and research.**

The initiative, begun by former UO president Myles Brand and further refined and developed by current president Dave Frohnmayer, is driven by an alliance of Native American faculty and staff members, students and university officials. It encompasses many programs and ideas forged at the UO over the past decade to learn from and serve the Native American communities and individuals of the Northwest.

The Native American Initiative represents long-standing and expanding relationships between the UO and the nine federally recognized tribes of Oregon—the **Coos, Coquille, Grand Ronde, Klamath, Siletz, Siuslaw, Umatilla, Umpqua and Warm Springs.**

Component Areas of Initiative

- ***Student Access and Support***

  The UO has increased access and academic support for its 204 (spring 2003) Native American students. Elements include new centers and institutes such as the Center for Indigenous Cultural Survival, the Northwest Indigenous Language Institute and the Southwest Oregon Research Project. They also include a program for residency by aboriginal rights, which grants enrolled members of tribes whose traditional lands include what is now Oregon, the right to pay in-state tuition regardless of where they live; special attention to Native American student recruitment and retention; academic support through the Office of Multicultural Affairs; a new full-time coordinator for Native American Enrollment Services; and an enhanced scholarship program. Active Native American student organizations on campus include the Native American Student Union; Native American Law Student Association; Native American research interest group at the Center for Study of Women in Society; and American Indians in Science and Engineering Society.

- ***Graduate Student Support***

  The university makes a concerted effort to recruit, support and mentor Native American graduate students. From 1992-2002, 82 Native American students earned graduate degrees and 27 earned law degrees at the UO; some graduate students have chosen the campus longhouse as the site to defend their thesis dissertations.

Ø ***New Directions in Anthropology***

UO Department of Anthropology faculty members and students, as well as staff members of the UO Museum of Natural History, work closely with Native American communities of the Pacific Coast to preserve and protect native archaeological sites. Building on an extensive history of Native American scholarship that started with Luther Cressman in the 1930s and continues with the work of faculty members Jon Erlandson, Madonna Moss, Mel Aikens, and others, the UO is at the forefront of changes that align the field more directly with the interests and needs of native peoples.

Ø ***Native Language Preservation***

UO Department of Linguistics faculty members, including Scott Delancey, Tom Givón, and Doris Payne, have done research in tribal languages and have tailored programs for Native American graduate students involved in the study and preservation of their own languages. Graduate students in the department are studying Klamath, Northern Paiute, Tolowa and Chinook languages, as well as languages of Mexico and South America. The department, in partnership with Northwest tribes, offers the Northwest Indigenous Language Institute.

Ø ***Native Peoples Worldwide***

Under the leadership of Rob Proudfoot, Six Nations Seneca Haudesaunee, an award-winning professor in the UO International Studies Program, the university has developed the Center for Indigenous Cultural Survival, the only international program in American higher education devoted to the study and preservation of indigenous cultures around the world.

Ø ***Native American Law***

Former UO School of Law Dean Rennard Strickland, of Osage and Cherokee heritage, is a nationally known scholar of Native American law, art and culture. Associate professor Mary Wood's work on tribal environmental issues is being used by federal agencies in developing national policies. Native American environmental and sovereignty issues have been at the forefront of the UO's annual environmental law conference. Past speakers include Carl Sampson, chairman of the Umatilla Tribe; Ted Strong of the Inter-Tribal Fish Commission; Winona LaDuke of the White Earth Recovery Project; and Huanani-Kay Track, who discussed Hawaiian sovereignty.

Ø ***Native American Teacher Education***

The U.S. Department of Education's Office of Indian Education awarded $1.06 million to a consortia of nine Northwest tribes and the UO College of Education. Funded through the Indian Professional Development Program, the three-year grant to the "Sapsik'walá" (Teacher) Program will support the education, recruiting, training and mentoring of American Indian teachers. The program's aim is to increase the number of

native teachers who have the professional development and cultural sensitivities necessary to help lower the high dropout rates and raise test scores at schools with high populations of American Indian students.

Ø ***Native American Literature***

Shari Huhndorf, an Alaska native, director of ethnic studies and associate professor in the UO English department, provides Native American literature courses and has written books on Native American literature, history and culture. In 1997 the Oregon Humanities Center sponsored a Native American Literature Conference at the UO, which featured such noted American Indian authors as N. Scott Momaday, Joy Harjo, James Welch, Wendy Rose, Pat Hilden and Robert Allen Warrior.

