

The Integrator

UNIVERSITY OF WASHINGTON
COLLEGE of ENGINEERING
A Community of Innovators

McMorrow Career Development Professorship Supports Research Innovations of Babak Parviz

Hundreds of news organizations around the world have reported on Babak Parviz and his “bionic lens,” including major television networks such as ABC, BBC, CNN, and NPR and print media such as *The Economist*, *Business Week*, *Washington Post*, *Popular Mechanics*, *LeMonde*, and *Wired*. In 2007 *MIT Technology Review* named him one of the top 35 innovators in the world under the age of 35. *Time Magazine* chose the bionic lens as one of the Best Inventions of the year in 2008, the same year a prototype lens was included in an exhibition at the London Museum of Science.

Parviz, who joined the EE faculty in 2003, is not just

a rising star, but a future supernova in the EE universe. He is exactly the kind of young faculty member that other institutions covet and could attempt to lure away. Thanks to a professorship fund established by Gerald McMorrow (BSEE '74, MSEE '78), the odds of keeping Parviz at UW have dramatically increased.

The new McMorrow Career Development Faculty Professorship in Innovation recognizes and rewards an outstanding mid-career faculty member with \$25,000 per year in current use discretionary funds that may be used for any scholarly purpose. Parviz is the first recipient and holds the professorship from 2009–2012. Such a career development professorship carries recognition

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Message from the Chair



This fall quarter kicks off with several impressive lectures that I encourage you all to attend. The first is Irwin Jacobs, co-founder of Qualcomm, the speaker for the 2nd annual Dean Lytle Electrical Engineering Endowed Lecture. The second is Assistant Professor Shwetak Patel's lecture on "smart" technology that can help mitigate our nation's energy crisis. Details about these lectures can be found on pages three and eight.

Many of our faculty continue to receive high honors and awards, most recently PECASE, NSF CAREER, and TR35 awards, to name a few. This issue's cover story features Associate Professor Babak Parviz, who has been awarded the McMorow Career Development Faculty Professorship in Innovation. This current use fund is especially valuable during the current economic climate

as it provides the flexibility to offer extra support to exceptional mid-career faculty. Congratulations to these faculty members!

We are delighted to announce an outstanding recipient of the first Irene C. Peden Electrical Engineering Fellowship. Tamara Bonaci ranked in the top 1% of EE students at the University of Zagreb. The ability to draw super achievers from across the globe is another indicator of the quality of our program.

Finally, my thanks to all of you who have been writing in to the department to update us about where life has taken you after graduation. Many of you have mentioned how much you like to read about your former fellow classmates through the class notes section of this newsletter, so keep the updates coming! We are extremely proud of our alumni and their achievements, and feel fortunate that EE could be a small part of it.

Leung Tsang
Professor and Chair

Professorship

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among colleagues within academia, industry, and beyond.

"It is a privilege to receive the professorship created by the generous support from Gerald McMorow," Parviz said. "This funding enables our group to conduct cutting-edge and exploratory research and support the education of the students involved."

Gerald McMorow, an innovator and entrepreneur, is the CEO,

founder, and chairman of the board of Verathon Inc. (formerly Diagnostic Ultrasound Corporation). The company, founded in 1984, designs, manufactures, and distributes state-of-the-art medical devices used in urology, acute care, primary care, extended care, anesthesiology, critical care, emergency medicine, and EMS markets. McMorow led Verathon through its transformation from a small start-up venture to an international corporation. He

was honored with the 2006 Ernst & Young Entrepreneur of the Year Award in the Pacific Northwest in the health services category. Last winter he participated in the EE Leadership Seminar Series and spoke to students about his career.

"Gerald McMorow's support to EE is invaluable," said chair Leung Tsang. "A career development professorship gives us a critical extra incentive for retaining exemplary young faculty members."

