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Technology Transfer

Graduate School

Program Enhances Interdisciplinary Learning

A biology laboratory seems an odd place to study computer science. Yet that is where computer science student Bryan Kolaczkowski is conducting his dissertation research. Kolaczkowski is one of more than two dozen students who are fellows in a federal program that encourages research across disciplines. The Integrative Graduate Education and Research Training (IGERT) program is allowing him to pursue a field he calls "computational biology," where he uses computer technology to model the process of evolution. **read more >>**

A fellowship that encourages interdisciplinary research allows Bryan Kolaczkowski to study computer science in the Thornton biology lab. Biology postdoctoral fellow Jennifer Fox is on the left.

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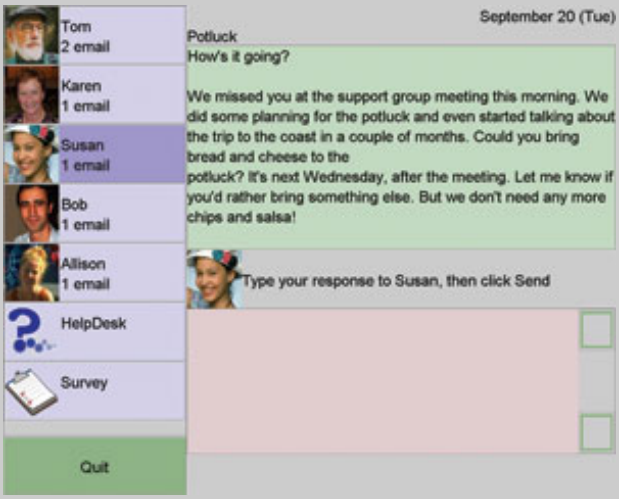

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A fellowship that encourages interdisciplinary research allows Bryan Kolaczkowski to study computer science in the Thornton biology lab. Biology postdoctoral fellow Jennifer Fox is on the left.

Funded by the National Science Foundation (NSF), the IGERT program provides fellows with tuition plus a stipend that gives them the flexibility to pursue their career interests as well as their own research.

Dave Johnson, professor of chemistry, says the IGERT fellowships bring some of the brightest students to Oregon because of the opportunities to enhance their education with outside internships in companies such as Intel, or to teach at regional colleges. "Then, when they apply for a job after graduation, they already have practical experience," he says.

The NSF awarded the university's Materials Science Institute (MSI) a $700,000 IGERT grant to support nineteen graduate students who study at the crossroads of chemistry and physics, which also is a focal point of Oregon's high tech industry. MSI has amplified the grant by designing special classes each summer that teach semiconductor processing and device physics, polymer science, and organic synthesis.

The Evolution, Development, and Genomics program received a $3 million, five-year IGERT grant in collaboration with Indiana University that supports six students at the University of Oregon. John Postlethwait, the principal investigator at Oregon, says IGERT grants benefit students by opening doors to otherwise impossible fields of study. "In the first five years of the program, one hundred students had peer-reviewed research papers published, giving them a leg up on their careers," says Postlethwait.

Kolaczkowski says the IGERT fellowship encourages innovation and creativity by helping you to think a little differently, look at problems from another perspective, and use the ideas of another field of study to find solutions. "My research depends on bridging that divide," he says.

Read more: **http://evodevo.uoregon.edu** and **http://materialscience.uoregon.edu/Graduate/igert.htm**

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Partnership to Address Teen Substance Abuse

A new partnership between three West Coast Native American tribes and University of Oregon researchers is designed to slow the rate of adolescent substance abuse by helping families in these communities rebuild traditional family structures.

The National Institute on Alcohol Abuse and Alcoholism awarded the university's Child and Family Center (CFC) a five-year, $3.7 million grant to work with the Confederated Tribes of Warm Springs Reservation, the Klamath Tribe of Oregon, and the Confederated Tribes of the Colville Reservation in Washington to establish Adolescent Transition Programs (ATP) in each community. Principal investigator Alison Ball, herself a member of the Colville tribe, will adapt the center's widely lauded program for specific tribal needs and sensitivities.

Psychologists nationally recognize ATP as a "best practices" approach to addressing substance and alcohol abuse and other problem behaviors. It is the centerpiece of the acclaimed book by the CFC director Thomas Dishion and psychologist Kate Kavanagh, Intervening in Adolescent Problem Behavior: A Family-Centered Approach (Guilford, 2003). Dishion is coinvestigator on the ATP project.

As many as three hundred families from the Colville Indian Reservation, the Warm Springs Indian Reservation, and the Klamath Tribe will be part of the five-year project.

Read more: **http://duckhenge.uoregon.edu/hparchive/display.php?q=28.6.05-Dishion.html**

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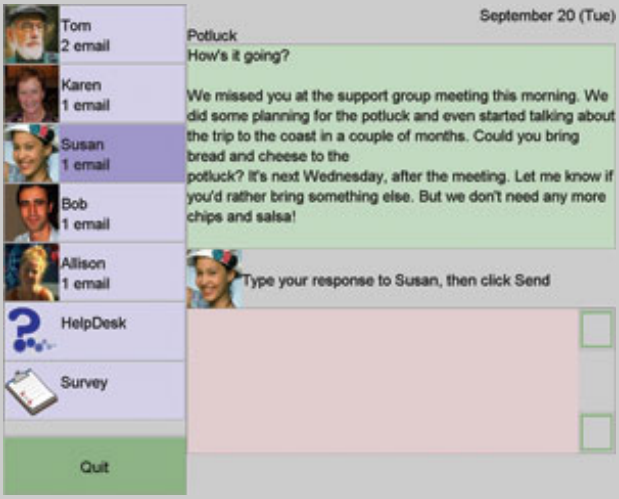
It was just a chance encounter, but the casual conversation led to the creation of a start-up company that today helps individuals with brain injuries break out of their social isolation.



Software interface developed by Fickas and Sohlberg simplifies e-mail program and uses pictures of "buddies" instead of lists of names.

Five years ago, Stephen Fickas, professor of computer and information services at the University of Oregon, was talking with McKay Sohlberg, who he recognized as another university faculty member, while the two waited in line for coffee. He told Sohlberg, an associate professor of communication disorders and sciences, that he wanted a real project for his software engineering students. Sohlberg was looking for tools her graduate students could use in a cognitive rehabilitation course.

By the end of the term, the students and their two teachers had developed the concept of an e-mail software interface for persons who are cognitively impaired. Sohlberg and Fickas won a five-year research grant from the U.S. Department of Education for a project they called "Think and Link" that they've been testing with individuals with brain injuries. This year they formed Life Technologies, Inc., to further develop the e-mail program.

Sohlberg says people with cognitive impairments often become socially isolated because they are perceived as "different." They often have difficulty making conversation and may reside in an assisted-living facility that physically separates them from family members and friends. That is the case for Evette Patt, who moved to the Uhlhorn Apartments assisted-living facility after suffering a traumatic brain injury several years ago.

Sohlberg says e-mail is potentially a good communication tool for individuals with cognitive impairments because it gives them the time to read and understand the messages they receive and then compose an answer. "However, with conventional e-mail programs, messages pop up

and windows open that can confound a person with cognitive disabilities," she says.

But as Fickas and his students learned, the solution would require more than an ordinary software program. "The hallmark of this disability is that there is no 'poster child' for individuals with brain injuries," he says. "You can't build a one-size-fits-all interface."

So, in what Sohlberg calls a "wonderful case of people from different fields coming together in partnership with the population they will serve," the teachers and students worked directly with Patt and others who have suffered brain injuries to develop a software interface that is the essence of e-mail and adapts to each person's capabilities or limitations. Pictures of "e-mail buddies" are used instead of addresses and the subject line, forwarding function, and "sent" folders initially are turned off. As the user becomes more skilled, those functions can be turned on.

"The e-mail brought back some humor," says Patt, who has used the e-mail interface developed by Fickas and Sohlberg for two years. She sends e-mails to friends and family members three times a week "to talk about my goals, things I've learned at the Uhlhorn program, and to share some laughs."

