

ETIC Success Stories

Examples of the benefits of the public and private investments under the guidance of the Engineering and Technology Industry Council.

- Eastern Oregon University
- OHSU's OGI School of Science & Engineering
- Oregon Institute of Technology
- Oregon State University
- Portland State University
- Southern Oregon University
- University of Oregon
- Western Oregon University



ETIC Investment...Eastern Oregon University

EOU's Computer Science/Multimedia Studies is unique among the Oregon University System in that, in addition to the formal Computer Science curriculum, concentrations are offered in software development for Multimedia applications and Statistical and Scientific Computing. The combined program has grown rapidly, from one graduate in 2002, seven in 2004, to 16 in 2004.



The CSMM Program has been fortunate to recruit several faculty members from the local community who bring industry perspective as well as teaching experience to their jobs. Here are two examples.



Dr. David M. Mayes received BS degrees in Physics and Chemistry from Eastern Oregon University and a Ph.D. in Chemistry from the University of Washington. Directly following his doctoral work, he founded *DSquared Development, Inc.*, a company located in La Grande Oregon, specializing in the design and development of innovative spectrophotometer sensors and their application to real world measurement problems.

ETIC Investment...Eastern Oregon University

Dr. Mayes' interests include miniature optical and sensor design, multivariate chemical analysis, numerical analysis, and software development. He holds several US and international patents in the application of Near Infrared Spectroscopic analysis. Software that he has developed is used by pharmaceutical companies for validating drug components during their manufacturing process. He teaches programming and numerical analysis.



John J. Clever teaches Assembly Language, Computer Architecture and Introduction to Operating Systems in the CSMM Program. Clever completed a 21-year military career in the US Army in 1985. He then completed a Master of Science degree in Computer Science from Farleigh Dickinson University and was employed as a Senior Member Technical Staff at Sandia National Laboratories in Albuquerque, New Mexico.

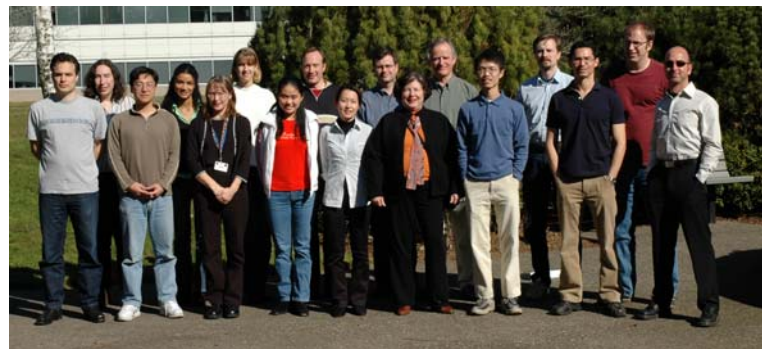
At Sandia, he worked as project member, leader or manager for a wide variety of technical projects including development of a backbone security network supporting the Cray supercomputer effort, development of a real-time multi-building campus intranet supporting the robotics research efforts, and specialized software testing applied to certain aspects of the global positioning system.

ETIC Investment...OGI School of Science & Engineering

OGI's Center for Spoken Language Understanding (CSLU) has become a world-renowned academic research center focusing on speech and language technologies, including speech recognition, computer-generated speech, voice transformation, and voice enhancement. Since 2000, when Jan van Santen became CSLU director, he and Dr. Hosom have parlayed the ETIC investment into \$10M of federal and business funding.

Annually, van Santen and Hosom have provided employment to 10 to 15 postdoctoral fellows, programmers, and graduate and undergraduate student assistants. The investment has enabled CSLU to add a new branch to its activities: Creating new speech and language technologies for communication disorders such as stuttering and those resulting from hearing disorders. This establishes CSLU as the leader in this new and exciting area and capitalizes on OHSU's strengths in neurological disorders.

The Center's research could lead to a new Oregon industry that provides low-cost solutions that allow caregivers and teachers to better help individuals with communication disorders. An example is BioSpeech, which creates products from intellectual property generated by CSLU.



