Hands-Free Cars?
Students Drive
Future Technology

Becoming a Leader
Key insights from an ECE alumnus

Engineering Art
The style and career of Purdue institution John Ollar
On My Mind

Welcome to the Summer 2008 issue of Impact magazine. This issue highlights entrepreneurship efforts and accomplishments within the School of Electrical and Computer Engineering. A key aspect of entrepreneurship at any university is the level of innovation taking place in its research efforts. This year has been record setting for ECE in terms of research funding and recognition. The school’s research expenditures hit $45 million this year and our faculty have been recognized for numerous awards, many of which are highlighted in the following pages.

As you will see in the following pages, ECE is a virtual hotbed of entrepreneurial activity. Nowhere else on campus will you find more activity in the spirit of uncovering new ideas and bringing them to the market. This is demonstrated in everything we do, from graduate student projects that hold great commercial potential, to faculty members with startup companies out in the “real world” making a difference, to faculty research areas that are pushing the school to the forefront of the field.

What is most exciting about all this activity is the continually evolving nature of our efforts, and the amazing rewards that can be realized. Our students are bringing fresh ways of thinking to the lab, our faculty researchers are recognizing the vast potential for commercialization and acting on it, and ECE alums are heading up business ventures across the country.

I hope you enjoy reading about our entrepreneurial success and the spirit that drives it. What an exciting time for ECE! Thank you for being part of it.

—Mark J. T. Smith
Michael J. and Katherine R. Birck Professor and Head, School of Electrical and Computer Engineering

Quotes

Nobody talks of entrepreneurship as survival, but that’s exactly what it is and what nurtures creative thinking.

—Anita Roddick

I never perfected an invention that I did not think about in terms of the service it might give others... I find out what the world needs, then I proceed to invent.

—Thomas Edison

Entrepreneurs are simply those who understand that there is little difference between obstacle and opportunity and are able to turn both to their advantage.

—Niccolo Machiavelli

Tell us what you think by sharing your Purdue memories or reacting to a story in this issue. We invite you to write to us via the contact information listed on page 2. In doing so, you grant us permission to publish your letter in part or in whole in an upcoming issue. We also reserve the right to edit letters for length and/or clarity.
About the Editor

I am happy to introduce Barbara Leonard, the new editor for ECE Impact magazine. An adopted Boilermaker, Barbara has been at Purdue for five years as a writer and communications coordinator for the Development Office. Barbara has a bachelor’s degree in English from Rutgers University in New Jersey and a master’s degree in English from Purdue. She has hit the ground running with this issue of Impact and I look forward to seeing the magazine flourish under her leadership.

Rwitti Roy
Director of Marketing and Communications
Neudeck’s Legacy: Mentor Extraordinaire

Pioneer in silicon device research spent nearly 40 years at Purdue


These only begin to tell the story of Gerold W. Neudeck, who came to Purdue University in 1964 as an instructor and research assistant, earned his PhD, and stayed to achieve international recognition as an electrical engineering professor. By his retirement in 2006, he’d developed 19 courses and overseen another 10, guided nearly 30 master’s and more than 30 doctoral candidates, and served three years as associate dean of engineering.

Neudeck passed away April 25, 2007, leaving a legacy of achievements: thousands who’d learned from him, nine books, hundreds of articles, 15 patents, as well as advancements in three-dimensional silicon device structures, physics and fabrication technologies.

“He loved being an engineer,” says his wife, Mariellen Neudeck. “He was proud of being an experimentalist. He thought solving real problems for real people was a very high-order challenge. He had quiet determination. He liked to find creative solutions to research problems. He was competent in every way.”

Former student Jon Birck’s (BSEE ’70) experience echoes many others’. “Dr. Neudeck was a great mentor, giving me freedom to explore my own solution, but providing guidance along the way,” he says.

Teaching was Neudeck’s hallmark, says former student John Denton (MS ’86, PhD ’95), now a Purdue associate professor of electrical and computer engineering technology. “Professor Neudeck believed firmly in teaching as the essential faculty role, whether in the classroom or through advanced research. He cared about student learning at all levels.”

In 1999, Neudeck was named to the Purdue University Book of Great Teachers. Other citations included the 2001 Aristotle Award from Semiconductor Research Corp., a 1995 Honeywell Teaching Award, and 1992 Nyquist Award. In 1990, he was named an IEEE Fellow.

Born in 1936 in Beach, North Dakota, Neudeck grew up during the Great Depression. He took his first job at age 10. In high school he went to work at 3 a.m. at a bakery, which he kept as a hobby, baking his family’s bread all his life.

He was the first in his family to go to college, earning a bachelor’s and master’s at the University of North Dakota. He met Mariellen on a blind date when they were both home for the summer from separate colleges.

“He loved kids and dogs,” his wife says. He enjoyed hiking, tennis, making wooden toys, and collecting Western Art. He also helped maintain protected land owned by the nonprofit, Northern Indiana Citizens Helping Ecosystems Survive (NICHES), and served on its board. Kathy Mayer

Gerold Neudeck is survived by sons Philip (BSEE ’86, MSEE ’87, PhD ’91) and Alexander (BSEE ’87, MSEE ’88) and his wife of 45 years, Mariellen. A graduate student office and gathering room in the ECE Building will be built in Discovery Park in the next few years and named in his honor.