Under the aegis of Life Technologies, Inc., Sohlberg and Fickas are engaged in large-scale testing to refine the software in anticipation of marketing it to commercial clients. (See a related story regarding a transportation center on page 7.)

Read more: **http//www.think-and-link.org**

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New Company Offers 'Help Desk' for Supercomputing

Allen Malony and Shameer Shende.

Everyone wants his or her computer to operate faster. Now, even operators of the fastest supercomputers can increase processing speed and efficiency by calling the "help desk" at Paratools, a new company spun off from research done at the University of Oregon.

To get the speed and power needed to perform complex tasks such as weather simulation, mainframe computers process information in parallel. They use as many as 64,000 central processing units (CPUs), the brains of the computer. Today's personal computer, by comparison, processes information sequentially and typically uses just one CPU.

"Ironically, when multiple CPUs are used, the efficiency of each CPU declines," says Allen Malony, professor of computer and information science at the University of Oregon, who is one of the principals of Paratools. His partner, Sameer Shende, is a postdoctoral research associate at the university's Neuroinformatics Center.

Shende says the loss of efficiency is like the difference between the productivity of one person versus a team of people. "Ten people produce more, but not ten times more, because someone has to supervise them and sometimes individuals must stop work while they wait for others to complete their portion of the task," he says.

To identify where and why the supercomputer inefficiencies are occurring, Malony and Shende use the Tuning and Analysis Utilities (TAU) performance system, software they developed jointly with the Los Alamos National Laboratory and the Center for Applied Mathematics at Germany's Research Centre Julich.

Although the University of Oregon holds the copyright for the TAU system codes, the system is considered an "open source" program since it was initially developed for the U.S. Department of Energy. Through Paratools, Malony and Shende will provide consulting expertise on how to use the TAU system and analyze its results.

Shende says the public's unquenchable thirst for ever-faster computers is likely to broaden the demand for their services in the future. He estimates that personal computers with multiple CPUs will be on the

market within five years.

Read more: **http://www.cs.uoregon.edu/research/tau/home.php**

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Finding New 'Eyes' to Observe Brain Activity

A discovery that could help physicians "see" electrical activity in the brain more clearly and open the way for improved medical care for epilepsy and other brain disorders has been developed by scientists at the University of Oregon's Neuroinformatics Center. The research was the genesis for a new Eugene-based company, Cerebral Data Systems.

University of Oregon psychologist Don Tucker says signals of electrical activity in the human brain become distorted when they pass through the skull, much like light does when it passes through frosted glass. Measurements of brain activity obtained from electrodes attached to the skull, such as an EEG (electroencephalograph), produce "a smeared picture of brain activity," according to Tucker.

Such distortion hinders treatments that require precision in locating brain electrical activity.

Now, three university scientists have developed a computational algorithm to eliminate the distortion and translate data generated by an EEG into a three-dimensional "functional image" that could be used by a physician or diagnostician to make a medical decision.

Process codevelopers are Allen Malony, director of the Neuroinformatics Center (NIC); Sergei Turovets, an NIC computational physicist; and Adnan Salman, a University of Oregon doctoral degree student in computational science. The university has filed for a preliminary patent on the process.

"This new computational advance gives us a window on the brain that could be a breakthrough in the precision of localizing the brain's electrical activity," says Tucker.

"An epileptic seizure is like a storm in the brain," he says. "Electrical charges spread so quickly that it's not obvious where they start." He says surgical techniques exist that could be used to help remedy epileptic seizures, if the epicenter could be determined.

For strokes, fast action is essential. "Physicians only have a narrow window of time to determine the location of a stroke and administer clot-busting chemicals," he says.

The company's principals--Tucker, Malony, and attorney Ann Bunnenberg--anticipate wide applications for the process. "Cerebral Data Systems can provide the data remotely and is working to identify telemedicine applications that could lead to hundreds of job opportunities," Tucker says.

Read more: **http://www.uoregon.edu/newscenter/20.6.05-CerebralData.html**

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K-16 Chinese Language Program Begins in Portland

Carl Falsgraf

As the result of the culmination of more than a decade of work on foreign language instruction, the University of Oregon's Center for Applied Second Language Studies (CASLS) will develop the nation's first Chinese language program that begins in kindergarten and continues through the college years.

At a September ceremony in Portland, Robert Slater, National Security Education Program (NSEP) director, awarded CASLS a $700,000 annual grant to develop a national model for a K-16 Mandarin Chinese flagship program. "The approach of this program will be radically different from traditional programs. It will ensure that young Oregonians are prepared to lead in the global economy and society," said Carl Falsgraf, director of CASLS.

The curriculum will integrate academic content, field experience, and explicit instruction to produce linguistically and culturally competent college graduates. Portland Public Schools will partner with CASLS to provide a pipeline of students in kindergarten through grade twelve through its heritage speaker and immersion Chinese language programs. Heritage programs build on the language skills of students who speak Chinese at home. Immersion programs deliver the regular school curriculum in Chinese primarily to students for whom Chinese is a second language.

Beginning in kindergarten, the new program will provide students with direct academic instruction in Mandarin. In elementary grades and continuing through college, students will have unparalleled opportunities to connect with communities of Chinese speakers through service learning, internships, and externships in China. Flagship scholars will receive scholarships, individual mentoring, and a rigorous curriculum of content courses in Chinese supported by advanced-level language courses.

"At the University of Oregon, the program will accommodate students in professional fields such as business and law, social sciences, and the humanities," says Falsgraf. "They will receive a liberal arts education in both Chinese and English and upon graduation will be able to perform at a high level in either language to, for instance, negotiate contracts, write

A lion dancer from Portland Public School's Chinese heritage language program entertains elementary students in the immersion program during a ceremony announcing a grant for the nation's first K-16 Chinese language program.

academic papers, or give an executive speech."

"The grant is part of the National Flagship Language Initiative (NFLI)," says Slater, "a strategic partnership between the U. S. national security community and higher education to address serious deficits in languages critical to national security. The Chinese language program proposed by CASLS was by far the best out of an extraordinary set of proposals from top universities around the country. It joins eight other NFLI programs, including programs in Arabic, Korean, Persian, and Russian."

Read more: **http://casls.uoregon.edu/home.php**

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Integrative Science Building Will Enhance Collaboration

The university's long history of interdisciplinary research moves to a new level next summer when ground is expected to be broken for the first phase of the integrative sciences building. As the university's "signature research facility" for the Oregon Nanoscience and Microtechnologies Institute (ONAMI), the 15,000-square-foot facility will support world-class research in nanoscience.

"The first phase of the integrative science building will bring new dimension to the university's tradition of interdisciplinary research by opening the doors to enhanced collaboration with private industry scientists who will work on nanoscience research that helps to move discoveries to market," says Rich Linton, vice president for research and graduate studies.

Partial project funding is provided by legislation approved in 2003 that authorized ONAMI signature research facilities at the University of Oregon, Oregon State University, and Portland State University. The legislature approved $9.5 million in lottery and general bond funds, issued in 2005, for the University of Oregon building.

Connected to other campus science facilities, the building will be built underground to preserve ground-level open space and to optimize building performance for the delicate experiments requiring the observation and manipulation of materials at the nanometer scale (a nanometer is one-billionth of a meter). Construction is projected to be completed by fall 2007.

The building will house more than twenty high-technology instruments available to industry and regional academia through the university's Center for Advanced Materials Characterization in Oregon. Nano-fabrication facilities in the building will support the university's ONAMI research, and laboratory space may serve the university's industrial internship programs in semiconductor fabrication, organic chemistry, and polymers. Laboratory space also will be made available to industry partners for translational or collaborative research.

Preliminary planning is under way for the building's second phase, which will emphasize interdisciplinary programs among biological sciences, psychology, and cognitive neuroscience in an above-ground facility connected to the other components of the university's science complex.