ETIC Investment...OGI School of Science & Engineering

The Center for Spoken Language Understanding (CSLU) has begun planning for development of a new institute, to be called the ***Institute for Neurobehavioral Science & Technology***. This new institute capitalize on the combined strengths of CSLU and OGI's Point-of-Care Engineering Laboratory to explore new research opportunities.

Existing Research	New Opportunities
Communication disorders	Neurodevelopmental and neurodegenerative disorders, such as Attention Deficit Hyperactivity Disorder, Alzheimer's Disease, and Parkinson's Disease.
Technology for speech and language	Technology for other modalities, including movement, cognition, and perception
Basic technology research	Translational research, neuroscience research, and clinical service.

ETIC Investment...OGI School of Science & Engineering

The new **Department of Biomedical Engineering** at OGI has begun an intensive faculty recruitment process. Two new faculty members were made possible by startup funding from ETIC.



Tania Vu earned a Ph.D. in vision science (neuroscience) from the University of California, Berkeley. She did postdoctoral training in San Francisco, Chicago, and Boston. At Boston University she did research in the Therapeutic Microtechnology and Micro/Nano Biosystems Laboratory. At OHSU, Tania will continue her work on nanoscale neuromodulating platforms (quantum dots) used to anatomically label and modulate postsynaptic receptors in the brain and retina.



Deniz Erdogan earned a Ph.D. in electrical and computer engineering from the University of Florida. He did a postdoc there in the Computational NeuroEngineering Laboratory. His research interests include fetal heart rate monitoring, image processing for phased-array MRI signals, and brain-machine interfaces for prosthetic robotic arms. He holds a joint appointment with the Dept. of Computer Science & Electrical Engineering.

ETIC Investment...Oregon Institute of Technology

The **Oregon Renewable Energy Center** is moving OIT and the State to the head of the class in America's sustainable-power industry.

The best known project involving OREC has been the Rose House, an 800-square-foot home in Southeast Portland built by a retired couple who have been dedicated environmentalists for decades. It is one of about 500 "zero energy" homes in the country. OREC operates equipment that constantly monitors the structure at numerous locations, measuring energy consumption and generation as well as interior and exterior wall temperatures.

OREC teams also monitor a home in Cannon Beach, which employs geothermal



energy available through tapping wells hundreds of feet deep and transferring the heat found in water at the level into the home for heating. The builders of the home turned to OIT for advice on geothermal technology because OIT is the only campus in the country entirely heated and cooled by deep-water geothermal wells. The University also boasts the 28-year-old Geo-Heat Center.

ETIC Investment...Oregon Institute of Technology

The **Oregon Renewable Energy Center** is moving OIT and the State to the head of the class in America's sustainable-power industry.

Fuel-Cell-Powered Vehicle: OREC staff and students have built "the lowest cost fuel-cell-powered vehicle in the country" using a Proton Exchange Membrane Ballard 1.2 KW Hydrogen fuel cell as its sole power source that is capable of driving the 280 pound vehicle at 55 MPH. The vehicle uses a bank of super capacitors to store the electricity from the fuel cell rather than batteries. The hydrogen is stored in the latest light-weight carbon-fiber storage tank. The motor drive, electrical generator and controller are the newest generation of electrical and electronic control technology. This project represents the first step in the development of an entirely self-contained fuel cell powered vehicle of tomorrow that will run clean, efficient, and virtually silent.



An OREC student tests a 1.2 KW hydrogen-powered fuel cell.

ETIC Investment...Oregon Institute of Technology

OIT's **Sponsored and Pre-College Programs** reach out to students of all ages to open their eyes to careers in science and technology. Students as young as the sixth grade are encouraged to start planning for a college education.

With programs ranging from film-making to geographic information systems, students are introduced to a wide variety of opportunities.



Students in high school have access to OIT's Advance Credit and High School Transition Programs that give them a head start on college. With our TWIST program, OIT takes special care to embrace women with programs specially designed to overcome stereotypes and help them consider careers in technology.

ETIC Investments...Oregon State University

ETIC-directed investment at Oregon State University since 1999 has enabled the OSU College of Engineering to dramatically increase capacity and capability, deliver top talent and ideas, and produce tremendous results across the board.



