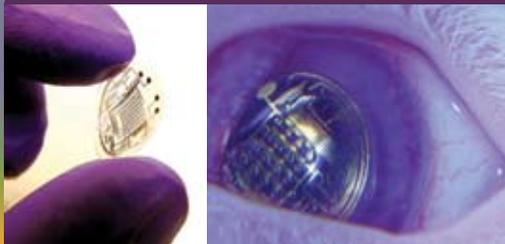


The Integrator

UNIVERSITY OF WASHINGTON
 COLLEGE of ENGINEERING
A Community of Innovators



UW EE research is at the forefront of next-generation assistive technology, and the media has noticed.

Read more on pages 4-5.



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Honoring Professor Ishimaru

Celebrate his 80th Birthday & a Lifetime of Achievements



To honor Professor Emeritus Akira Ishimaru and his achievements, the department will host an 80th birthday celebration. Please join us! Festivities begin with the Akira Ishimaru Distinguished Lecture on *April 29 at 10:30 a.m.* in the Electrical Engineering Building Room 105. This year our guest lecturer is Professor Anthony J. Devaney from Northeastern University. Following the lecture, faculty, guests, and former students will share in the celebration at a luncheon in the Husky Union Building (HUB) Room 106B.

If you would like to attend this celebration, please contact Karen Howard at krhoward@u.washington.edu or call (206) 616-8259. Space is limited; please RSVP by April 25.

Professor Ishimaru is one of UW EE's most accomplished faculty members, with a career spanning over 50 years. He earned his BS degree in 1951 from the University of Tokyo and the very first PhD awarded by UW EE in 1958. Professor Ishimaru became a world-class instructor and researcher with active research grants to this day. Over the years, Professor Ishimaru received numerous awards highlighted by the Distinguished Achievement Award from the IEEE Antennas and Propagation Society, the IEEE Heinrich Hertz Medal, the URSI John Howard Dellinger Gold Medal, and election to the National Academy of Engineering. To learn more about Professor Ishimaru, please visit the following websites:

www.ee.washington.edu/people/faculty/ishimaru/

www.ee.washington.edu/people/alumni/hall_of_fame/ishimaru_akira.html



Message from the Chair

The EE Department enters spring with many accomplishments to acknowledge in both education and research. The Evening Professional Masters Program launched this winter, and enrollment has increased to 40 students for Spring Quarter, evidence the program is meeting a need (see page 3).

Several professors have won prestigious awards. The UW is honoring Associate Professor Denise Wilson with the 2008 S. Sterling Munro Public Service Teaching Award for leadership in community-based service learning. Professor David Allstot received the 2008 SIA University Researcher Award. Assistant Professor Michael Hochberg received the Air Force Office of Scientific Young Investigator Award, and Microsoft Corporation recognized Assistant Professor Eric Klavins with the A. Richard Newton Breakthrough Research Award. We are proud of their achievements.

Several faculty members have attracted worldwide media attention for their research innovations. You can read more about Professor Babak Parviz's research on the "bi-ionic eye" and Jeff Bilmes' work on the vocal joystick on pages 4-5.

Our guest speaker for EE's Commencement on June 13 is an outstanding corporate leader, Keith Rattie (BSEE '76). He is CEO and chairman of Questar Corporation, a Fortune 1000 energy company. We are excited to welcome him back to campus to inspire our graduates as they transition to alumni status.

We have planned a wonderful event for April 29 to celebrate Professor Emeritus Akira Ishimaru's 80th birthday. It is also a tribute to his distinguished career of scholarship and mentoring of so many highly accomplished MS and PhD students. Please join us at this celebration to share memories of one of EE's most esteemed faculty members.

Leung Tsang
Professor and Chair

Alumnus Keith Rattie to Speak at Commencement

Alumnus Keith Rattie, the chairman, president, and chief executive officer of Questar Corporation, will speak at the 2008 Electrical Engineering Commencement ceremony on June 13. Questar is an \$11 billion energy company headquartered in Salt Lake City. Through subsidiaries, it engages in natural gas and oil development and production, gas processing, interstate transmission, wholesale gas marketing, and retail distribution.