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Congress Funds Collaborative Transportation Center

The six-year highway spending bill approved by Congress this fall includes $19.5 million in direct and shared research funds for the University of Oregon.

The bill funds a University of Oregon project to help people with cognitive impairments use mass transit; it also provides for capital improvements to the university's Museum of Natural and Cultural History. In addition, the bill includes $16 million over five years to fund a university transportation center, a collaborative research project including the University of Oregon, Portland State University, Oregon State University, and the Oregon Institute of Technology.

The bill designates $1 million for research by McKay Sohlberg, associate professor of communication disorders and sciences, and Stephen Fickas, professor of computer and information science, to develop smart tools that can help individuals with brain injuries live independently. (See related story on page 4.)

The university's Museum of Natural and Cultural History received $2.5 million to improve and expand research and storage facilities for significant Oregon archaeological collections. The museum is designated by state law as the official repository of Oregon's anthropological collections and is the Oregon Department of Transportation's primary provider of archaeological surveys for transportation projects.

The bill also includes funding for what U.S. Rep. Peter DeFazio (D-Oregon), the ranking member of the subcommittee that wrote the bill, calls "a unique partnership" between four Oregon institutions of higher education to conduct research on transportation and transit systems. "Their research will be critical to federal, state, and local officials in planning and enhancing our transportation systems and in turn improving our national economy," he said.

The center's research will focus on planning and implementation of transportation systems that integrate land use, livability, and growth, and that provide policy makers with transportation strategies, policies, and programs.

Read more: **http://natural-history.uoregon.edu/Pages/research.html**

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Research in Brief

Transitioning youth with disabilities

A $3.5 million U.S. Department of Education grant has established the National Post-School Outcomes Center at the university's College of Education to study how young adults with disabilities fare after they leave school. Researcher Caroline Moore will interpret data already collected in each state and recommend improvements to transition programs. Read more: **http://education.uoregon.edu/feature.htm?id=1449**

Sorting good bugs from bad

The American Society for Microbiology presented one of its most prestigious awards to university biologist Karen Guillemin. She was recognized for her creative research on pathogens as well as her outstanding contributions to the study of "beneficial microbes," a field of study so new that the first conference on the topic was held last spring. Read more: **http://waddle.uoregon.edu/?id=351**

Leading physics research

Physicist Jim Brau cochairs national and international teams working to build a linear collider to answer questions that have long puzzled physicists. Called "Einstein's telescope," the massive project will allow exploration of energy regions beyond the reach of today's particle colliders. Read more: **http://www.linearcollider.org/cms**

Coloring coral reefs

Molecular biologists Jim Remington and Nathan Henderson discovered that a fluorescent protein produced by sea anemones is responsible for turning many coral reefs blue. Understanding how these organisms tune their colorations to meet biological requirements will lead to tools for molecular and cell biology research. Read more: **http://www.molbio.uoregon.edu/facres/remington.html**

Achieving a first

Chemistry professor David Tyler and two graduate students have produced ammonia from nitrogen, thus coming one step closer to achieving one of chemistry's coveted goals. When converted to ammonia, nitrogen becomes available as a source for plant growth and a fertilizer that drives the world's food supply. Read more: **http://waddle.uoregon.edu/?id=377**

Unclouding Oregon

Summers are getting sunnier in Oregon, according to evidence collected by physicists Frank Vignola and Laura Riihimaki. This evidence will help researchers understand long-term trends in solar radiation that are important to agriculture. It also will help to assess risks and reliability for power generated by hydroelectric and solar energy sources. Read more: **http://waddle.uoregon.edu/?id=406**

Greening chemistry education

Teachers worldwide can now access green chemistry resources for classroom experiments through the Greener Education Materials (GEMs) "living database" maintained by chemist Julie Haack. Pioneered at the University of Oregon, green chemistry ends the cycle of "pollute and then clean up" by preventing the pollution in the first place. Read more: **http://greenchem.uoregon.edu/gems.html**

Unraveling new mysteries

Marine biologists exploring a newly identified undersea volcano have discovered the first hydrothermal community that is dominated by thousands of eels. Craig Young, director of the Oregon Institute of Marine Biology, says it is not yet known what supports the eels that are living among fragile cavernous rock pillars surrounding the volcanic vent. Read more: **http://waddle.uoregon.edu/?id=343**

A newly discovered underwater volcano teems with a unique "city" of eels.

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in the news

»National Post-School Outcome Center
»OSEP
»Mike Bullis
»Jane Falls
»Caroline Moore

3.5 million grant funds new national center

Center director Mike Bullis and program coordinator Jane Falls are pictured. The center's mission is to improve success of young adults with disabilities after they leave school.

EUGENEâ€"About 10 percent of American children and youth in schools have disabilities, and experts at the University of Oregon College of Education are providing a new resource to help states track how well these students are prepared for the transition from school to adult life.

The U.S. Department of Education's Office of Special Education Programs (OSEP), has awarded a $3.5 million grant to the university to establish the National Post-School Outcomes Center (NPSO).

Research conducted at the center will identify how each of the 50 states and 10 federal jurisdictions is currently serving high school students with disabilities and provides technical assistance aimed at encouraging and implementing best practices. UO Professor of Special Education Michael Bullis will direct the center,

which is located in the Riverfront Research Park near the UO campus.

Post-school success data varies by state

Caroline Moore, principal investigator for the OSEP grant, says the center's mission is to help states put systems in place that will, for the first time, provide a national overview of how young adults with disabilities fare after they leave school.

"States are now required to collect and use data to track the postsecondary education and employment of young adults with disabilities," says Moore, director of Technical Assistance and Consulting Services (TACS) at the UO College of Education. "While some states have such systems in place, others do not and are seeking guidance."

Collecting information is the first step, but providing technical assistance for interpreting the new data is crucial in order to make informed decisions about how to improve programs for students with special needs, says Jane Falls, program coordinator for the new center.

"We need to get a picture of what is happening with these young adults after they leave school so we can identify the services and programs that best prepare them for success," says Falls, a national expert on the transition of youth with disabilities from high school to adult life.

Currently, about 40 percent of the states collect some form of data on students after they leave school, but there's no uniform standard for what data to collect or how to report it.

Transition success affected by community conditions

"Many factors affect the employment prospects for these youth," Falls explains. "By determining how many actually find employment, identifying the services they have received, and examining how community conditions affect their progress, states will be able to improve supports and educational opportunities provided to transition-aged youth."