Top photo, page 1: Prof. Gerold Neudeck and Rashid Bashir, shown in front of the LPCVD Epitaxial Reactor, check the parameters of the selective epitaxial growth of single crystal silicon which is fundamental to the fabrication of their advanced device structures. (photo from Electrical Engineering Wavelinks, Spring 1994)
Recognition Abounds for ECE Faculty Member

Professor Andrew Weiner has received three significant forms of recognition this year. He was awarded the R.W. Wood Prize of the Optical Society of America, the 2008 Purdue Graduate School Outstanding Graduate Mentor Award, and was elected to the National Academy of Engineering, among the highest distinctions given to an engineer.

For more on Weiner, see this issue’s “Up Close: Faculty” section.

Delp Becomes Committee Chair, Board Member

Professor Edward J. Delp has been elected Chair of the Information Forensics and Security Technical Committee (IFS-TC) of the Institute of Electrical and Electronics Engineers Signal Processing Society (SPS). In this role, which became effective January 1, Delp will help set the direction of the areas of forensics and security in the society.

Delp to join the Scientific Advisory Board (SAB)

Professor Delp has been invited to become a member of the SAB of the Nokia Research Center*. The main goal of the SAB is to provide strategic guidance and evaluate scientific excellence of the center. The SAB is composed of international members from industry and academia.

*Research Center, located in Tampere, Finland.

ECE Faculty Receive NSF Career Awards

The CAREER Award supports the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of their organization’s mission. This year’s award recipients are Professors Dan Jiao, Dimitrios Peroulis, and Mithuna Thottethodi.
2008 Purdue-Silicon Valley Symposia Underway

The Purdue-Silicon Valley Symposia for 2008 kicked off with a return visit to Testarossa Vineyards in February, followed by monthly events in Palo Alto, California. At a special June Symposium, President France Córdova presented an advance preview of Purdue’s new strategic initiatives that build on Purdue’s contributions and reputation as a global research university.

ECE Professor Receives 2008 Sigma Xi Faculty Research Award

At its annual Initiation and Awards Banquet held in April, the Purdue University Chapter No. 27 of Sigma Xi presented Professor Jan Allebach with the 2008 Sigma Xi Faculty Research Award. The recipient of this award is chosen from among all science and engineering faculty members at the Purdue West Lafayette campus. Sigma Xi is the international honor society of research scientists and engineers and was founded in 1886 at Cornell University.

ECE Professor Scott Sudhoff becomes IEEE Fellow

The grade of Fellow is conferred upon a person of outstanding and extraordinary qualifications and experience in IEEE-designated fields, and who has made important individual contributions to one or more of these fields. Scott Sudhoff was named a Fellow in the IEEE for his contributions to electric machinery and power electronics.

Alumnus Recognized for Leadership, Accomplishments

Don Thompson (BSEE ’84), president of McDonald’s USA, was recognized for his corporate leadership and accomplishments at the 2008 Trumpet Awards sponsored by the Trumpet Foundation. Thompson received the organization’s Corporate Executive Award, which acknowledges the accomplishments of men and women who have significantly contributed to enhancing the quality of life for all.
CE researchers are in the driver’s seat when it comes to innovation. From faculty members with startup companies to graduate student work that has the potential to change the way we live and learn, researchers across the school are affecting change in the world beyond the university campus. In the process, ECE has become a hub for entrepreneurial endeavors at all levels.

continued on next page
Doctoral student Chad Aeschliman is in the driver’s seat when it comes to research, literally. The catch is that he has taken his hands off the wheel. Aeschliman, working with Professor Ray DeCarlo, has developed automated-steering technology that has the potential to make car travel safer.

Already installed on a test vehicle, the technology, based on lane-center tracking, so far has a 95 percent efficiency rate on the highway and has heavy potential to be marketed to automakers worldwide. The hands-free technology consists of a windshield-mounted camera, focused on the usual driver’s viewing plane, which records 30 frames per second. Images are sent to a 600 MHz processor in the dashboard that identifies the painted, dashed, and solid driving lane boundaries, and signals a motor that turns the steering wheel so that the car effectively tracks the center of its driving lane without any human interaction.

Before you start planning that hands-free, pre-programmed ride to the supermarket, Aeschliman’s focus is not convenience but safety. As an example, with automated steering, if a driver were to fall asleep at the wheel, the device would recognize that the car had moved dangerously close to either of the driving lane boundaries and audibly alert the driver while steering the car back to the center of the driving lane.

With self-steering technology already on the radar of major automakers, Aeschliman’s project comes with the added bonus of being inexpensive. With a mere 1,200 lines of code, the basic self-steering device costs $200, and much less if mass produced. More featured, more efficient, and slightly more expensive models would still seem a small price to pay for increased safety, effectively leveling the playing field for low-end, smaller cars traveling the same roads as the often larger and more expensive cars and SUVs.

This revolutionary technology, born of Aeschliman’s own boredom with his two-hour commute between campus and home, combines his passion for building things with his research interests. As his advisor, De Carlo is excited about the project, particularly about seeing theory and practice merge with nearly unlimited potential for future development.