Rattie's long career in the energy sector included service as senior vice president of The Coastal Corporation and general manager of Chevron Corporation's international gas unit. Mr. Rattie is past chairman of the board of the Interstate Natural Gas Association of America and a member of the board of the National Petroleum Council. He serves on the University of Wyoming Energy Resources Council, the Board of Directors of Zions First National Bank in Salt Lake City, and the Board of Governors of the Salt Lake Area Chamber of Commerce.



A native of Washington State, Rattie grew up in Aberdeen. He earned his BSEE at the University of Washington ('76) and an MBA at St. Mary's College (California). In a recent UW *Columns* article, he expressed his appreciation for Professor Dan Dow, chair of electrical engineering in the 1970s, who helped launch his career by passing his name along to Standard Oil, and to Professor Fred Bergseth, who helped inspire his choice of specialties. "I credit him with getting me to decide to focus on electrical power," Rattie says. "He took the theory and made the connection to potential applications clear and compelling."

Rattie and his wife, Nancy, have two children and make their home in Park City, Utah.

Professional Master's Program Offers First Course

The new UW EE Professional Masters Program (PMP) officially commenced Winter Quarter with 35 students enrolled in the inaugural courses (EE 518 Digital Signal Processing [DSP] and EE 500 EE Colloquium). Courses in the PMP are scheduled in the evening, and designed so that students generally need to come to campus only once per week. The benefits of a masters degree are well known to most engineers as it prepares them for new career challenges and opportunities by expanding and sharpening their skill set.

“For a masters degree in Electrical Engineering, DSP is like the circuits or other fundamentals course for an undergraduate electrical engineering degree,” says professor Les Atlas, longtime instructor of the day time EE 518 course and

first PMP professor. “Almost all topics—industrial, defense, medical, consumer, and communications electronics seem to grow out of the underlying mathematics in DSP.” One PMP student noted that the tools gained from the program will “assist me with the decisions I need to make on the job.”

The evening program is a flexible solution for the working professional, which facilitates access to an excellent curriculum and faculty. “The pace of the new Professional Masters DSP class is no slower than the fast pace we use for on-campus students,” says Atlas. “Some students say that it starts like “Trying to drink from a fire hose,” but when modern applications like MP3 players and HDTV are linked to the mathematics, it all comes together and make sense.”

The inaugural class drew from applicants with a variety of backgrounds. One-third of the enrolled students are women, compared to the daytime PhD and masters program, which consistently has 20%. Many companies in the Seattle region are represented, although by far the largest is the Boeing Company. Others include Avionics, Blue Origin, Fluke, Honeywell, Microsoft, Motorola, and Philips Ultrasound.

The PMP will offer two electromagnetics courses in the next two quarters. In academic year 2008-09, courses in signal processing, wireless communications, and other areas of EE will be available. For more information, please contact our newly dedicated PMP staff member, DJ Miller (206-616-1351), or visit us at:

www.ee.washington.edu/academic/pmp/index.html



Photo by Andy Morabito.