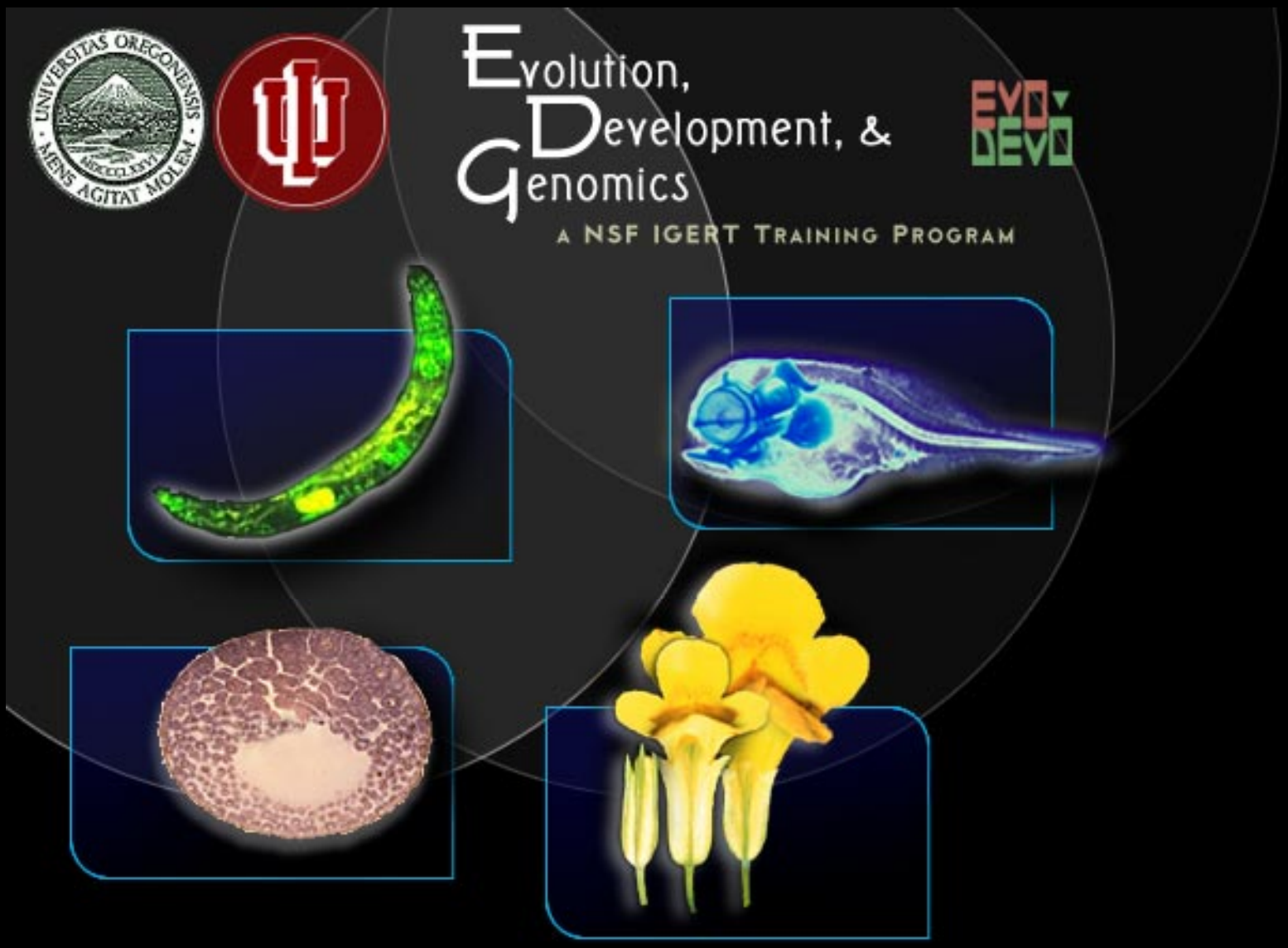
Moore describes the new center as "a unique marriage" of the UO College of Education's top-rated researchers in special education and the college's technical assistance team.

"From a research standpoint," Bullis says, "the goal is to zero in on the connection between what happens in school and what happens immediately afterward."

The center partners with the OSEP, the National Dropout Prevention Center/ Network, the National Dropout Prevention Center for Students with Disabilities, the State University of New York at Potsdam, the National Association of State Directors of Special Education, and the Technical Assistance Alliance for Parent Centers.

The 2006 edition of "America's Best Graduate Schools" ranks the UO special education program as third in the nation for the sixth straight year. Overall, U.S. News & World Report consistently ranks the UO College of Education comfortably among the top 10 among public graduate institutions of education nationally.

Photographed at the University of Oregon College of Education



Overview Training Seminars People Research

EvoDevo IGERT attends SACNAS

Another IGERT Fellow gets Nature Article!

University of Oregon Student Bryan Kolaczkowski co-authors "Letter to Nature"

related UO article

IGERT Fellow gets "Nature" Cover!

Indiana University Student, Troy Wood, discovers long lost Mollusk!

An integrated understanding of the ways in which organisms obtain their form during development and the ways in which morphological and genomic diversification originate via population-genetic mechanisms.

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National Science Foundation: Integrative Graduate Education and Research Training Program

New Materials for Electronics and Optics through Control of Nanoscale Structure

The IGERT program offers a nationally-unique, comprehensive package of new and tested approaches to graduate education in materials chemistry and physics. It is designed to prepare the next generation of graduate students for the challenges of an increasingly interdisciplinary and rapidly evolving research and development arena. The research and education activities of this IGERT program are unified by the study of the structure/property relationships in electronic and optical materials whose properties are dominated by their nanoscale structure. The proposed research builds upon established activities in three major thrust areas to address the:

Synthesis and Properties of Superlattice Materials

Preparation and Study of Metal and Semiconductor Nanoparticles, Quantum Dots and Assemblies

Fabrication and Properties of Molecular Assemblies

These research topics provide outstanding opportunities for interdisciplinary graduate training because both the chemistry and physics of "short length scale" systems are intertwined. The collaborative/interdisciplinary programs within MSI will provide IGERT fellows with unusually diverse research training because the activities combine elements of electronic structure theory, chemical approaches to new structures, materials synthesis, nanostructure characterization adn detailed physical investigation. IGERT students involved in this research will naturally develop an excellent understanding of how the concepts and approaches of their core discipline interrelate with those of complementary discipline. Our student-focused program is designed to address three goals:

- help each student acquire diverse, adaptable and portable technical skills and the knowledge base to succeed in rapidly evolving career markets, ·
- help each student develop the critical thinking skills necessary to solve complex problems and understand new phenomena, and ·
- provide each student with comprehensive career training - development of professional skills, exposure to many career opportunities and training tailored to specific career paths.

Students accepted into the IGERT program receive generous fellowships and tuition waivers for multiple years, and substantial travel and research funds to foster creative, independent projects.

IGERT fellows will participate in multidisciplinary course work incorporating substantial hands-on experience with state-of-the-art techniques, as well as receiving training in scientific communications, ethics and other necessary tools of the trade.

Students will have the opportunity to for internships in industry, government, education and non-government organizations. We wish to encourage students to apply their knowledge in internships in the electronics and optics industry where engineering and physical sciences have become increasingly interdependent . This initiative has received wide-ranging support within the University and among our industrial affiliates because it provides a multidisciplinary research experience, stimulates industrial/academic relations and prepares students to be successful participants in diverse and changing job markets.

For more information on the program contact
Lucy Biggs, Manager, Materials Science Institute
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phone (541) 346-4784

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Tribal Substance Abuse Focus of Grant

A new partnership between three West Coast American Indian tribes and University of Oregon researchers is designed to slow the rate of adolescent substance abuse by helping families in these tribal communities rebuild traditional family structures.

The university's Child and Family Center was recently awarded a five-year, $3.7-million grant from the National Institute on Alcohol Abuse and Alcoholism to work with the Confederated Tribes of Warm Spring Reservation, the Klamath Tribe of Oregon and the Confederated Tribes of the Colville Reservation in Washington to establish Adolescent Transitions Programs (ATP) in each community. Principal investigator Alison Ball, herself a member of the Colville tribe, seeks to adapt the center's widely lauded ATP for specific tribal needs and sensitivities.

When the federal government began ordering American Indian families to send their children to distant boarding schools in the 1800s, traditions that held these families together began to fray. Several generations later, the children of these families are at greater risk than other American kids to abuse alcohol and drugs.

Psychologists nationally recognize ATP as a "best practices" program in dealing with substance and alcohol abuse and other problem behaviors. Its approach is the centerpiece of the acclaimed 2003 book by the center director Thomas Dishion and psychologist Kate Kavanagh, "Intervening in Adolescent Problem Behavior: A Family-Centered Approach" (Guilford, 2003). Dishion is co-investigator on this project.

"The ATP is appropriate for families with adolescents who range in age from 12 to 17 and live in a variety of family situations," Ball says. "In collaboration with the three tribes, this study will promote caregivers' use of family management and relationship skills in order to reduce escalations of problem behavior and promote positive social and academic achievement in children and adolescents living in American Indian reservation communities."

As many as 300 families from the Colville Indian Reservation, the Warm Springs Indian Reservation and the Klamath Tribe will be part of the five year project. Ball has assembled a team of American Indian psychologists and mental health professionals to help guide the project and advisory boards within each tribe - both essential to building relationships with communities with longstanding and understandable distrust of efforts billed as "helping" their populations.