So the next time you see someone driving with no hands, don’t panic, it might just be the car of the future.
Student-Driven Innovation

Students in Mimi Boutin’s classes are developing an interactive online learning tool that is changing the way information is stored and shared. “Kiwi,” a play on its converse, Wikipedia, is an online space where class notes, discussions, and images help students connect and learn together.

Inspired by a desire to increase communication and based on the principle that teaching others is itself a learning tool, Kiwi has the potential to revolutionize how we communicate and, more importantly, how we learn. Since Kiwi is student driven, Boutin stresses that just as in research where there is no absolute truth, in the Kiwi environment there is no authoritative voice to guide—or limit—what the students discuss. What they have found is that this bottom-up interface allows for knowledge and information to be shared, with the idea that creating a community of ideas will give students, themselves burgeoning researchers, the tools to explore for themselves.

Innovations like Kiwi have the potential to change the way students interact with their professors, fellow students, and information itself. With a pool of knowledge at their fingertips that is at once deep and holistic, students can choose what to use and what to discard. The tool gives them the ability to filter what is useful and extract what they need. Still in its relative infancy, Boutin and her students envision Kiwi as a model that could be used not only by schools and programs universitywide, but could easily be applied to industry and other environments where maintaining and sharing large amounts of information is necessary.

As a multi-dimensional learning tool of data, links, and graphs, Kiwi demonstrates the non-linear nature of how information is used and how it can be shared. As the Kiwi environment grows, and with the potential to be used campuswide and beyond, ECE students are quietly transforming how learning happens.

“... Just as in research where there is no absolute truth, in the Kiwi environment there is no authoritative voice to guide—or limit—what students discuss.”

Mimi Boutin, ECE Professor
Entrepreneurship at the University: Rewards and Challenges

Distinguished ECE professor Jerry Woodall knows a bit about entrepreneurship. As the founder or co-founder of five companies to date, his ideas about the university’s role in entrepreneurial endeavors can help us understand both the challenges and vast potential that seemingly small ideas can have on the marketplace.

For Woodall, entrepreneurship activities within the university environment, while holding great potential for commercialization, also face significant hurdles in terms of obtaining funding and winning support. Woodall says that entrepreneurship is exciting at an institution like Purdue because it allows researchers to step outside the lab and take their research to another level—commercialization.

Each of Woodall’s own companies has sought to address technological issues by marrying research with market needs. His first company, Mellwood Labs, Inc., began in 1995, followed by OptoLynx, LLC, LightSpin Technologies, LLC, Compound Photonics, Ltd, and AlGalCo, LLC. The latter is capitalizing on Woodall’s research in producing hydrogen on demand from water using aluminum and gallium catalysts. The research, already receiving significant attention, has great marketing potential in the medical device field and in aiding developing countries in producing clean drinking water. Especially exciting is the application of Woodall’s research in creating hydrogen hybrid automobiles, hydrogen enriched diesel fuel for cleaner and more energy efficient trains, and environmentally sound and secure electricity by enabling wind and solar power.

A successful entrepreneur must have personality and drive along with the ability to successfully fund and run a business operation. While becoming profitable is always a goal, Woodall says: “the diffusion of new knowledge should be the key drive behind any entrepreneurial activities.” The reward is seeing an idea blossom into something useful and with commercial value. With the economy becoming more globally focused, the potential for marketing ideas seems infinite.

A number of programs in place at Purdue are making becoming an entrepreneur attainable for students and faculty alike. One example Woodall points to is the certificate program at the Burton D. Morgan Center for Entrepreneurship, housed in the university’s Discovery Park. He says students in this program are most interested in learning the process of entrepreneurship and in getting out on their own.

While opportunities abound at Purdue, the challenges inherent in entrepreneurship at any university have the potential to become obstacles and to actually slow the process of commercialization. Funding can be a significant obstacle to entrepreneurial endeavors. Companies are more interested in supporting the final product than in sponsoring research, which may or may not become profitable in the long run.

In addition to funding woes, issues over intellectual property (IP) can stifle creativity and profitability, says Woodall. Stemming from the Bayh-Dole Act of 1980, universities with entrepreneurial pursuits own the IP resulting from government-funded research. “As a result, it is difficult to obtain funding from large companies,” Woodall says. “Universities are hard-pressed to show a commercial gain from marketing their IP.”

A more productive route, according to Woodall, would be educating and training students via classroom and research activities, then diffusing this knowledge into society so that startup companies can commercialize it; a win-win for researchers, students, and society.

Despite the challenges, Woodall says that balancing his entrepreneurial activities with his research and teaching is rewarding. The greatest satisfaction comes in seeing his work made into something worthwhile that betters people’s lives and having the opportunity to pass his knowledge on to students. With a tip of the hat to students like Chad Aeschliman and those working with Mimi Boutin, Woodall says, “training in the basics is the key; once they have gained that knowledge, students should be encouraged to think outside the box and to go hands on.”
To long-time building services employee John Oilar, the university’s engineering program epitomizes not only advancements in technology but also in artistic expression.

“I’ve worked for four engineering departments, I’ve known a lot of engineers and I’m inspired by what they do. I’m inspired by their positive outlook and work ethic; they work constantly and love it. I draw like an engineer, I go step by step,” he says.