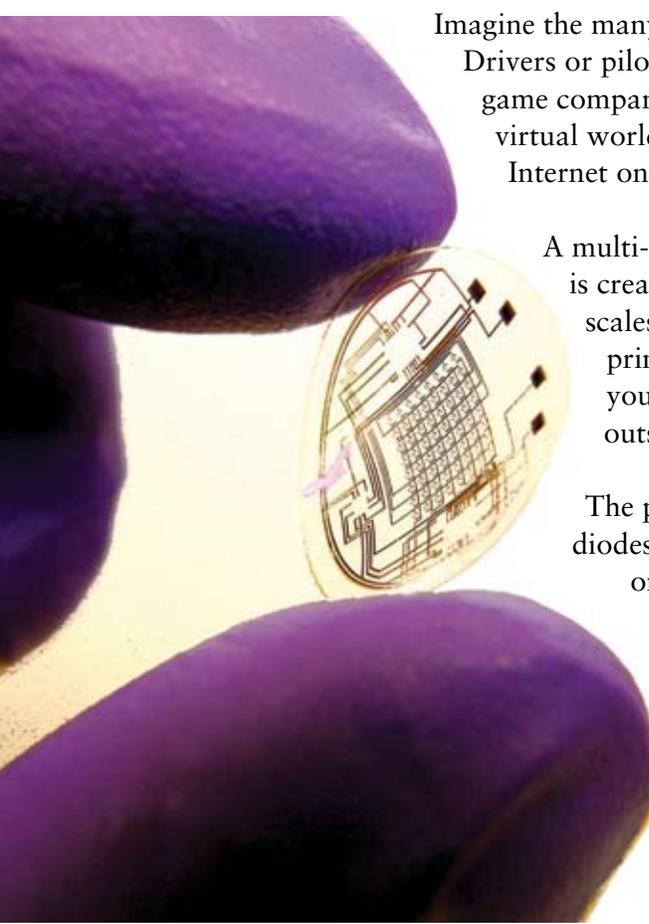
UW EE Research In the News

From the looks and sounds of it, UW EE research has been catching the eyes and ears of people across the globe through a variety of media channels such as National Geographic News, ABC News, BBC, NPR, CBC, NBC, Fox News, The New York Times, The Economist, Business Week, Discovery Channel, London Times, Daily Telegraph, Popular Mechanics, Focus, Guardian, Independent, EE Times, The Atlantic, Wired, Yahoo! News, and MIT Technology Review. Assistant Professor Babak Parviz's bionic contact lenses and Associate Professor Jeff Bilmes' Vocal Joystick exemplify some of the recent departmental research making quite a news splash.

To read more about the cutting-edge research conducted by our faculty and students, check out the department's annual research review, EEK (The Electrical Engineering Kaleidoscope):

www.ee.washington.edu/about/eeek/index.html

Bionic Eyes



Imagine the many possible uses for virtual displays integrated onto contact lenses. Drivers or pilots could see a vehicle's speed projected onto the windshield. Video game companies could use the contact lenses to completely immerse players in a virtual world without restricting their range of motion. People could even surf the Internet on a midair virtual display screen that only they would be able to see.

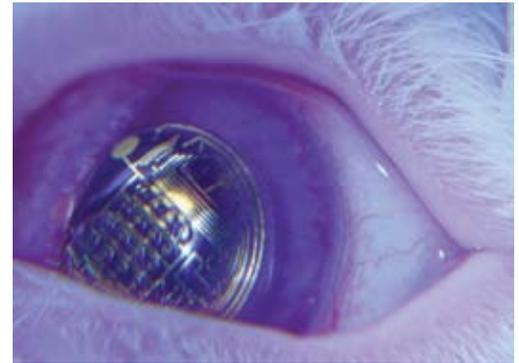
A multi-disciplinary UW group headed by Assistant Professor Babak Parviz is creating such a device by using manufacturing techniques at microscopic scales to combine a flexible, biologically safe contact lens with an imprinted electronic circuit and lights. "Looking through a completed lens, you would see what the display is generating superimposed on the world outside," said Parviz.

The prototype device contains an electric circuit and red light-emitting diodes for a display, though it does not yet light up. The lenses were tested on rabbits for up to 20 minutes and the animals showed no adverse effects. "People may find all sorts of applications for it that we have not thought about. Our goal is to demonstrate the basic technology and make sure it works and that it's safe," said Parviz.

Building the lenses was a challenge because materials that are safe for use in the body, such as the flexible organic materials used in contact lenses, are delicate. Manufacturing electrical circuits, however, involves inorganic materials, scorching temperatures, and toxic chemicals.

Researchers built the circuits from layers of metal only a few nanometers thick, about one thousandth the width of a human hair, and constructed light-emitting diodes one-third of a millimeter across. They then sprinkled the grayish powder of electrical components onto a sheet of flexible plastic. The shape of each tiny component dictates which piece it can attach to, a microfabrication technique known as self-assembly. Capillary force—the same type of forces that make water move up a plant’s roots, and that cause the edge of a glass of water to curve upward—pull the pieces into position.

Future improvements will add wireless communication to and from the lens. The researchers hope to power the whole system using a combination of radio-frequency power and solar cells placed on the lens.