Ø ***Native American Gatherings***

The UO campus has become a focal point for tribal and community gatherings in Oregon. In May 1997, leaders of coastal Oregon tribes gathered for the first time in more than a century for a potlatch ceremony on the campus. During the ceremony, leaders of the Coquille tribe, in conjunction with the UO Graduate School and Knight Library, presented to the tribes of Southwest Oregon copies of some 60,000 pages of documents on tribal history and culture. The documents were found and organized as part of the Southwest Oregon Research Project (SWORP). Another groundbreaking potlatch in June 2001 brought together representatives of 44 Western Indian tribes for the first time in at least 150 years, to celebrate the recovery and presentation of an additional 50,000 pages of archival material by SWORP researchers.

Programs, Projects and Groups Relating to Initiative

Ø **Aboriginal Right Initiative**

UO President Dave Frohnmayer introduced the groundbreaking “residency by aboriginal right” pilot program in 1997, offering in-state tuition to all members of the 44 tribes and bands that have a historic relationship to the land that became Oregon. The Oregon University System adopted the program for the state’s six other public universities.
http://comm.uoregon.edu/newsreleases/latest/apr98/O040298.html

Ø **American Indians in Science and Engineering Society**

UO chapter of national organization provides an array of programs and presentations which can benefit the cultural and physical development of native student from any discipline.
gladstone.uoregon.edu/~asuonasu/aises.html

Ø **Center for Indigenous Cultural Survival (CICS)**

The CICS, through its collaboration with indigenous people and their communities, serves to increase the understanding of the challenges faced by indigenous peoples and to support

the continuance of their diverse cultures. The CICS staff consists entirely of indigenous people.
http://darkwing.uoregon.edu/~cics/center.htm

Ø **Many Nations Longhouse**

The $1.2-million longhouse on the UO campus—expected to be completed by spring 2004—replaces the retired Native American Longhouse, which for 30 years served as an Oregon tribal meeting place for graduation and potlatch ceremonies, annual powwows, feasts and informal potlucks, drumming and singing, and classes in Native American crafts. Seattle architect **Johnpaul Jones, a 1967 UO architecture graduate and a designer of the Smithsonian Institution's National Museum of the American Indian**, designed the new longhouse to express the cultural values of Oregon's native communities; reference the historic form of some native dwellings in Oregon; and promote interaction between the university and Native American communities, as well as indigenous peoples of many cultures.
http://www.uoregon.edu/~committees/longhouse/LonghouseDevelopment/

Ø **Native American Community Research Interest Group**

Faculty, students, and community members engage in weekly discussions of topics related to Native American, Alaskan Native, and other indigenous cultures worldwide. Topics include research issues, literature, film and other academic subjects.
http://csws.uoregon.edu/rigs/rNative.shtml

Ø **Native American Law Student Association (NALSA)**

NALSA, which meets weekly, is open to anyone interested in the education and/or reform of legal issues involving Native Americans and other indigenous peoples.
http://www.law.uoregon.edu/org/nalsa/

Ø **Native American Student Union (NASU)**

NASU is a student-run organization that provides academic, social and cultural support for the Native American community on campus. It hosts three powwows a year; sponsors events and conferences; offers educational advising; holds weekly meetings; provides a voice for native students within the student government; and honors Native American graduates each year in a blanketing ceremony at the spring powwow.
http://gladstone.uoregon.edu/~asuonasu/

Ø **Native American Summer Bridge Program**

Each summer, this UO English department program brings a multicultural group of incoming freshmen to the university to get an early start on their college careers. Designed as a recruitment tool for Native American students, the program offers full tuition, room

and board, and book expenses for as many as 12 students who share a deep interest in Native American and multicultural issues. Participants are selected through a competitive process.
http://www.uoregon.edu/~bridge/ http://cas.uoregon.edu/alumnidev/cascade/200110bridge.html

Ø **Northwest Indigenous Language Institute (NILI)**
Offered through the UO linguistics department in partnership with Northwest tribes, NILI provides training and tools to help native people of North America maintain their culture through the learning and teaching of their native languages. It creates opportunities for native people to restore their languages of heritage to a central place in their communities.
http://babel.uoregon.edu/nili/

Ø **President's Native American Advisory Board**
A group of native and non-native professionals, locally and nationally, with whom the UO president seeks dialogue and council regarding the UO Native American Initiative.
http://www.uoregon.edu/~natinit/initiative.htm

Ø **Sapsik'walá (Teacher) Program**
"Sapsik'walá" is a Sahaptian word meaning "teacher." In partnership with the nine federally recognized tribes in Oregon, the UO College of Education prepares American Indian teachers through a master's degree scholarship program to meet the needs of native students. The program started with two students in 2002 and has funding for about 20 in 2003. As of April 2003, the program has received 28 applications and accepted 17 students for fall 2003.
http://education.uoregon.edu/sapsikwala

Ø **Southwest Oregon Research Project (SWORP)**
Started in 1995, SWORP involves the repatriation of 110,000 pages of archival documents from the National Anthropological Archives and National Archives in Washington, D.C., to 44 tribal nations in the greater Oregon area. Involves UO anthropology researchers and members of the Coquille, Siletz, Coos, Siuslaw, Lower Umpqua and Grand Ronde tribes.
http://darkwing.uoregon.edu/~coyotez/index.html

Select Numbers

Ø A record 228 American Indian/Alaska Native students enrolled at the University of Oregon in the fall of 2002, up 21% from the 188 who enrolled in the fall of 1997.