The total number of OSU engineering graduates is up by 40 percent—from 543 in 1999 to 754 in 2004.



Total research funding at the OSU College of Engineering is up by 80 percent—from \$12.3 million in 1999 to more than \$22 million in 2004.

ETIC Investment...Oregon State University

Keeping Oregon—and the World—Safe from Tsunamis

ETIC funding helped build a team of OSU Engineering faculty researchers who now work in association with *the largest and most-wired Tsunami Wave Basin in the world.*

It was the unique combination of professor Cherri Pancake's expertise in information technology and OSU's civil engineering infrastructure that enabled OSU to win a \$4.8 million NSF grant to build the tsunami basin. Hiring computer science professors Ron Metoyer and Jon Herlocker to join Pancake (seated), as well as wave and tsunami experts Dan Cox and Harry Yeh, has made the OSU wave basin world-class: researchers anywhere in the world can participate in real-time experiments.

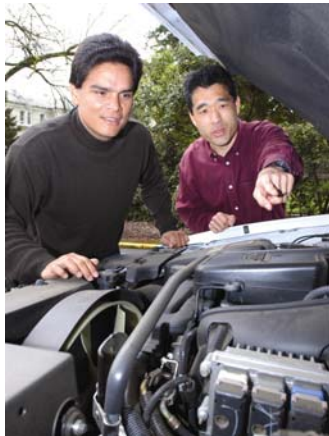


Recently, this team has been all over the media, from CNN and The Today Show to National Geographic, NOVA, and the Discovery Channel. Thanks to this stellar team of people, OSU Engineering is developing better early warning systems that will spread the word faster next time a tsunami strikes...which will ultimately save many thousands of lives.

ETIC Investment...Oregon State University

Taking Care of Oregon's Highway Infrastructure

Using ETIC funding, the OSU College of Engineering hired two new faculty, José David Porter Medina (left) and David Kim, who have helped the Oregon Department of Transportation and the state of Oregon develop a *creative solution for replacing the state's gas tax*. The unique wireless technology system developed by Kim and Porter is so innovative and successful that the state of California and the rest of the nation have taken notice.



In the past few months, Kim, Porter, and their graduate students have been featured on the CBS Evening News with Dan Rather, National Public Radio, and in newspapers and TV stations across the country. ETIC funding enabled OSU Engineering to build this team of extraordinary researchers who are showing California, and the rest of the world, how to attain stable funding for highway infrastructure.

ETIC Investment...Oregon State University

Helping Oregon's Technology Industry Succeed

When Oregon's technology industry succeeds, Oregon succeeds. The world's fastest computer chips are designed here in Oregon, at Intel—the state's largest employer. ETIC funding enabled the OSU College of Engineering to hire new professors in the field of chip design.

This innovative research team, which includes star graduate students like Jeff Bender, developed an innovative tool that solved one of Intel's biggest problems: as chips get faster and smaller, "interference" or "noise" from radio waves becomes a severe problem. OSU faculty researchers and graduate students figured out a way to solve this problem. This creativity and innovation are why OSU Engineering's Mixed-Signal research group is ranked No. 6 in the nation, and climbing fast. Again, ETIC is helping us build teams of extraordinary people to produce astonishing, innovative results.



ETIC Investment...Oregon State University

The Oregon State University Extension Service is providing non-formal education for pre-college rural 4-H and other youth to boost their technology skills, increased awareness of science and technology careers, and advancing entrepreneurial abilities. Since the start of the biennium these programs have reached nearly 3,000 rural 4-H and other youth, including those from a variety of under-represented groups, residing in 27 rural counties. ETIC support enables the OSU Extension Service to present engineering and technology related youth summer camps, 4-H clubs, special events, after school classes and in-school educational presentations to enhance and inspire rural youth toward bright futures.



ETIC Investment...Portland State University

In addition to the goal of expanding the number of engineering graduates, ETIC is pursuing the goal of developing programs of national ranking and quality. PSU has embraced this goal aggressively.