Pioneer of Digital Wireless Technology to Deliver Lytle Lecture

Irwin Jacobs, co-founder of Qualcomm Incorporated and pioneer of code division multiple access (CDMA) digital wireless technology, is the speaker for the second annual Dean Lytle Electrical Engineering Endowed Lecture. CDMA employs spread-spectrum technology and assigns each transmitter a code to allow multiple users to send information over a single communication channel.

Dean Lytle Electrical Engineering Endowed Lecture

October 15, 2009

10:30 a.m.

*Lecture, Microsoft Atrium,
Paul G. Allen Center*

11:20 a.m. – 12:10 p.m.

Reception, light refreshments

Jacobs directed the commercialization of CDMA, the world's fastest-growing, most-advanced voice and data wireless communications technology. He served as Qualcomm's CEO until July 2005 and chaired the company's board until March 2009. Internationally recognized and widely honored for his achievements, Jacobs now

serves the engineering profession on the national level as chair of the council of the National Academy of Engineering. He also chairs the board of the Salk Institute for Biological Research in San Diego.

"Dr. Jacobs is a stellar innovator, entrepreneur, and industry leader," said EE Chair Leung Tsang. "We are delighted to bring to the Lytle podium such a distinguished member of our profession."

Before launching into entrepreneurship, Jacobs served on MIT's EE faculty and the computer science and engineering faculty at the University of California, San Diego. He left academia to co-found and head LINKABIT Corporation, which introduced Ku-band very small aperture earth terminals (VSATs), commercial TDMA wireless phones, and the VideoCipher® satellite-to-home TV system. More than 35 San Diego telecommunications companies, including Qualcomm, trace their roots back to LINKABIT.

Jacobs holds doctoral and masters degrees in electrical engineering from MIT and a BSEE from Cornell University. Among his many honors he is a Fellow of the IEEE and winner of its Alexander Graham Bell Medal (1995), the Distinguished Industry Leader Award (2004) from the IEEE Communications Society,



and the Wolfson James Clerk Maxwell Award (2007). The Franklin Institute honored him with the Bower Award in Business Leadership (2001), and The Woodrow Wilson International Center for Scholars recognized him with the Woodrow Wilson Award for Corporate Citizenship in 2004.

Faculty Accolades

Michael Hochberg

PECASE Award

Brian Otis

NSF CAREER Award

Shwetak Patel

TR35 Award

Robert Spindel

*Silver Medal Award from the
Acoustical Society of America*

Bonaci Awarded Peden Fellowship

Electrical Engineering has chosen a student of exceptional promise as the first recipient of the Irene Peden Fellowship. Tamara Bonaci ranked among the top students in electrical engineering and computing at the University of Zagreb.

She plans to focus her UW research in the areas of networking and system control, working with Professors Radha Poovendran and Linda Bushnell, and ultimately is aiming for a research career in the aviation industry.



Bonaci first visited Seattle several years ago and reports a case of “love at first sight.” The UW’s reputation as an outstanding university and the diversity of research projects in the EE department motivated her to apply here for graduate studies.

“I am very proud to receive the fellowship established to honor Professor Emerita Irene Peden,” Bonaci said. “Her accomplishments are truly amazing and so inspiring. I would like to express my deep gratitude to the alumni and others whose contributions helped establish the fellowship.”

Six EE faculty members were among donors to the Peden Endowment, which also received a substantial matching gift from The Boeing Company.

*The department is finalizing new **EE Certificate Programs**, with the first one, on Smart Grids, expected to begin in spring quarter!*

Learn more at:
www.ee.washington.edu/academic/pmp/certificates.html

2009 Fellowships

Congratulations to our graduate student fellowship recipients, and thank you to the organizations and individual donors who enable this essential support.