Describing his style as somewhere between German and French Expressionism, Oilar is heavily influenced by renaissance masters Michelangelo and Da Vinci who, he notes, were also engineers. His medium is black and colored permanent ink. The difference between the two comes from the observer’s reaction. “Colored ink is more whimsical and creative; it sort of explodes before the eye and makes people happy when they see it,” Oilar says. “Black ink is about the interplay between light and dark; how they interact with each other. One makes you happy while the other makes you observe and think, color radiates out and black ink draws people in to look at it.”

Oilar’s art career spans over 40 years. As a college student, he studied art in Europe and sketched the rooftops of Florence. He graduated as an honor student with a degree in art from Western New Mexico University. Since 1989 he has had 10 one-man shows in Indianapolis, Crawfordsville and Lafayette. Oilar has been featured in international art magazines and is also a prolific writer with over 500 published articles on various topics. He feels that his career as an artist has been heavily influenced and supported by Purdue.

His artwork can be seen in over half the major buildings on campus. The Purdue Employees Federal Credit Union uses one of his drawings for a check design. Presidents Beering, Jischke and Córdova have each had their portraits drawn by him. His work has been featured in the Exponent and over 250 of his drawings have been donated to fundraisers and support groups. Oilar has designed the covers of Purdue textbooks and the logos of various campus groups like the Campus Safety Committee, of which he is also a member. Physics professor Ephraim Fischbach has lined the wall outside his office with nine of Oilar’s colored prints.

As a staff member, Oilar has spent over 21 years in building services, which he compares to artwork, “It’s like art to the extent you are making something better and more appealing. Making areas more attractive and better to work in; plus it gives me time to think about my art.”

Oilar’s partner in his artwork is his wife of 20 years and fellow Purdue employee, Diane. She organizes his shows, schedules and takes him to events, and is the person who convinced him to do more professional shows. Oilar and his wife will be the coordinators for this year’s professional art gallery at the Indiana State Fair.

Oilar believes it is the different cultures and “great students and teachers” he has been exposed to at Purdue that have had the most significant influence on his artwork. “Purdue is a worldwide entity and culture. I believe that a culture’s artwork and its engineering are the things that seem to last.”

John Oilar can be contacted for sales and commission work at (765) 362-3436.

Joseph Fowler
Keeping the Edge Sharp

Successful entrepreneurship takes a unique individual

Interestingly enough, this perspective comes not from being an entrepreneur but from spending 16 years in large, fairly bureaucratic telecom companies. These were companies where innovation was genuinely encouraged but then often summarily punished. The companies just didn’t know how to be entrepreneurial.

The 16 years bookended four years at a dynamic telecom startup and were followed by eight years as a venture capitalist helping start high-tech companies in Silicon Valley, Boston, and Europe—a highly dynamic and competitive environment, to say the least. These worlds are dramatically different.

While each requires bright, talented and energetic people to succeed, the specific skills, attitudes and mindsets that enable people to rise to the top tend to be quite different.

I have seen dozens of very successful, very smart executives from large corporations try their hands at running high-tech startups. Most have failed, many times quite miserably, and often it is the first significant failure in their careers.

The question is, “Why are these otherwise very successful people failing?” On the other side of the coin, I have seen people who flounder and go nowhere in large corporations go on to flourish magnificently in small, scrappy, and unstructured startups.

The corresponding question is why and how do these people succeed?

It often seems nothing is quite as quick and easy as a successful startup. You begin with a great idea, a bunch of smart, energized people and in a few hardworking but relatively short years you get bought or go public, get rich and buy your big boat, sports car, vacation home, or whatever. The reality is few things are quite as difficult and rare as a truly successful high-tech startup company. The perception versus reality gap is huge. These people earn their success!

To me, an entrepreneur is someone who has a compelling vision about how to change the way people live their lives. Whether it is a new product or a new service; this change or innovation must be dramatically different and better than whatever has existed before it.

But that is the easy part. An entrepreneur must also possess a very deep sense of purpose, self confidence, willingness to persevere, and sacrifice the ability to accomplish much with very little resources and no creature comforts. He or she must also be able to communicate ideas in a way that inspires others to adopt their vision as their own and to sign up to work and sacrifice to make it a reality.

An entrepreneur must be very comfortable in a completely nebulous and
unstructured environment where the realities change day by day and even hour by hour. Entrepreneurs resist hard and fast rules, preferring flexibility and creativity. They must have a “healthy” impatience with progress, no matter how fast or slow it is. While they are keen to celebrate and share success they also live in constant fear that their competitors are at their heels ready to pounce on their first misstep if they pause to take a break. The pace can be ruthless. Entrepreneurs are constantly evaluating their team’s performance, making sure they have the most capable people surrounding them.

This is an environment few successful large company people are truly comfortable in leading. They (and I include myself in this) tend to have become reliant on “big company” procedures, resources, and infrastructure.

On the other hand, entrepreneurs often get frustrated with the rules, processes, and general bureaucracy of large companies.

Large companies are very complex and even the best, most dynamic ones require unique leadership that is every bit as smart and talented as successful entrepreneurs but that also have very special communications and organizational skills to motivate large numbers of people.

So, large companies and small companies: two different worlds for two different kinds of people.

Q: What advice would you give to someone just entering the world of entrepreneurship who wants to stay ahead of the curve?