Last fall, the **Computer Science** department hired 10 new tenure-track faculty – a 50% increase from its current ranks. It has renovated 9,000 sq. ft. to house these new faculty and graduate students and is now involved in a crash course of integrating new and old faculty cultures. The goal of this venture is to create a Computer Science department that is ranked in the top 40 nationally in terms of Research and Development expenditures and which produces \$5 million in sponsored research annually.

Professor David Maier (right) is a key player in this venture and is clearly a faculty member of national stature. David graduated from Princeton University in 1978 and received a NSF Presidential Young Investigator Award. He is the Maseeh Endowed Professor in Emerging Technologies at PSU and is regarded as one of the five best database researchers in the country.



Professor David Maier and Vassilis Papadimos, a Computer Science graduate student, solve database problems in new facilities in a new department.

ETIC Investment...Portland State University

In the **Northwest Center for Engineering, Science and Technology** at PSU, four different, but related, programs are being pursued within a single lab scheduled to open in March 2005.

Professor Fu Li will occupy a greatly expanded **Video Image Processing Lab**. This program has received significant support in terms of state-of-the-art testing equipment from Tektronix over the years. Professors Jim Morris and Sung Yi are creating a **Nanoelectronics and Electronic Packaging Lab**, an interdepartmental effort involving the departments of Electrical and Computer Engineering and Mechanical and Materials Engineering.

Assistant Professor Shalini Prasad is a new faculty member joining PSU this academic year. She is opening her lab which integrates electrical and computer engineering, materials engineering, and biology.

PSU is active in the business accelerator business. Morgan Johnson from Octavian Scientific, Inc. is using lasers to create signal pathways which are more precise than anything that exists in the electronics industry today.



PSU faculty in the Maseeh College of Engineering and Computer Science put the finishing touches on a new multi-purpose lab.

ETIC Investment...Portland State University

As Scott Wells, Chair of the Civil and Environmental Engineering Department, defines “infrastructure” as those basic systems responsible for bringing all of us to and from work each day. Highways, buildings, bridges and water systems all fit the definition. Intelligent transportation systems involve the creative integration of information processing, sensors, communications, controls and electronics to solve highway, transit, bicycle, pedestrian and freight transportation problems. PSU not only makes these topics understandable but fun and socially significant.

Professor Robert Bertini is Director of the **Intelligent Transportation Systems Lab** at PSU. He graduated from the University of California at Berkeley and is the first NSF Career Award recipient in the Maseeh College of Engineering and Computer Science. Total research funding for the laboratory is \$2.5 million and the lab supports 25 students. Eight new courses have been established to meet emerging needs.

Financial leverage is a concept Robert Bertini knows well. In order to accelerate the growth of this lab, PSU is funding a Research Assistant Professor (Chris Monsere – Ph.D. from Iowa State University) to work with Rob and students in the lab.



Professor Rob Bertini and Professor Chris Monsere monitor traffic flows in the Portland metropolitan region

ETIC Investment...Portland State University

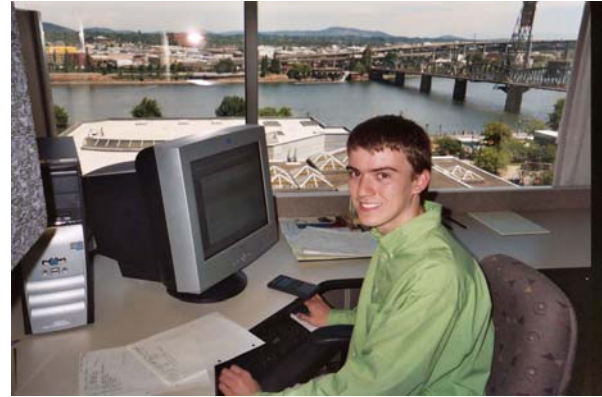
PSU's motto is "Let Knowledge Serve the City." Under President Dan Bernstine's leadership, this motto has a specific meaning in the sense that our faculty and students should be as diverse as the city we serve. Through a **Diversity Incentive Program**, new faculty from diverse backgrounds receive supplemental faculty grants to help move them forward.