"The federal government divided American Indian families by sending children to boarding schools when they were as young as five years of age, relocated their families to reservations and tried to replace

native religion with European religions," says Ball. "For those and many other historical reasons, the steps we're taking to give the tribes ownership of and a strong voice within this study are essential."

The desired outcome, Ball says, is practices that will serve tribal families more effectively and be adapted easily by reservation communities nationwide.

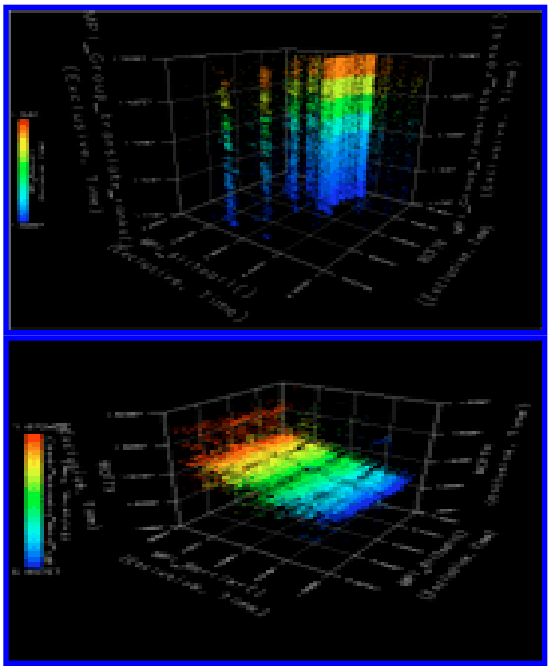
The Child and Family Center works closely with the National Institutes of Health and its various programs, the U.S. Department of Education, the Native American Research Centers for Health and other federal offices to understand and promote mental health within families across cultural communities. Its various research initiatives attract millions of dollars annually in grants and contracts, and its scientists collaborate extensively with researchers in Canada, England and Italy, as well as with Oregon communities through offices in Eugene and Portland.

For more news on university people, events and programs, you're invited to read the current issue of Inside Oregon*, the official e-newsletter for UO faculty, staff and graduate teaching fellows.*

TAU (Tuning and Analysis Utilities) is a portable profiling and tracing toolkit for performance analysis of parallel programs written in Fortran, C, C++, Java, Python.

TAU is capable of gathering performance information through instrumentation of functions, methods, basic blocks, and statements. All C++ language features are supported including templates and namespaces. The API also provides selection of profiling groups for organizing and controlling instrumentation. The instrumentation can be inserted in the source code using an automatic instrumentor tool based on the Program Database Toolkit (PDT), dynamically using DyninstAPI, at runtime in the Java virtual machine, or manually using the instrumentation API.

TAUs profile visualization tool, paraprof, provides graphical displays of all the performance analysis results, in aggregate and single node/context/thread forms. The user can quickly identify sources of performance bottlenecks in the application using the graphical interface. In addition, TAU can generate event traces that can be displayed with the Vampir, Paraver or JumpShot trace visualization tools.



Here is an example of tau's visualization capabilities. These images are generated from paraprof visualizing a computing network of over 16,000 processors. Here are **more images.**

TAU is a joint project between the University of Oregon Performance Research Lab, The LANL Advanced Computing Laboratory, and The Research Centre Julich at ZAM, Germany.

More about TAU be found on the **About Page**, or browse the Online documentation on the **Documents Page**. Search the library of TAU papers on our **Publications Page**.

On November 17, 2005, a new version of TAU was released. See the latest news and release notes on the **News Page**.

Department of Computer and Information Science, University of Oregon Advanced Computing Laboratory, LANL, NM Research Centre Julich, ZAM, Germany

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July 4, 2005 - Today's Other News Items

'Window on the Brain' Discovered

A discovery by scientists at the University of Oregon's **Neuroinformatics Center** (NIC) promises to help physicians "see" electrical activity in the brain more clearly, opening the way to improved medical care for epilepsy and other brain disorders.

The process, which recently won a major international award, provided the genesis for a new company, Cerebral Data Systems. The company's debut was announced June 20.

University of Oregon psychologist Don Tucker says signals of electrical activity in the human brain become distorted when they pass through the skull, much like light through frosted glass. Measurements of brain activity using electrodes attached to the skull, such as an EEG (electroencephalograph), produce "a smeared picture of brain activity," according to Tucker.

Such distortion hinders treatments that require precision in locating brain electrical activity. To correct for the distortion, physicians must approximate the source of electrical signals by analyzing and averaging EEG readings collected over extended periods of time, or open the skull and attach sensors directly to the inner cranium.

University scientists have used high-performance computing to eliminate the distortion caused by the skull and have developed a computational algorithm to translate data generated by an EEG into a three-dimensional model that pinpoints the location of the activity. A physician or diagnostician then could use this "functional image" to make a medical decision.

Co-developers of the process are Allen Malony, NIC director; Sergei Turovets, an NIC computational physicist; and Adnan Salman, a University of Oregon computational science doctoral student. The university has filed for a preliminary patent on the process.

"This new computational advance gives us a window on the brain that could be a breakthrough in the precision of localizing the brain's electrical activity," says Tucker. And that, he says, could be helpful in the treatment of many brain disorders, such as epilepsy and stroke.

"An epileptic seizure is like a storm in the brain," says Tucker, with electrical charges spreading so quickly that it's not obvious where they start. He says surgical techniques exist that could be used to help remedy epileptic seizures, if the epicenter could be determined. "Physicians have only a narrow window of time to determine the location of a stroke and administer clot-busting chemicals," he says.

Tucker and Malony, along with attorney Ann Bunnenberg, are principals in Eugene-based Cerebral Data Systems (CDS). The new company will function as a subsidiary business unit of

Electrical Geodesics (EGI), a private entity owned by Tucker and Bunnenberg, with partial ownership by the University of Oregon. It's a structure that Bunnenberg says is as innovative as the product.

"The partnership will expedite the commercialization of new computational neuroscience technologies developed by the NIC by applying procedures required by the regulated medical industry during the preliminary stages of research," she says. The parallel process will create an environment that will bring new discoveries to the market quickly without shortchanging the rigor required to develop a safe and reliable product, she says.

Tucker says CDS also will facilitate application of NIC discoveries to advance computation and telemedicine services pioneered by EGI. He says CDS eventually could employ as many as 100 people.

NIC director Malony says the next research steps will make the process faster and more reliable, integrate it with software developed by the NIC and make it available for use in real applications. The research will be conducted in cooperation with several teaching hospitals, including those at the University of Washington and Harvard University Medical School.

Using high-performance computation to solve the distortion problem recently drew acclaim from the international computer science community.

The researchers' paper describing the discovery, "Computational Modeling of Human Head Conductivity," was one of only three (out of 200 presented) to win an award of excellence, at the Fifth International Conference on Computational Science, held in May in Atlanta, Ga. Malony says their discovery received recognition because it "was not an easy problem to solve and required a good merger of physics, neuroscience and computer science." The paper's authors included Salman, Turovets, Malony, computational physicist Jeff Eriksen and Tucker.

The high performance computations were made possible by a $1 million grant from the National Science Foundation received by the NIC in 2003. With the grant, NIC founders Malony and Tucker established the Integrated Cognitive Neuroscience, Informatics and Computation Grid, a high-performance computing system dedicated to the analysis of imaging data on brain structure and function. The grid harnesses the collective processing power of 100 computers and makes the translational nature of this new process possible.

Electrical Geodesics is a direct spin-off from research done at the Brain Electrophysiology Laboratory in the University of Oregon's Department of Psychology. EGI licenses technology from the university and designs, produces and sells electrophysical neuroimaging equipment and related software. EGI also employs undergraduates, graduate students and postdoctoral fellows, serving as a training ground in the field of cognitive neuroscience.

EGI and CDS are located in the university's **Riverfront Research Park**, 1600 Millrace Dr.