A: The first thing I would suggest is that you do an honest self-assessment of your own desires, skills, personality, and passion. We are each different and the world needs all types of people. We are not all made out to be successful entrepreneurs. I am not trying to discourage anyone; I do believe that many, many people possess the skills required to be successful entrepreneurs. But it takes far more than pure skill. It takes an immense amount of passion, desire, energy, flexibility, willingness to sacrifice and creative ingenuity. You need to have a fire in your belly that can’t be extinguished any other way. I think you know it when you have it.

Most great entrepreneurial successes don’t come from tweaking someone else’s proven idea or from doing what seems obvious.

You also need to have a tremendous amount of confidence in your abilities and a burning passion for your ideas. You need to be able to take rejection over and over again and you need to develop very thick skin. Most great entrepreneurial successes don’t come from tweaking someone else’s proven idea or from doing what seems obvious. They come from ideas and efforts that seem impossible to just about everyone except the entrepreneur. It will almost always be hard, against the odds and different than what everyone else is doing.

This isn’t an “8-to-6” job. The commitment required can be hugely demanding. I hate to say it, but it is a fairly rare person who can balance all the demands of running a successful startup company and maintain a sane and successful personal life. It can be done, and is done, but not by everyone who tries, and it isn’t easy.

So, if all these challenges and difficulties really turn you on, then you may just be a natural entrepreneur. If you are, my advice to you would be to go for it and don’t let anyone or anything stop you. It may happen quickly, it may take years, but in the end, you will finally succeed. Because that is what entrepreneurs do: they succeed in making their vision a reality.

Q: In terms of new technologies and product development, what challenges does the communications industry face on the global stage?

A: The telecommunications industry has been in a constant state of very rapid change (some would say chaos) since 1982 when the Department of Justice and AT&T settled the government’s antitrust lawsuit by breaking up the Bell System monopoly. This resulted in highly-competitive long distance and equipment markets. It enabled the creation of several great new competitive telecom companies such as MCI and Sprint and the emergence of many dynamic equipment companies such as Tellabs, ADC, and DSC.

The change accelerated during the 1990s with the Telecommunications Act of 1996, which created a whole new regulatory platform that opened up the local telephone service market to competition and enabled the creation of hundreds of competitive local telephone companies. At about the same time, the Internet and IP-based communications technology began to fundamentally rewrite the economic framework for building and operating communications networks. Emerging competitors had at their disposal new technologies that reduced the cost of building and continued on next page
operating networks by at least an order of magnitude. This stimulated billions of dollars of investment by both new and established telecom companies, each building their own new network and/or substantially modernizing their old networks. The result was a whole new round of industry consolidation among the older and established players. The one way these older companies (service providers and equipment makers) could remain competitive with the new, emerging lower-cost operators and suppliers of equipment was to get further down the economies of scale curve, thus lowering their costs. Communications was and remains fundamentally a scale industry—the bigger, the better. The trick is to stay responsive to ever-changing customer needs and expectations.

The creation of all these new networks as well as the modernization of the older networks flooded the equipment market with billions of dollars and stimulated the creation of thousands of young startup companies. Each of these companies was competing fiercely on many fronts. They each needed great ideas, innovative products that actually worked, access to capital and, most importantly, they needed many bright and talented people.

You know how the story goes from here, the vast majority of these companies never made it; they died. But in the process of trying to build their companies they reached out to other countries in search of the talent workforce they needed to design and build their products. This in turn has acted as a strong catalyst for the creation of very strong and dynamic high-tech design and engineering centers of excellence in places like India, China, Israel, and Western Europe. Because of the excellence of their people, these centers continue to thrive and take on more and more of the industry’s design, engineering, and manufacturing tasks. Soon, I predict, these new development and technology centers will spawn several world-class, high-tech multinational companies as large and well known as Cisco, Microsoft, and Hewlett-Packard.

With all this as the back drop, the real challenge for any and all players in the communications industry will be to stay innovative, customer driven, nimble and low cost enough to survive. The pace of change in this industry is not likely to change. As crazy as it is today, I think 20 years from now we will look back and think, “Isn’t that quaint? Things sure were much simpler back then!”

Q: What inspired you as a young man to pursue an entrepreneurial direction in your career?

A: Honestly…I have two confessions: First, I wasn’t inspired to be an entrepreneur. My career kind of evolved in this direction. I have always been involved with new technology through a long series of engineering jobs in the telecom industry. My job immediately prior to becoming a venture capitalist was as vice president of Network Planning, Engineering and Construction for Ameritech/SBC. At that time a good friend offered me a partnership in his venture capital firm. It seemed like the right thing to do at the right time. So I guess I evolved into the situation.

Second, while I do not really consider myself an entrepreneur, I live in that world and I interact with entrepreneurs every day. I don’t think I could do what they do. As I said earlier, the world needs all types of people with all types of skills and interests. However, I do feel that my experience working for large and small companies as well as investing and sitting on the board of directors of several high tech startups has given me an interesting and, I hope, valuable perspective on entrepreneurship.

I find the entrepreneurial environment and entrepreneurs themselves to be fascinating. These folks are very, very smart and completely devoted to their vision. They also face great odds and almost impossible challenges on a daily basis, yet they remain confident, positive and determined. This is inspirational. They are a great group to be around and I learn and grow each day I spend with them.