DOD, NDSEG, SMART Fellowships

Nathan Parrish, Colin Reinhardt, Alexandra Sinclair, Anirudha Siripuram, Dan Yeager

EE Peden Fellowship

Tamara Bonaci

EE Rushmer Fellowship

Christopher Takahashi

Egtvedt Fellowship

Seunghee Shelly Jang, Nathaniel McVicar

Fulbright Fellowship

Frank Sun

Graduate School Top Scholar Fellowship

Nicole Thomas

Gray Fellowship

Gabriel Cohn

Halpert Fellowship

Colby Boyer

Intel Fellowship

Parmoon Seddighrad

Kaiser Fellowship

Hector Cuevas

NSF Fellowship

Robert Egbert, Nicole Nichols

Samsung Fellowship

Younsun Kim, Jun Hyuk Song

Bror Saxberg, Learning Engineer

Imagine the typical background of a chief learning officer for a company that develops educational curricula and tools for K-12 students. Perhaps a former teacher or school administrator? An expert in child development, educational psychology, or instructional methods? Electrical engineer surely would not come immediately to mind; neither would mathematician, computer scientist, or physician.

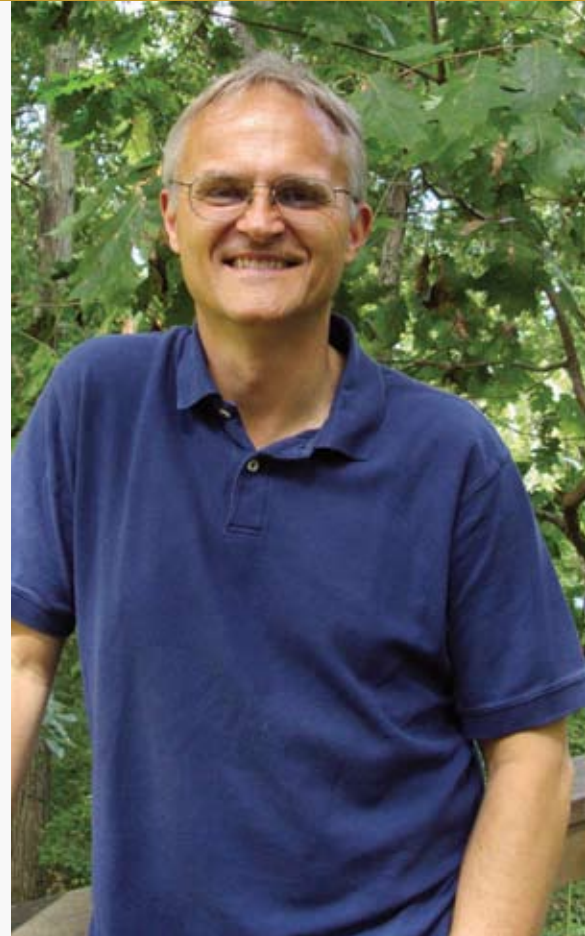
Bror Saxberg (BSEE 1980) is a dissembler of preconceptions who has applied an extraordinarily diverse background to the challenge of engaging students in learning, with the goal to unleash the potential of any developing mind. In 2000 he helped found K12, Inc., an e-learning company that is now the largest provider of curricula tools to virtual charter schools, to parents who home-school children, and parents who want to complement what is being taught at traditional schools. K12 went public in December 2007, trading on the NYSE, with annual revenues now expected to exceed \$300 million. In June 2009, he began a new assignment as chief learning officer for Kaplan, Inc., a \$2.2 billion revenue provider of lifelong education, with programs for K-12 students and schools, post-secondary education, and professional training.

Saxberg himself is a case study in potential unleashed. While finishing his UW EE and math degrees, he won a Rhodes scholarship to Oxford, where he earned an MA in mathematics. He followed that with SM and PhD degrees in electrical engineering and computer

science from MIT, and then topped off his educational odyssey with an MD from Harvard Medical School.