Contact lenses with metal connectors for electronic circuits were safely worn by rabbits in lab tests.

The Vocal Joystick

For those unable to operate a handheld mouse for a computer, the Vocal Joystick developed by Associate Professor Jeff Bilmes just might be the answer. Vocal Joystick is a voice-activated software system that detects sounds 100 times a second and instantaneously turns that sound into movement on the computer screen. Different vowel sounds dictate the direction: “ah,” “ee,” “aw,” “oo” and other sounds move the cursor one of eight directions. Users can transition smoothly from one vowel to another, and louder sounds make the cursor move faster. The sounds “k” and “ch” simulate clicking and releasing the mouse buttons.



Graduate student Jon Malkin & Associate Professor Jeff Bilmes use the Vocal Joystick to control movement of a robotic arm. The computer screen shows how the software analyzes vocalizations to create instructions for the arm’s movement.

“A lot of people ask: ‘Why don’t you just use speech recognition?’” Bilmes said. “It would be very slow to move a cursor using discrete commands like ‘move right’ or ‘go faster.’ The voice, however, is able to do continuous commands quickly and easily.” Early tests suggest that an experienced user of Vocal Joystick would have as much control as someone using a handheld device.

Versions of Vocal Joystick exist for browsing the Web, drawing on a screen, controlling a cursor, and playing a video game. The newest development, presented at the Assets Conference on Computers and Accessibility in Tempe, Ariz., uses Vocal Joystick to control a robotic arm. The pitch of the tone moves the arm up and down; other commands are unchanged. This is the first time vocal commands have been used to control a three-dimensional object, says Bilmes, and he believes the technology could one day be used to control an electronic wheelchair. Future research will incorporate more advanced controls that use additional aspects of the human voice, such as repeated vocalizations, vibrato, degree of nasality, and trills.

Engineering a Business

Three Alumni Develop Personify Design, Inc.

Just a few short years ago, Brian Trautman, Joe Buys, and Rob Schlender were your average EE students, spending countless hours in the labs working on projects. Now they are spending countless hours growing their own company. Their friendship and entrepreneurial inclinations prompted them to incorporate Personify Design even before they graduated with BSEE degrees in 2002. Personify Design provides custom web development and design services to local and international clients. Their first project was an e-commerce website they picked up through Trautman's connection to an employee of Ann Geddes, the prominent baby photographer.

Upon graduation from UW EE, both Trautman and Buys joined Microsoft, while Schlender pursued his master's degree at Carnegie Mellon University. In their spare time, they worked to build their business. For Trautman, that sometimes meant 8:00 p.m. to 2:00 a.m. after putting in a full day at Microsoft. In December 2003, Trautman left Microsoft to work out of his house. Personify Design quickly started gaining clients and now has 12 employees and an office in downtown Seattle. Personify Design has completed projects for many high-profile clients such as Microsoft, Flexcar, The New York Times, and the Bellevue School District. Recently, they finished an e-discovery



Brian Trautman and Joe Buys at the office in downtown Seattle.

soft Outlook to the Visual Studio 2005 Team System. "We pulled an all-nighter to burn promotional CDs before catching a flight to San Francisco," Buys recalls. Trautman added, "It was so cool to see Steve Ballmer on stage talking to 100,000 people around the world about our product." Personify Design now has a second product on the market, TeamSpec, a project requirements management tool that can be used through Microsoft Word.

As their company approaches the six-year mark, Trautman and Buys have survived the challenges of entrepreneurship—leaving a secure paycheck for several years

"It was so cool to see Steve Ballmer on stage talking to 100,000 people around the world about our product."

website for attenex.com, a scheduling desktop application for the PRO Sports Club, and a content management system for Microsoft XBOX at creators.xna.com.

One particularly exciting experience was the public launch of Personify Design's first product, TeamLook, at the 2005 Microsoft Product Developers Conference in San Francisco. TeamLook facilitates team communication and collaboration on software projects by linking Micro-

of working harder than ever at reduced income. They continue to face the challenges of competing with larger companies for great employees and always upholding the reputation of being the best in the business around Seattle. Personify Design has made a profit "from day one," so Trautman and Buys can enjoy the rewards of running a small, nimble company — accomplishing more with less red tape, staying close to clients, and engaging at all levels of product design and project implementation.