For more news on university people, events and programs, you're invited to read the current issue of Inside Oregon*, the official e-newsletter for UO faculty, staff and graduate teaching fellows.*

CASLS

The Center for Applied Second Language Studies
The Northwest National Foreign Language Resource Center

Home

Welcome to the Center for Applied Second Language Studies (CASLS) on the University of Oregon campus.

CASLS' Mission
CASLS is a K-16 National Foreign Language Resource Center promoting international literacy by supporting communities of educators and by partnering with those communities to develop a comprehensive system of proficiency-based tools for lifelong language learning and teaching.

Operating Principles
CASLS is supported almost exclusively by grants from private foundations and the federal government. Reliance on receiving competitive grants keeps CASLS on the cutting edge of educational reform and developments in the second language field.

CASLS adheres to a grass-roots philosophy based on the following principles:

- Teachers are the solution, not the problem. Support them, don't preach to them.
- All children have the ability to learn a second language and should be provided with that opportunity.
- The purpose of language learning is meaningful communication.
- Meeting the needs of teachers and students is our top priority.

In the News

Online Language Assessment Drives Chinese K-16 National Language Initiative

New Jersy Dept. of Education Receives Federal Grant for World Languages Testing

CASLS Calendar

CASLS is currently conducting online proficiency pilot tests. For more information, contact the language coordinator at the address given.

Chinese reading pilot test
Contact: chpilot@uoregon.edu

Hebrew reading pilot test
Contact: hbpilot@uoregon.edu

Also visit our ALP Website for information on CASLS' listening assessment.

This month's article is by Emily Spinelli. Emily is a professor of Spanish at the University of Michigan-Dearborn. She is the recipient of numerous awards including the prestigious Florence Steiner Award Post-Secondary for Leadership in Foreign Language Education. She was the 1999 President of ACTFL and currently serves as Editor for Foreign Language Annals.

How can published foreign language research change your classroom?

In my role as Editor of Foreign Language Annals, I have been asked a number of questions about the importance of research and the value of scholarly publication in general. These questions seem to reveal a lack of awareness on the part of many in our profession about the nature and role of research, especially the research that leads to publication in scholarly journals and books. Since I see this lack of awareness as a general trend, I would like to use this forum to answer some of the questions that I have been asked about research.

What is the objective behind the "publish or perish" policy in post-secondary institutions?

While the major goal of K-12 education is to transmit knowledge, the major goal of most post-secondary institutions is to expand knowledge. In other words, university faculty members not only transmit knowledge by teaching, but they also engage in research to expand the knowledge base in their area of specialization. This research is then disseminated to other scholars in the same field through conference presentations, scholarly articles, books and other publications.

All I want to do is be a good teacher. Why do I need to understand current research?

There is widespread agreement that all instructors should teach the most up-to-date knowledge available in their field and that they should utilize the most advanced methods and techniques to teach that knowledge base. Thus, the connection between research and teaching should be obvious: solid background in a subject matter area stems from knowledge of current information about the field. One of the most effective ways for teachers at all levels to increase their knowledge base of the subject matter and current pedagogy is to read scholarly articles and attend conference presentations. It is imperative that teachers at all levels understand the importance of keeping abreast of current research in their field in order to obtain the theoretical background to make informed curricular and pedagogical decisions.

I am often intimidated by journal articles that contain a lot of statistics and heavy data. Is there a way for me to understand these articles easily and then relate them to my teaching?

A close reading of the title of the article, the abstract, and the conclusion should provide most readers with the essence of the article and its important findings. After reading through these sections, it would be helpful to reflect on the implications of these research findings for the classroom. The research can then relate to teaching by focusing on how this new information could be used to design curriculum, to prepare lesson plans, to focus on student needs, or to add to one's knowledge of the field.

With all these journals and publications, are there still areas in foreign language education that need to be explored?

The field of foreign language education is in great need of new studies that address the value of learning a second language so that we can answer the critics who state that learning a second language inhibits the development of literacy in English, the first language. We must gather statistics that demonstrate that students who study a second language in elementary or secondary school learn to read and write in English better, or at least as well, as those students who do not study a second language. We also need studies that show that students who learn to read and write in a second language can transfer these skills to English.

What can I do to support research even though I do not engage in it?

The professional associations in the fields of foreign language education and second language acquisition directly support research through their conferences and publications. The research necessary to expand the field will thrive as long as foreign language

professionals continue to join professional organizations, attend professional conferences, and subscribe to and read scholarly journals.

Read articles from the CASLS's archive.

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UNIVERSITY OF OREGON

MUSEUM OF NATURAL AND CULTURAL HISTORY

RESEARCH

General Info
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Exhibit Info
Volunteer Info
Education
Research
Don Hunter Project
Collections

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The museum's research is carried out through the Oregon State Museum of Anthropology (OSMA), a self-contained division of the Museum of Natural History. This research division is comprised of two subdivisions: archaeological research and collections.

ARCHAEOLOGICAL RESEARCH DIVISION

New archaeological discoveries constantly re-shape common knowledge and understanding of our human history. The Research Division of the Museum of Natural and Cultural History has been Oregon's most active archaeological research program for many decades, and has been the leader in bringing to light new findings about the region's cultural past.

Within the museum, more than 500,000 items held in collections offer university students, faculty, and visiting researchers significant scholarly research opportunities. Many Ph.D. and master's degrees in anthropology have been awarded on the basis of research accomplished on the museum's holdings.

Outside the museum walls, its researchers and archaeologists lead surveys and excavations throughout the region. This research has unearthed fragile centuries-old basketry and traces of ancient settlements buried beneath volcanic ash. It has also uncovered evidence of a 19th century Chinatown in southwest Oregon and the doomed Donner Party camp in the Sierra Nevada.

Through field schools, grant-funded studies, and collaborations with corporations and public agencies (like the Oregon Department of Transportation (ODOT) and the Bureau of Land Management), the Research Division helps to rediscover and preserve Oregon's rich cultural heritage. One major project in collaboration with ODOT is the Bridges Project, begun in 2003, in which archaeologists survey areas adjacent to soon-to-be redesigned and rebuilt highway bridges, looking for evidence of past human settlement. Click here to find out more information about the archaeological research division.

COLLECTIONS DIVISION

The Collections Division of the UO Museum of Natural and Cultural History was established by the Oregon Legislative Assembly in 1935 (a year before the museum officially opened) to serve as the custodian of state-held anthropological materials. Click here to find out more information about the collections division.

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University of Oregon scientist wins American Society for Microbiology award

Merck award honors beneficial microbe researcher Karen Guillemin

Karen Guillemin, assistant professor of biology at the University of Oregon Institute of Molecular Biology, will receive one of the American Society for Microbiology's (ASM) most prestigious awards at the society's annual meeting this week.

Guillemin is being honored both for her creative research on pathogens as well as her outstanding contributions to the study of "beneficial microbes," an area of study so new that the first ASM-sponsored national conference on the topic was held just last April. Though microbes often are viewed with fear or contempt as the source of infectious scourges, "most are innocuous or even beneficial to us," said Guillemin.

The Irving S. Sigal Merck Award is given by the society (the world's oldest life science organization) in memory of Sigal, who was instrumental in early discoveries of HIV/AIDS therapies. The award is given to researchers who are no more than three years beyond completion of postdoctoral training in microbiology or infectious diseases.

"This award has extra cachet because the American Society for Microbiology is one of the nation's premier science organizations," says George Sprague, head of the university's biology department. "Karen Guillemin's science has this wonderful combination of creativity, rigor and willingness to move out and tackle important new problems."

Guillemin pursues two lines of quite different but complementary inquiry on harmful and beneficial bacteria. Her research on Helicobacter pylori, the bacteria responsible for the majority of stomach ulcers and gastric cancer, has defined how stomach cells perceive and respond to this bacterium. Guillemin uses approaches that survey the whole genome of the host and bacterium. In addition to her focus on H. pylori, her newest line of research explores the dialogue between animals and their resident community of microbes using the model organism zebrafish. Her lab already is showing that the presence or absence of microbes may be as important as genetic factors for normal development.