The Maseeh College of Engineering and Computer Science has recruited three excellent women faculty members. Gwynn Johnson in Civil and Environmental Engineering has leveraged her support into a \$200,000 grant from the Oregon Department of Agriculture to research heavy metals issues in fertilizers. Shalini Prasad in Electrical and Computer Engineering is setting up her research laboratory. Lisa Zurk, a new ETIC hire in Electrical and Computer Engineering (not pictured), is transferring \$300,000 in grant support from MIT.

ETIC Investment...Portland State University

PSU's **Saturday Academy** placed 144 high school students in summer internships at companies, agencies and research labs statewide last summer through its Apprenticeships in Science and Engineering program. Another 145 apprenticeships are scheduled for summer 2005.



Saturday Academy's AWSEM clubs (Advocates for Women in Science, Engineering and Mathematics) encourage 300 middle-school girls a year to embrace math and science as integral to their futures. And Saturday Academy's after-school & weekend classes have posted over 5800 enrollments in science education since the start of the biennium. Special effort is made to reach students from groups traditionally underrepresented in the sciences, including girls, low income students, ethnic minorities and children of immigrants.

ETIC Investment...Southern Oregon University

ETIC funds helped the SOU Computer Science Department start the first undergraduate **CS Security** track in Oregon and a security emphasis in the Master's program, which have recruited at least twelve undergraduate students and eleven Master's students to SOU. SOU hired Dr. Lynn Ackler (at left in photo), who organized the curriculum and recruited Priscilla Oppenheimer, an expert in networking. ETIC funding established the laboratory used by students to perform security-related experiments.

On the right, Diana Carrol is demonstrating her research on cryptographic hardware for opportunistic encryption.. Diana's project focuses on fast encryption of a Voice Over IP channel. Jules Kongsliie, on her right, will be working on a research-based internship in Portland this summer. Ben Davol, to her left, is writing the drivers for the project and is currently employed by SOU's information technology department.



Katy McCleary (left) and Ambra Elmer (right) are SOU students working on a project at Tree Star, Inc., a start up bioinformatics company in Ashland. They are translating a complex system for biological cell analysis to a more readily used java product for academic and commercial researchers.

ETIC Investment...Southern Oregon University

Professor Panos Photinos of the department of Physics and Engineering at SOU has been studying the flow properties of **polymer solutions and liquid crystals**, in cooperation with researchers at the MacDiarmid Institute for Advanced Materials and Nanotechnology at Victoria University of Wellington, New Zealand. The cooperation has produced several presentations at professional meetings and publications.

SOU students are studying how liquids with gas bubbles flow through filtration beds under reduced gravity. This project is a collaboration among OIT, SOU, and Umpqua Research Company. The project is scheduled to fly on a NASA flight during Summer 2005. The result of this work may contribute to the Mars Mission.



Corey Hoven participated in the polymer-solutions research as a physics major at SOU, and will be presenting the most recent result at the annual meeting of the Oregon Academy of Sciences. Professor Peter Wu is also pictured.



SOU students Jason Matthews and Chase Christian (standing) are programming the computer to measure different parameters, such as pressure and flow rate.

ETIC Investment...University of Oregon

Beginning in 1998, ETIC provided “start-up” investments for three masters-level internship programs offered by the UO’s **Materials Science Institute**. These internships serve the state’s technology industries in computers and electronics, wood products and polymers, and the emerging biotechnology field by providing masters-level students with context that allows them to better appreciate understand the content their courses. The internships have been so successful at preparing the students for industry that nearly all interns have received offers for full-time positions from the companies where they have interned.

The **Semiconductor Device Processing** internship prepares chemists to meet the challenges of the rapidly evolving semiconductor industry. The program introduces fundamental concepts and processes used in the industry so that students can be more effective problem solvers in the industrial environment.



Andrea Jones of Eugene says the program helped fulfill her ambition to work for Intel. After a nine-month internship at Intel, the company offered her a full-time position. She is currently at MIT, under an Intel sponsorship, studying in the Leaders in Manufacturing Program. Rob Donis of Medford interned at and now works as a senior engineer for LSI Logic. He say the internship program gave him confidence on the job to quickly fit in.