At his core, though, Saxberg says he is an engineer. “I rely on scientific research about learning and minds, but I use it to solve real problems. I am, essentially, a learning engineer.” He would like to see more people in education approach learning — even at undergraduate and professional levels — with an engineering mindset. “As with any engineering task, we should ask, ‘What is the science behind this? How do we use that science to make robust learning environments? How do we measure learning progress over short and long time frames?’ Education cannot be defined by a few numbers; still, we shouldn’t shy away from objective information to improve the student experience.”

Saxberg says there are stumbling blocks for traditional education. First, he sees an information gap. “Teaching and curricula are not yet informed by existing high-quality empirical research on how learning works.”



Second, he notes that not all learners have access to the teachers and environments that could help them work hard to master material effectively. “The best teachers are able to orchestrate learning so that all the students are challenged and making progress,” Saxberg says. He likens good teachers to the best music directors. “There are high notes and low notes in the same orchestra, but all the music comes out in a coordinated way — and all the players find different challenges as they play together. In addition, not all musicians play at their best in large groups — we need the equivalent of string quartets, even a-capella groups, around

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Saxberg

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academic subjects to take advantage of students' skills and interests to drive learning through practice."

Third, Saxberg has noticed that teachers vary greatly in their topic or pedagogy expertise in domains they're teaching. At any level of education, without additional support, this makes it hard to get reliable outcomes for students with different teachers — and it may be very challenging, too, for teachers with more limits to get more students excited about these subjects.

K12 and Kaplan address these issues by designing curricula and training materials to assist teachers (and others) in customizing education and helping students achieve mastery, especially for students for whom traditional methods have not been as successful.

worked, putting parts together, and hearing beautiful music come out." His math interests also originated at home. His mother and father (Borje Saxberg, who recently celebrated his 50th year teaching at the UW Foster School of Business) regretted they had never mastered mathematics at the level they wanted, and provided their sons with opportunities to learn as much as they could.

Saxberg suggests engineering students take "as much math as they can stand" because school provides almost the only time engineers can think deeply about theory — the world of work prioritizes the quick over the exact. "Deep exposure to mathematics gave me an enormous toolkit to engage and understand the principles and problem-solving of engineering," Saxberg notes.

"Don't feel constrained by the academic boundaries of engineering — that's just a starting point. The world needs people able and willing to work on hard, important problems — the world needs engineers in every area."

One of the most satisfying things for Saxberg during his time at K12 was hearing from many 8- and 9-year-old girls that science was their favorite subject. "These kids see science as investigating their world, digging in the dirt, projects in the kitchen, tied to theories developed by people about how the whole world works, and they get excited about it. As they overcome challenges, they feel successful, and that translates into higher performance and greater interest in the subject matter," he says.

Saxberg's interest in EE sparked as a teenager while helping his father with his hobby of building stereo equipment. "I loved learning how these gizmos

He also emphasizes that it is important to do what you love, what you think is important. "Don't feel constrained by the academic boundaries of engineering — that's just a starting point. The world needs people able and willing to work on hard, important problems — the world needs engineers in every area." Saxberg plans to keep on as a "learning engineer" — working on the hard problems of education with creativity and care backed up by science and technology.

Saxberg lives with his wife, Denise, daughter, Siri, and two sons, Tor and Haakon, in the Washington, D.C. area.

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

Harold J. Engebretson, BSEE '47

Longbranch, WA – Engebretson retired in 1981 from Rockwell International. Since then, he has conducted a consulting practice related to the use of inertial technology in surveying or guiding drilling for boreholes in the earth for the oil and gas industries.

Gary Rondeau, MSEE '79

Eugene, OR – After receiving his Master's degree, Rondeau went on to Cornell University, where he earned a PhD in 1989. For the past ten years, Rondeau has been the technical director of Applied Scientific Engineering, Inc. (www.ASIimaging.com), in Eugene, Oregon, where he lives with his wife, Ellen Singer, an attorney.