So, while it wasn’t inspiration that brought me to this world of entrepreneurship, it certainly is inspiration that keeps me here.
Andrew Weiner wants us to move faster. Not at the supermarket checkout or the drive-up at Starbucks; he wants to move our data faster, at rates of speed previously only dreamed of. By working to expand ultrafast optical signal technology, Weiner, Scifres Distinguished Professor of Electrical and Computer Engineering, is broadening the field of optics and creating new avenues for applications as varied as the music we download to the wireless radar used by military interests.

Hailing from Winter Park, Florida, Weiner received his doctorate in electrical engineering and computer science from MIT in 1984. Prior to joining the faculty at Purdue in 1992, Weiner spent nearly a decade with Bellcore, one of the premier research organizations in the telecommunications industry at the time. He is widely recognized as a pioneer in the field of femtosecond pulse shaping.

Weiner’s current research in ultrafast optics and optical fiber communications focuses on the technology and application of ultrafast laser pulses. By developing and applying technologies for manipulating and processing femtosecond lightwave signals, his work is playing a significant role in revolutionizing how our information moves and, more significantly, how to move it at greater speeds.

Likening the movement of information to a highway of fiber optical data and pulses, Weiner sees the infrastructure of that highway as something of benefit to everyone. With applications both civilian (yes, that iPod in your ears) and military (such as distribution of high bandwidth radar signals), the revolution in ultrafast fiber optics will speed the way information moves and how it gets to us.

Recognition for Weiner’s work has been voluminous and this year has been particularly rewarding. He was recently awarded the R.W. Wood Prize of the Optical Society of America, which recognizes outstanding discovery, scientific or technological achievement, or invention in the field of optics. He received the 2008 Purdue Graduate School Outstanding Graduate Mentor Award, which recognizes excellence in mentoring graduate students. In February, he was elected to the National Academy of Engineering, among the highest distinctions given to an engineer, which recognizes pioneering contributions.

While it’s gratifying to be awarded for his accomplishments, one of the most satisfying things Weiner finds about his job is the opportunity to work with graduate students, to him “an investment in human capital,” who he helps prepare for careers in industry and academia. With a belief in early guidance for students in the laboratory, Weiner enjoys seeing them grow and become intellectually self-sufficient. By creating an atmosphere that challenges students at all levels, novice students benefit not only from their interactions with him, but from work with more senior students.

For Weiner, there is no better place to be doing the kind of work he loves than at a university, and for him there is no higher caliber institution than Purdue in terms of laboratories, students, and fellow faculty. The freedom to decide the direction of his research is complemented by the challenge of attracting prospective students and getting them excited about that research. Weiner is grateful for the opportunity to work and mentor what he sees as an “incredibly talented pool of people” in constant stream through Purdue’s program.

With the potential for growth along the information superhighway still in its relative infancy, Weiner is helping to ensure Purdue continues to set the pace of that growth. ■ B. L.
Designed to Make a Difference

Taking senior projects into the real world

Few senior design projects have as exciting a potential for application in the real world as those of Craig Rewerts and Chia-Yiaw Chong. The two ECE seniors, who graduated in May, worked hard with their teams to create devices that could have far-ranging impact on the world around them.

ECE Solutions Make Officers Safer

Standard police procedures currently require police to enter a suspected methamphetamine lab with a warrant to collect evidence for court, a practice that can be dangerous to officers. As team leader in his EPICS 402 class, a course that puts projects to use in the community, Rewerts came up with a way to solve that problem.

After meeting with West Lafayette law enforcement agents, the team devised a small, box-like mechanism to detect and document the presence of labs by sampling the air nearby. Police will now be able to collect evidence without a warrant or by personally endangering themselves.

The mobile air sampler operates by pumping air into a sorbent tube, which is made of a porous material with an affinity for certain non-volatile organic compounds. The tube traps particles from the air and is then taken to a mass spectrometer to identify the chemicals according to their molecular weights.

“Developing the mobile air sampler was a rewarding experience,” says Rewerts, who also created and oversaw the electrical control configurations for the project. “The device will provide a more efficient way for local law enforcement to detect methamphetamine production.”

Craig Rewerts with his team’s device that senses meth labs in the area
Making the Impossible Possible

Imagine a magic hat that allows those with limited mobility to live more comfortably. Chia-Yiaw Chong and his ECE 402 senior design project teammates may bring such a wonder to life.

Chong and his team created a five-function remote control that allows a person to send simple commands by moving the head, blowing on a sensor, and winking. The device consists of a baseball cap with sensors interfaced to a radio transmitter that sends the commands to a base-station receiver/interpreter box.

Chong’s duty was to design and implement the remote control and receiver so that the headset can wirelessly communicate with the base station. The signal is then decoded and sent to the next subsystem. The device is currently programmed to allow people with limited mobility to perform complex operations that they would otherwise be unable to do, such as measuring objects and storing the images and data on a computer.