Continued on Page 8

Alumni on the Radar - EE Class Notes

We would like to hear from you! Check out our Alumni Connections web page to read a complete list of updates from your former classmates, or to provide an update of your own:

www.ee.washington.edu/people/alumni/index.html

Robert Lemman, BSEE '48



Alumnus Robert Lemman's outstanding career in the electrical distribution industry began with Consolidated Electrical Distributors as vice president. There, he worked his way up to president/CEO and led the company through the acquisition of more than 50 independent electrical distributors.

In 1974, Lemman purchased North Coast Electric and grew the company from \$5 million in annual sales to \$280 million with 32 locations in six states.

Lemman was actively involved with the National Association of Electrical Distributors (NAED), lobbying Washington on behalf of electrical distributors in the 1970s, and served as president and chairman of the NAED Education & Research Foundation.

In April 2006, NAED honored Lemman by presenting him with the prestigious Arthur W. Hooper Award for outstanding service to the industry.

As a student at the UW, Lemman played basketball (#13 in picture) under Coach Clarence "Hec" Edmundson. One quote in the UW 1945 Yearbook read, "Bob Lemman, the Husky "giant killer," fought for the ball every minute and hit the hoop with deadly accuracy."



John Brew, MSEE '82

Lake Forest Park, WA – Brew is a technical fellow at Boeing, where he has worked for 22 years. He has worked on a variety of projects, which usually involve adding "gadgets" of all sorts onto Boeing aircraft. Brew met his wife at UW, and they have been married for almost 25 years, with one son.

Hoang Le, BSEE '87

Kaneohe, HI – After graduating from UW, Le attended a graduate Software Engineering Program at Monmouth College in New Jersey. He now works for the Navy in Pearl Harbor as a software developer.

Nanlin Chiang, BSEE '93

Sacramento, CA – After graduating, Chiang worked for two years as an inside plant engineer with Guam Telephone Authority. For the next 11 years, she took a detour in career path and went back in school in Boston, receiving her DMD from Harvard School of Dental Medicine and MD degree from Harvard Medical School, and also completed her residency in oral and maxillofacial surgery. She is now in private practice in Sacramento. Chiang is still fond of the days of reading *The Daily*, and firing Nd:YAG laser on a cow's eyeball in Professor Kelin Kuhn's basement lab.

Continued on Page 8

Personify Design

(Continued from Page 6)

Looking back on their experiences as EE undergraduates, Trautman and Buys reflect on Professor Jim Peckol's Microcomputer Systems course (EE 472). "The cool thing about course projects was seeing an idea all the way through from conception to design to function," says Buys. "This type of class taught me how to gather relevant information and to think outside the box to solve problems."

Trautman and Buys recently returned to the department to talk to one of Professor Peckol's classes about their entrepreneurial experiences. For any EE graduates interested in starting a business venture, Buys advises, "Whatever you do, be passionate about it, but also be patient for things to work out." Trautman adds, "Always keep your contacts and never burn bridges because you never know when you'll meet them again. Contacts are everything."

Class Notes

(Continued from Page 7)

F.L. Dan Dankert, BSEE '01

Bothell, WA – After graduation, Dankert accepted a position at AMD in Austin, TX. He went on to obtain his MSEE at UT Austin, specializing in circuit design. Recently, Dankert was transferred to AMD's Advanced Architecture and Technology Lab. This transfer brought his family back to the Seattle area and he couldn't be happier!

Luca Cazzanti, Ph.D. '07

Seattle, WA – Cazzanti is working full time at the Applied Physics Laboratory at the UW. He develops signal processing and machine learning algorithms and systems.

Daniel Draper, BSEE '07

Shoreline, WA – Draper is currently working for Fluke Networks in Everett as part of the company's Advanced Engineering Program. For the next two and a half years he will work with senior engineers on rotating engineering assignments (hardware, embedded, software, etc.) and is also pursuing a graduate degree.

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