Dan Young, MSEE '01

Middlebury, VT – Young works for the Sensor and Integrated Systems division of Goodrich Aerospace in Vergennes, Vermont, on several data concentrator systems for the new Boeing 787. After studying medical electronics with Dr. Spelman, he is amazed at how the skills he learned apply to monitoring the health of an airplane. Young is married with two wonderful children, and they live in Middlebury, home to the Middlebury College Panthers (think hockey).

Ian Hayles, BSEE '04

Kent, WA – Hayles works for Smart Works, Inc. and designs power quality

and watt hour metering equipment for datacenters. He has used and needed all the math, physics and EE knowledge working at this company, and has been able to do everything from PCB layout, switch-mode power supply and magnetic design, high current applications, and UL (Intertek-ETL) compliance testing.

Loukas Lazos, PhD '06

Tucson, AZ – Lazos has been a faculty member at the Electrical and Computer Engineering Department at the University of Arizona since 2007, teaching classes in the areas of computer networks, network security and computer programming. As a recent recipient of the NSF CAREER Award, Lazos is also conducting research in the areas of networking and distributed systems, focusing on identification, modeling and mitigation of security vulnerabilities in wireless networks and analysis of network performance.

Nima Miri, BSEE '07

Everett, WA – Miri was an intern at Areva T&D during his last three quarters at UW before he was offered a permanent position as project integrator. He joined Snohomish County PUD in 2008, and has been involved in system planning, protection, and substation engineering. He reports there are great opportunities out there for students with power systems background, and says he loves his profession.

David Meyer, BSEE '09

Brighton, MA – Meyer worked at Intel Labs in Seattle for the summer after graduation while preparing to move to Boston to attend MIT as a PhD student. He is apart of the Quantum Nanostructures and Nanofabrication group, headed by Karl Berggren, and received an IGERT Fellowship from the Interdisciplinary Quantum Information Sciences and Engineering group.

Patrick Tague, PhD '09

Mountain View, CA – Tague is an assistant research professor at the Silicon Valley campus of Carnegie Mellon University. He is a member of CyLab and INI at CMU.

Alumni Accolades

Cameron Charles, PhD '06

NSF CAREER Award
University of Utah

Loukas Lazos, PhD '06

NSF CAREER Award
University of Arizona

Mingyan Li, PhD '06

*Silver Star Award from Boeing,
2nd highest employee award*
Boeing Phantom Works

Energy Crisis, Smart Solutions **Tuesday, November 17, 2009**

7 p.m., Kane HALL ROOM 130, UW Seattle – FREE!



Carl Imhoff, Manager, Electricity Infrastructure Market Sector, Pacific Northwest National Laboratory (PNNL)

Shwetak Patel, Assistant Professor, Computer Science & Engineering and Electrical Engineering

Our nation's electric grid must transform into an integrated digital system to meet expanding 21st century power demands. PNNL is a leading contributor in the nation's multi-billion-dollar push to develop "smart grids" and the technologies that will radically transform grid operation, boost energy efficiency, incorporate renewable energy, support electrification of the transportation sector and produce a smaller carbon footprint. Meanwhile, UW engineers are inventing sensors to monitor resource use in real time and encourage efficiency in the home—smarter energy from source to user.



Register online at UWalum.com or by calling **206-543-0540**.

The Integrator

Website: www.ee.washington.edu / Tel: 206.221.5270 / Fax: 206.543.3842

To learn about supporting EE, please call 206.685.9816, or visit www.ee.washington.edu/supportee

Leung Tsang
Professor & Chair

Sumit Roy
*Associate Chair for
Research & Development*

James A. Ritcey
*Associate Chair
for Education*

Laura J. Haas
Publications Manager

Contributors
*Kelly Oswald
Sandy Marvinney*

Send address corrections to:
alumni_relations@ee.washington.edu

University Of Washington
Department of Electrical Engineering
Paul G. Allen Center - Room AE 100R
Box 352500
Seattle, Washington 98195-2500