“This five-function remote control can be modified to turn on a TV, dial a number, and do many different things,” Chong says. The graduating senior, who will return in the fall to pursue his master’s degree in electrical engineering, was recently honored with the Eaton Award in Design Excellence for his work on this project. Chong is the eighth recipient of the award, established with a generous gift from Jim (BSEE ’58, MSEE ’63, PhD ’67) and Shirley Eaton, that recognizes outstanding work in the field of design.

“I learned a lot. It’s really important to get a job done with good communication skills,” he says. “It is an exciting and satisfactory experience to be able to apply the theories and principles I learned in class to real world applications.” — Rebecca Goldenberg

Chia-Yiaw Chong with his senior design team project that helps those with limited mobility
A former electrical engineering student returned to Purdue in May to fund scholarships in his field. Charles Wallrodt (BSECE ’63) of Glen Ellyn, Ill., contributed $5 million for electrical and computer engineering. His gift, which will establish a scholarship for Illinois natives, helps launch the university’s new $304 million Access and Success Campaign.

Following graduation, Wallrodt worked at Western Electric and remained with the company through several mergers, first with AT&T and later Lucent Technologies. He retired from Lucent after more than 36 years as a product manager.

A veteran of the U.S. Army, Wallrodt served his country both stateside in Arizona and for one year in Saigon, Vietnam. His unit was responsible for the ongoing operation and maintenance of military communications systems in that country.

Wallrodt says the gift is both a testament to his time at Purdue and a helping hand for out-of-state students. “We were just beginning to transition into some cutting-edge technology when I attended Purdue,” Wallrodt says. “We were moving from the old ways to the new transistors, and I took a class on that my senior year and loved it. Because I was an out-of-state student, I recognized that finances were a problem for some of my peers. There are plenty of people in Illinois who want to go to Purdue, and I am pleased that I am now in a position to help them over that financial hump so they can focus on the next new technology.”

The university has raised more than $42 million toward its Access and Success Campaign fundraising goal since July 1, 2007. Funds from a variety of donors have been designated for scholarships in colleges and schools across the university. President France A. Córdova says the donors share a common passion for the success and welfare of students.

“These donations showcase the ability of the friends and family of Purdue to come together to better meet the needs of our students,” Córdova says. “Thanks to their generosity, students in a variety of disciplines and from a broad spectrum of backgrounds will not only be able to attend Purdue, but also be able to graduate with fewer financial obligations. We are thankful for these gifts.”

—Chuck Wallrodt

Tanya Brown
The year 2008 promises to be one of generous funding. It also marks a year of growing campaign priorities for the School of Electrical and Computer Engineering. ECE campaign goals aim to bring funding to the areas that will benefit the most.

ECE’s $7.5 million undergraduate and $5 million graduate student funding goals allow the school to cover the costs of scholarships, assistantships, and fellowships, as well as paves the way to significantly increase student diversity and promote cutting-edge research and technology commercialization. The $2.5 million innovative teaching goal will bring the latest equipment and software into ECE labs, encouraging collaborations, and benefiting the students, research, and program. Two $500,000 goals will go to the leadership development program for undergrads and the academic and career counseling for all ECE students. Opportunities like these allow students to become leaders and prepare for successful and rewarding careers. ■ R. G.

“Support from our alumni propels our students to their brightest futures.”

—Mark J.T. Smith
Michael J. and Katherine R. Birck Professor and ECE Head
Over the past two decades, alumnus Rich Niemiec’s (BSEE ’87) world has exploded with unsurpassed entrepreneurial innovation and exemplary leadership skills. The co-founder of TUSC, a leader in information technology solutions, author of three best-selling Oracle software performance-tuning books and 1998 Entrepreneurship Hall of Fame inductee personifies the best of the best in Purdue’s growing list of entrepreneurial alums.

Foundations for Entrepreneurism

Niemiec studied electrical engineering at Purdue before universities even offered classes on entrepreneurship. Most of what he learned about business and becoming an entrepreneur came from experiencing it first-hand, though the courses he took provided him with a strong foundation for his field. “Several classes really did matter for me in finding and working at early jobs in my career prior to becoming an entrepreneur,” he recalls. “I had a job designing microchips that I couldn’t have done without taking a class from Dr. Dave Meyer on chip logic. I also designed skyscrapers at Skidmore Owings and Merrill, the company that did the Sears Tower and the John Hancock buildings in Chicago. This job included mostly work related to power, thanks so much, Professor Paul Krause and Professor Chee-Mun Ong, for teaching me so much in this area.”

“I would suggest that any students with entrepreneurial intentions take some financial classes that teach marketing,
economics, how to read a Profit and Loss statement and how
to write a business plan,” he says. “I think it’s better to take
risks early in life when you have a lot of energy, but you’re def-
initely never too old to be an entrepreneur,” he says.

Building Blocks for the Future

Early on-the-job exposure to database systems eventually
led Niemiec toward the computer science field and a job
with Oracle Corporation, a company that created an innova-
tive leading-edge database. “When I went to Oracle, they
were virtually unknown by most technologists; IBM ruled all
of IT back then. I found out about Oracle from someone I
met in the Marines and decided to go there because they
moved at an incredibly fast pace.”