Guillemin says her research is possible "only because of the amazing zebrafish resources available at the University of Oregon." Zebrafish research was pioneered by the late University of Oregon biologist George Streisinger, and today the university is home to the Zebrafish International Resource Center (ZIRC) and the Zebrafish Information Network (ZFIN).

Guillemin's work with H. pylori is funded by the American Cancer Society and a Burroughs Wellcome Fund Career Award. Her study of beneficial microbes is supported by a grant from the National Institutes of Health.

In addition to her regular appointment at the University of Oregon as an assistant professor of biology, Guillemin holds adjunct assistant professorships in microbiology at Oregon State University in Corvallis and in the department of molecular microbiology and immunology at the Oregon Health & Science University in Portland. She earned her bachelor's degree in biochemical sciences with highest honors at Harvard and Radcliffe Colleges. Her doctoral work at Stanford University was in the area of developmental biology. She continued her training at Stanford in microbiology where she began her H. pylori work as a Damon Runyon-Walter Winchell postdoctoral fellow.

Guillemin was nominated for the Merck award by Sprague and Tom Stevens, a University of Oregon chemistry professor. Both are ASM fellows and members of the University of Oregon Institute of Molecular Biology. ASM fellows are elected through a highly selective, annual peer-reviewed process, based on their records of scientific achievement and original contributions that have advanced microbiology.

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Sources: Karen Guillemin, (541) 346-5999, guillemin@molbio.uoregon.edu; George Sprague, (541) 346-5883, gsprague@molbio.uoregon.edu; Tom Stevens, (541) 346-5884, stevens@molbio.uoregon.edu; American Society for Microbiology, (202) 737-3600
Photo: http://waddle.uoregon.edu/gallery/NewsImages/karen_g?full=1

Links:
About Karen Guillemin: http://www.molbio.uoregon.edu/facres/guillemin.html
About the award: http://www.asm.org/Academy/index.asp?bid=15068
About the UO Institute of Molecular Biology: http://morel.uoregon.edu/home.html

ILC International Linear Collider

Latest News

From *Science Magazine*
17 March 2006
PARTICLE PHYSICS: Linear Collider Partners Woo Newly Opened India

NEW DELHI--With the wheels of Air Force One barely off the tarmac following U.S. President George W. Bush's visit, which ended India's 3 decades as a nuclear pariah state, a delegation of U.S. and European physicists arrived here last week to discuss India's involvement in the International Linear Collider.

From *symmetry*
15 March 2006
Out of the Box: Designing the ILC

Scientists working on the proposed International Linear Collider have made important design decisions.

From *symmetry*
15 March 2006
Deconstruction: ILC Design

The Baseline Configuration Document for the International Linear Collider outlines the proposed main components of the future collider.

ILC News Archive from Interactions.org

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Baseline Configuration Document released
BCD Director's Update

Features

ILC NewsLine
16 March 2006
Developing Partnership with India on the ILC

ILC GDE Meeting
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Faculty Profile

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Research Interests

Our group uses an interdisciplinary approach in applying physical techniques to the study of biological molecules, especially the structure, function, and interaction of enzymes and fluorescent proteins. The primary technique we use is x-ray crystallography, but occasionally we do computer modeling of enzyme active sites and other properties of proteins. In the laboratory, chemists and biologists collaborate with physicists to achieve a broader intellectual basis for the research.

Green Fluorescent Protein

The newest and most exciting project in the laboratory involves a protein that spontaneously rearranges itself to become fluorescent, absorbing blue light (or UV) and re-emitting green light, hence the name Green Fluorescent Protein (GFP). GFP was discovered in the Pacific Northwest jellyfish Aequorea victoria and has become enormously popular as a visible tag for proteins of interest or as a marker for gene expression. It is nontoxic and has been expressed in essentially all types of organisms ranging from bacteria to mice. No host factors are required for the transformation to a fluorescent protein. If GFP is linked to a protein of interest, the cellular location of that protein in the living cell is revealed by a glance in the fluorescence microscope. We determined the structure of the protein in 1996 and have since embarked on a large project to generate a variety of biosensors by taking advantage of the fact that most forms of the protein actually have two absorption maxima that are sensitive to changes in the protein structure. Using genetic engineering techniques we have successfully constructed visual pH indicators, halide (chloride) concentration indicators and redox potential sensors. The color of the protein can also be modified by changing the environment or internal structure of the chromophore, which is derived from the

primary sequence Ser(Thr)65-Tyr66-Gly67. We reported a yellow mutant in 1996 based on substitution of Thr203 with Tyr, but subsequently a Russian group has discovered related proteins from coral that fluoresce yellow and red, enabling multicolor reporting of a variety of cellular processes. It is fascinating that these different fluorescent proteins are nevertheless based on the same Xaa-Tyr-Gly peptide, and suggests that additional autocatalytic chemistry is involve in maturation of the protein. Crystals of a red variant are now on hand and work is well under way to determine the structure.

Enzyme Structure-Function Relationships

For many years we have worked to determine detailed structure function relationships in citrate synthase, which is at the entry to the citric acid cycle and is found in every organism examined. Citrate synthase, in its rate-determining step, abstracts a proton from the methyl group of acetylCoenzyme A to form a carbon-carbon double bond. The side chain which accomplishes this task is Asp375 working in concert with His274 (sequence numbering of pig heart enzyme). This equilibrium for this seemingly simple reaction is disfavored in solution by 12-15 orders of magnitude, and proposals for how an enzyme can do this are extremely controversial. Several publication have resulted from our studies, but the answer remains elusive. Recently, we determined the crystal structure of an enzyme that catalyzes an essentially identical reaction (malate synthase) in order to compare their respective mechanisms. It was fascinating to discover that the underlying chemistry is essentially the same in the two enzymes, but all of the details with the exception of an aspartic acid acting as a base are different. Evidently, Nature has discovered only one solution to this fundamental problem in chemistry, but the machinery is almost totally different! These studies are ongoing.

In the last few years, we have defined the first structures of two new families of enzymes, glycerol kinase and serine carboxypeptidase and may continue studies in these areas in the future. However, they are now "back burner" projects in favor of other exciting developments. Both enzymes are members of newly discovered superfamilies that are very diverse. For example glycerol kinase, actin and the heat shock cognate chaperonin (HSC70) are all ATPases with the same basic fold that utilize conformational changes upon hydrolysis of ATP to drive otherwise unrelated and extremely diverse biological processes.

Selected Publications

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University of Oregon chemists discover new way to fix nitrogen

Lab synthesizes ammonia using nitrogen and hydrogen in solution

EUGENE - (July 5, 2005) - University of Oregon chemists have produced ammonia from nitrogen at room temperature under normal atmospheric pressure, marking a significant step toward achieving one of chemistry's coveted goals.

A scientific article describing the method, which uses a simple compound of iron and hydrogen as the electron source in the "fixing" reaction, is available online and will be published in the July 27 issue of the Journal of the American Chemical Society.

The process devised by University of Oregon chemistry professor David Tyler and two graduate students, John Gilbertson and Nate Szymczak, was carried out in ether solutions. However, all steps but one also have been shown to work in water.

In the atmosphere, nitrogen gas is inert. However when nitrogen is converted to ammonia, it becomes available as a nitrogen source for plant growth - and as such is the fertilizer that drives the world's food supply. Industry produces ammonia using the century-old Haber-Bosch process, which directly combines nitrogen from the air with hydrogen under extremely high pressures and temperatures.

"For the first time, we've been able to use hydrogen as the source of electrons in the laboratory fixation of nitrogen," Tyler said. "Until now people have had to use other sources of electrons that are not relevant to the Haber-Bosch process. The only other case in which hydrogen was used successfully required higher temperature and exotic materials."

"In the eyes of chemists, the conversion of nitrogen to ammonia in water, using simple hydrogen at room temperature and pressure is the holy grail of nitrogen fixation," Tyler said. "The next challenge is figuring out how to carry out the complete cycle in water."