ETIC Investment...University of Oregon

The **Polymer and Coatings** internship responds to the fact that “nearly 70 percent of all chemists work with polymers,” according to UO Chemistry Professor David Tyler, who directs the polymer program. Student interns have worked on shoe soles at Nike, paint manufacturing, drug-delivery systems such as pharmaceutical patches, as well as the wood products industry.

Chris Larsen of Springfield is a graduate of the polymer program who interned at Willamette Valley Company and now works there as a coatings chemist. Chris says the internship program prepared him for the differences between academic study and industry work. “In academia, it’s mostly about research. But in industry, it’s all about developing the research into a commercial application.” Chris travels frequently as part of his job, but he says he’s yet to find a better place to live than Oregon. “It’s a pretty rare thing to be able to work in your field in your home town.”

The **Organometallics/Advanced Organic Synthesis** internship serves the biotechnology industry, which may become one of the largest industries in Oregon. Director Bruce Branchaud says the capital-intense program could not have been started without funding help from ETIC. Now in its third year, the program hopes to double the number of intern positions offered.



ETIC Investment...University of Oregon

When the faculty of UO's **Computer and Information Science** (CIS) department discussed future strategies in 2000, they identified networking and distributed informatics as being cornerstones to the future of information technology. These areas are particularly important as all forms of communication are rapidly converging: telephone calls are being made over the internet; cable TV companies are providing internet service and broadcasting digitally; and even cellular telephones are being woven into the fabric of the internet. They are also areas in which Oregon's private sector has existing strengths. CIS has successfully recruited three stellar young researchers in these strategic areas from corporations in Silicon Valley and leading research institutions.



Professor Reza Rejaie – a leading expert on communicating sound, video, and other continuous media over data networks – joined the UO in 2002 from ATT labs in California. He is teaching classes on internet multimedia, peer-to-peer streaming and quantitative evaluation of network performance and evolution – areas of growing importance as the internet is used for more and more voice and video calls. Professor Rejaie and his colleagues have created the first accurate model of the “gnutella” peer-to-peer network, using new high-performance network measurement techniques, which will help guide development of the next generation of peer-to-peer networks.

Professor Rejaie was awarded a 2004 NSF Career Award, which will provide \$400,000 of federal funding to Oregon over a 5-year period for his research projects.



ETIC Investment...University of Oregon



Professor Jun Li also joined the UO in Fall 2002. Professor Li's area of expertise is network security, an area of increased interest by both the private and public sector. He is the head of the UO's Network Security Research Laboratory. Professor Li teaches a wide range of undergraduate and graduate courses related to network security and operating systems. Professor Li received his PhD (with Honors) from UCLA in 2002 and already has close to twenty publications, including six journal articles and a book as the first author, *Disseminating Security Updates at Internet Scale* (Kluwer Academic Publishers). His research on defending against network worms is supported by Intel Corporation.



Professor Dejong Dou was hired in the spring of 2004 to do research and teach in the area of the "semantic web" which is the exchange of self describing data over the World Wide Web and in several scientific and commercial domains, including medical informatics and genomics. He is a recent graduate from Yale University with a PhD in Electrical Engineering, and an expert in translating and merging the "ontologies" that describe data from different sources.

ETIC Investment...Western Oregon University

The Western Oregon University Computer Science Division developed a Microsoft software laboratory in the spring of 2003. Microsoft products are running on Dell machines in an environment where students are able to have a hands-on experience. The division is a member of the Microsoft Alliance Group thus all Microsoft software products are available for the laboratory. The courses utilize many specific software tools.



Some examples would be: SQL server, .NET, Microsoft Project, Visio, Crystal Reports and Windows Server 200X. Students of both computer science and information systems are expected to install, maintain and modify these systems and software applications as part of their courses.

The new Sun Workstation laboratory goes online at Western Oregon University in the spring of 2005. A hands-on experience similar to the Microsoft lab, it will be provided to the computer science / information systems students. Students will learn UNIX administration, open source applications, security assurance, and parallel processing/ programming.