In December of 1988, just two years after he graduated
from Purdue, Niemiec left Oracle to co-found a company
with partners Joe Trezzo and Brad Brown. TUSC, “the
Oracle Experts,” develops successful business solutions
through its understanding and use of advancing technology.
“There are more opportunities in a small growing company
than in almost any large company that’s shrinking,” he
points out. “I was lucky to marry a wonderful woman,
Regina—who I met at the Sweet Shop in the Student Union.
She helped with the company and was the most supportive
person I could ever hope for... she is the secret of my
success.”

Today, TUSC is one of the leaders in its field, with seven
offices and an excellent reputation worldwide, but 20 years
ago it began as just another shaky startup company. “It was
a risk to focus on Oracle,” Niemiec remembers, “but I saw
how valuable database technology was at my previous job
and I believed that it would accelerate in importance in all
major companies.”

And accelerate it did, thanks to character and excellence,
two definitive traits of company employees. “I think that
drove future growth,” Niemiec says. “Focusing on excel-
ence would have given us some nice short-term gains, but
adding character to the mix made our success long-lasting.
Hiring employees who were not only great at what they did
but were also great people to be around helped drive the
company’s future.”

As an entrepreneur, Niemiec feels that providing jobs and
an environment where people can grow and succeed is the
most rewarding aspect of entrepreneurship. “Things that
make work fun include the teamwork, unbelievable char-
acter of the company, and employees, building the Oracle
market and helping them grow, and educating others on
Oracle when the product is really frustrating to use.”

Recipe for Success

Niemiec has become so successful as an entrepreneur
and author that he began lecturing across the country to
hundreds of thousands of businesspeople on the benefits
of character, common sense, and tenacity. “I believe you will
succeed in life beyond your wildest dreams if you ensure
that you are always working on your personal character and
leadership traits. You don’t just need to work on technical
skills, but the successful people are always working to make
themselves better people as well. Valuable traits to develop
include integrity, physical courage, knowledge, moral cour-
age, tact, unselfishness, respect, humility, initiative, loyalty,
self-control, and enthusiasm. Work on these most of all and
you’ll have the fortitude to overcome and accomplish any-
ting you can dream.” ■ R. G.

One of the creeds Niemiec follows teaches people
that character has a lot to do with success. John
Wooden, a Purdue basketball superstar and long-
time UCLA coach, was given a seven-point creed
to live life by his father that is often included in
Niemiec’s lectures.

1 Be true to yourself.
2 Make each day your masterpiece.
3 Help others.
4 Drink deeply from good books, especially
   the Bible.
5 Make friendship a fine art.
6 Build a shelter against a rainy day.
7 Pray for guidance and give thanks for your
   blessings every day.

“Your character will be your destiny,” Niemiec
asserts, “so never forget that! You’ll never be
perfect, but if you change that person in the mirror
for the better every day, you’ll always be one step
closer to where your dreams are.”

The future is still bright for entrepreneurial guru
Rich Niemiec, who has no intentions of slowing
down. “I’ll always be in a place where things go
fast and grow fast. It’s what I enjoy and it’s what I
do well.”
THOMAS J. SHEEHAN, JR.

Thomas J. Sheehan Jr., (BSEE ’64, MSEE ’65) received an honorary doctorate from Purdue during Spring Commencement exercises in May. Sheehan distinguished himself in the global automotive electronics industry during a career that included management positions at Delco Electronics, where he became vice president and chief operating officer in 1995. Sheehan retired in 2001 and currently resides in Kokomo, Indiana.

JOHN R. CHIMINSKI

John R. Chiminski (MSEE ’87), who has held various leadership roles at GE Healthcare, most recently as vice president and general manager, Global MR Business, has been promoted to president and CEO, Medical Diagnostics, at GE Healthcare. Chiminski serves on the School of Electrical and Computer Engineering Advisory Board and was a recipient of the school’s Outstanding Electrical and Computer Engineer (OECE) award in 2006.
EDMUND O. SCHWEITZER, III

Edmund O. Schweitzer, III (BSEE '68, MSEE '71) presented the keynote address at the 2008 Survalent User conference in Nashville, Tennessee, in June. Sponsored by Survalent Technology Corporation, a leading SCADA system supplier, the annual conference allows attendees to connect with other users, learn about new development, and hear about important industry trends. Schweitzer is recognized as a pioneer in digital protection. In 1982, he founded Schweitzer Engineering Laboratories, in Pullman, Wash., to develop and manufacture digital protective relays and related products and services. Schweitzer serves on the ECE Advisory Board and is an OECE Award winner (2003).

JOHN D. MCDONALD

John D. McDonald (BSEE '73, MSEE '74) was invited to join the U.S. Department of Energy’s Electricity Advisory Committee (EAC). McDonald currently serves as the general manager of marketing for GE Energy’s transmission and distribution (T&D) business. During his one-year tenure on the EAC, McDonald will work with the DOE to support its strategy for helping the United States overcome barriers and move forward in the energy industry.
This colorful collage consists of work by MSE Professor R. Edwin García. It is actually two superimposed simulations of the nucleation and growth process of an undercooled Nickel melt. The background shows periodic tapestry of Ni nuclei during the initial stages of the solidification process. The superimposed structure in the center corresponds to a single solidified Ni dendrite. The coloring embodies the degree of crystallinity and the orientation of each nuclei. Simulations were performed by Michael Waters (BSMSE 2008). García’s work is featured in the current issue of *MSE Impact*. 