The University of Oregon method parallels the Haber-Bosch process very closely by using the electrons in the hydrogen molecule as the source of electrons required in the fixing reaction. "This is simpler than any other solution put forward to date," Tyler said. "Other procedures involve the use of relatively exotic electron sources or they require elevated temperatures to complete the synthesis."

And, while the new method "provides one solution to a fascinating, fundamental scientific challenge," Tyler emphasized that it could be decades - if ever - before it will bridge from the bench to cost-effective industry use.

Tyler said the new approach to synthesizing ammonia took five years to achieve and was inspired by earlier advances made by his graduate students, who found ways to make complexes soluble in water. He pointed out that Gilbertson and Szymczak both are funded by the university's National Science Foundation grant establishing research positions in Materials Science through the IGERT (Integrative Graduate Education and Research Traineeship) program.

"Solving problems of this magnitude takes a lot of student power and research dollars," Tyler said. "We're building on advances achieved during the last 20 years. A lot of hard thought went into this, not only by me and my students, but by other researchers who came before us."

Students chosen for the IGERT program receive opportunities to pursue interdisciplinary research, teach at other campuses, and do internships at National Labs and private companies. Gilbertson, who will complete his doctorate in chemistry in August, will begin a teaching postdoctoral position at Trinity University in San Antonio, Texas this fall. Szymczak currently has an internship at Pacific Northwest National Laboratories.

Editor's note: Journalists may obtain a copy of the scientific article by contacting Michael J. Bernstein, Communications Officer for the American Chemical Society, (202) 872-6042, m_bernstein@acs.org.

Photo: http://waddle.uoregon.edu/gallery/NewsImages/chemists
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David Tyler's website: http://darkwing.uoregon.edu/~chem/tyler.html
IGERT: http://www.igert.org/

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University of Oregon study says sunnier Oregon summers reflect global warming

Summers are getting sunnier in Oregon, according to evidence presented today by University of Oregon physicists during the 2005 Solar World Congress in Orlando. The study is a first step toward testing and refining regional climate models for the Pacific Northwest that will help track global warming.

In sharp contrast to reports of increased global dimming, the study's researchers reported a 10 to 15 percent increase in solar radiation at sites in Burns, Hermiston and Eugene over the last 25 years, according to an initial analysis of data collected since 1979 by the university's Solar Radiation Monitoring Laboratory.

"Oregon is a state famous for rain but in fact, Oregon is getting much more sunshine," said Frank Vignola, the laboratory's director and the study's co-author. "In fact, about two-thirds of the Northwest gets as much or more solar radiation than Florida. The northwestern corner of Oregon, which includes the population center in Portland, gets about 20 percent less."

Vignola and lead author Laura Riihimaki, a physics doctoral student, also found that Oregon winters are becoming cloudier. However, solar radiation levels during December average 75 percent less than July, so sunnier summers more than offset the increase in winter cloud cover.

"Now that we've characterized the trend, we can use this data with regional climate models to tell us how global warming is affecting the region and improve our success at predicting climate change in the Northwest," Riihimaki said. "Understanding long-term changes and trends in solar radiation is important to agriculture and for assessing the risks and reliability of power generated from hydroelectric and solar energy facilities."

The university's Solar Radiation Monitoring Lab, which collects data throughout the Northwest, is helping develop the infrastructure to integrate solar resources into the regional energy mix.

Though monitoring is done globally, no other site has measured solar radiation continuously for such a long period. "We are working with the largest and highest quality continuous record in the world," Vignola said.

Unlike other recent "global dimming" studies, which have reported decreases of about two percent per 10-year-period over large sections of the world, this study analyzes direct normal data.

"We have better data because we're looking at this with direct beam instruments which are more stable than global instruments," Vignola said, explaining that most recent studies on global dimming have been done with instruments whose sensitivity decreases over time.

The study was funded by Riihimaki's fellowship in the National Science Foundation's GK-12 Program at the University of Oregon's Materials Science Institute.

Oregon beam map: http://www.eurekalert.org/images/release_graphics/uoo0809.gif
Northwest beam map: http://waddle.uoregon.edu/gallery/NewsImages/AnnualBeam
Scientific paper: http://waddle.uoregon.edu/media/ASES-UOsolar.pdf
Solar Radiation Monitoring Laboratory: http://solardat.uoregon.edu
About the NSF's GK-12 Program: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5472
GK-12 at the University of Oregon: http://materialscience.uoregon.edu/GK12/Overview.html

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This project is supported by funds from the National Science Foundation and the University of Oregon. Please see **system requirements** for browser compatibility issues.

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Scientists discover active underwater volcano off Samoa

Unique 'city of eels' populates volcano's summit

University of Oregon biologists on the first-ever manned submersible expedition to a newly discovered undersea volcano near Samoa report that warm water emanating from the volcano's summit supports a remarkable eel population.

During a recent trip to study Vailulu'u Volcano, scientists found a new active volcano growing to within 1,800 feet of Vailulu'u's surface. The new volcano is emerging from Vailulu'u's summit crater, according to Craig Young, director of the university's Oregon Institute of Marine Biology (OIMB), and eventually will become the next island in the Samoa Chain.

"The biological community surrounding the eruption site is unique," said Young. "We were amazed to find that this area, which was dubbed 'Eel City' by expedition members, is populated only by thick microbial mats and hundreds, perhaps thousands, of eels. Although small eels are not uncommon in the cold waters of the deep sea, this is the only place in the world where any type of fish is known to dominate a hot-water vent and where invertebrates are virtually absent."

Young and Adele Pile of the University of Sidney led the biology group for the international scientific team exploring Vailulu'u, located off Samoa's eastern end. They are working with geologists and geomicrobiologists led by researchers at Scripps Institution of Oceanography at the University of California, San Diego.

The new volcano, named Nafanua after the ferocious Samoan goddess of war, did not exist just four years ago, according to Hubert Staudigel, a geologist at Scripps's Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics, and Stan Hart, a geochemist at Woods Hole Oceanographic Institution. With a growth rate of at least eight inches per day, the volcanic cone has rapidly emerged since the area was last surveyed by sonar in May 2001. Nafanua now stands at 300 meters, or nearly 1,000 feet.

"To actually have a documented case of an underwater volcano that has emerged within a accurate period of time is very rare—this is one of those cases," Staudigel said.

The eels live among fragile cavernous rock pillars surrounding the hydrothermal vent area. As the submarine landed near this area, scores of eels, approximately one foot in length, emerged from the rock caves and crevices.

"This is the first deep-sea hydrothermal community ever discovered that is dominated by eels" said Young. "Organisms at hydrothermal vents normally obtain their energy from hydrogen sulfide. At this point we do not know how these eels make their living, because we have not yet caught any of them." During the next expedition, planned for this July, the biologists expect to trap the eels and study their position in the food chain.

The team explored the site using the National Oceanic and Atmospheric Administration (NOAA) submersible Pisces V, a seven-foot sphere that has the capability to carry a pilot and two scientists to dive to depths of more than 6,000 feet. The research vessel Ka'imikai O Kanaloa carried the Pisces V to the dive site, with Staudigel and Young serving as co-chief scientists.

The University of Oregon biology team, which included Young and Sandra Brook of OIMB, was funded by two grants, one from NOAA's Ocean Exploration Office and one from NOAA's National Undersea Research Program, which underwrote the cost of the ship and submersible.

OIMB is located on the Oregon Coast at Charleston, Ore., about three hours southwest of the university's main campus in Eugene.

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Editor's Note: The following news release from Scripps Institution of Oceanography provides

more details about the geological discoveries associated with this expedition, including video taken during a dive and downloadable high resolution images: http://scrippsnews.ucsd.edu/article_detail.cfm?article_num=681

Photo of eels: http://waddle.uoregon.edu/gallery/NewsImages/eel_city

Photo of Craig Young: http://waddle.uoregon.edu/gallery/NewsImages/cmyoung_samoa

About Craig Young: http://darkwing.uoregon.edu/~oimb/craigyoung.html

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