Reflecting a retention rate of 90% for the year, 204 of these students remain enrolled in spring term 2003. On average, the university retention rate for American Indian/Alaska Natives and all students is about 84%.

Ø The University of Oregon had 38 American Indian/Alaska Native faculty and staff members in 2001-02, an increase of 52% from the 25 in 1995-96.

Ø The representation of American Indian/Alaska Native officers of administration at the university increased from .94% in 1994 to 2.02% in 2001.

Contacts (Areas of Expertise)

Ø **Gordon Bettles,** interim Steward of the Many Nations Longhouse. *(Coordinates Longhouse User Group, provides liaison to Northwest Tribes, links Longhouse project to all aspects of University Native American programming.)*
e-mail gbettles@oregon.uoreogn.edu

Ø **Az Carmen**, coordinator for Native American enrollment services, University of Oregon
(UO efforts to recruit, enroll and retain native students, related statistics, program information)
(541) 346-0681 (office), (541) 343-2758 (home); e-mail azcarmen@oregon.uoregon.edu

Ø **Johnpaul Jones**, architect for Many Nations Longhouse and a Native American UO alumnus
(Design elements and cultural considerations of UO longhouse and other Native American sites)
(206) 624-5702; e-mail info@jonesandjones.com
http://www.jonesandjones.com/office/jj/index.html

Ø **Dr. Rob Proudfoot**, Senior Native Professor, International Studies, director, Center for Indigenous Cultural Survival
(Leadership of the Center for Indigenous Cultural Survival, Details of graduate teacher education scholarship program for Native Americans)
541) 346-1056; e-mail foot@oregon.uoregon.edu

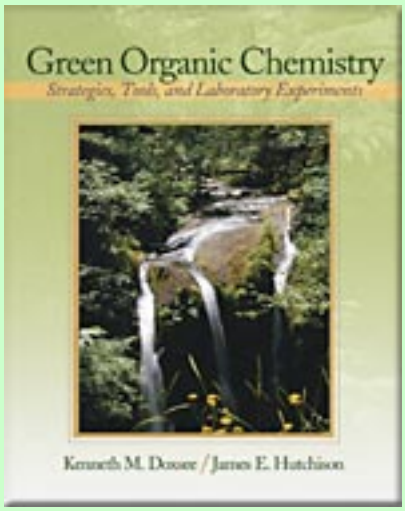
Ø **Pat Rounds**, director of Sapsik'walá Program, UO College of Education
(Details of graduate teacher education scholarship program for Native Americans)
(541) 346-1056; e-mail plrounds@oregon.uoregon.edu

Ø **Dr. Dave Hubin**, executive assistant president, University of Oregon
(Intergovernmental relationships between university and tribes, longhouse project, link to Presidential leadership in overall initiative)

(541) 346-3036; e-mail hubin@oregon.uoregon.edu

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

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Inquiry

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New Records in UO Research

Long considered a premier, public, liberal arts institution, the University of Oregon has in recent times become increasingly successful in attracting competitively awarded grants as a reflection of the quality and scope of its scholarly work. Last year, research grants and contracts to the university grew to nearly $78 million, setting a new record.

While the sheer size of the research funding and the pace of its growth are eye-catching--we've grown by some $20 million over the past two years alone--even more impressive is its impact. Within every college and school, faculty researchers are contributing significantly to the global body of knowledge, meeting key needs of local communities, the state, and the nation. The active engagement of the UO faculty in scholarly pursuits greatly enhances the education that our students receive in preparation for their future roles in the knowledge economy.

This edition of Inquiry describes how the university's emphasis on interdisciplinary research is one of the many reasons for our success. We also take a closer look at some specific projects funded by grants and awards.

Inquiry has been reformatted with this edition, providing more stories and news about research at University of Oregon. Readers are invited to learn more about faculty researchers and their projects by going to websites listed after a story. Stay up-to-date with UO research by visiting Inquiry online, http://comm.uoregon.edu/inquiry/.

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