CEA’s Big Bang: How We Change the World

INSIDE
- We’re Tops in Producing “Titans of High Tech”
- Meet CEA Alum “Whiz Kids”

WASHINGTON STATE UNIVERSITY
Many of you realize the impact that your WSU education has had on your life. Your time here probably determined your career path. You learned valuable lessons about how to investigate problems and create solutions. You may even have met your spouse at WSU.

While many of you know about the particular ways in which the College of Engineering and Architecture touched your life, this issue of Innovation is devoted to showing you CEA's broad impacts on the Washington state economy and the region. It's truly amazing what happens here and how the work of our alumni, research, and education significantly affects peoples' lives—from a small factory opening in Elma, Washington (page 9), to the product that you may be using from Microsoft, which was co-founded by CEA alum Paul Allen.

WSU was recently named one of the top schools in the country for producing alumni who go on to become industry leaders (page 1). I hope you'll enjoy hearing from some of them about how their time at WSU shaped their lives. You can also read about Clint Cole, a CEA alum and instructor, who heads up a company that was recently named manufacturer of the year in Washington (page 5).

Some of you may also be aware of the impact of our cutting edge research in critical areas like energy, sustainable design, the environment, and health. Our research has impacts on people's lives that you can see every day—when our researchers help get a small business off to a promising start (page 12), for instance. Our work can be as concrete as the pavement on which you drive (page 10). Or our researchers may be striving to answer the biggest questions of our time, such as what to do with man-made emissions of carbon dioxide that contribute to climate change (page 5).

And, of course, we provide education to our approximately 3,000 students every year, preparing them to be work-ready, day one, and to tackle the grand challenges of our time. I hope you'll enjoy reading about a Department of Energy grant that will help us better train engineers in clean energy and the smart electric power grid (page 14). We are also making education more accessible for place-bound students and have begun offering a mechanical engineering degree at Olympic College in Bremerton (page 17). Many of you also may not have heard about our little-known Engineering and Technology Management program for engineering professionals (page 20). The practical, nuts and bolts management training that it provides means better management and significant cost savings for industries around the region and the nation.

In these challenging budgetary times, your support is more important than ever to our continuing success. You provide much of the support that makes that possible. I hope you'll take a look in this publication at some of the ways that your fellow alumni and friends are making a difference with their gifts to the college.

As always, please feel free to contact us, tell us your news, or become our fan on Facebook. I look forward to hearing from you soon.

Sincerely,

Candis Claiborn
We weren’t surprised to learn that we are a leader in preparing students for successful industry careers. It just took awhile for someone else to notice.

After reviewing resumes from industry leaders in the United States, the news website The Daily Beast recently found that WSU came out as one of the top universities in the country for preparing “titans of industry.”

Of course, we’ve known for a long time that we prepare our students to be industry leaders. At WSU, we have active student clubs, we provide hands-on learning on real projects, and we prepare students who are known to be work ready, day one.

“Of course, having a top-notch engineering curriculum helps,” writes Thomas E. Weber in the article, adding that electrical engineering and computer science were the top majors for the top executives.

The Daily Beast asked “Can an alma mater really make a difference?”

We decided to ask a few of our alums just how WSU helped them to become leaders in their fields. Was it the hours spent trying to figure out how to get concrete to float? A professor’s top-notch lectures on thermodynamics? Long nights spent on homework problems? Here’s what they had to say:

Atri Chatterjee, BS & MS Computer Science
MBA, Wharton School of Business
Senior Vice President, VeriSign

To say that my WSU experience prepared me for my later career is an understatement. I arrived in the Palouse from Bombay, India (now Mumbai), at the age of 18 and made it my goal to make the fullest of this opportunity provided to me by my family and the university. Here are three key things from this experience that prepared me for a career in business:

1) Majoring in computer science
   I chose to try computer science because it was a hot new field at the time, but I knew very little else about it. However, after my first couple of courses I realized I really liked computer science because it was a problem space very similar to life itself. As professor KC Wang used to say, think of an operating system like a natural ecosystem where resources are limited and your software has to manage and optimize within that framework. Today I use this training of logical thinking, resource planning, and problem solving all the time. Even if I were not to be in high tech and was running a coffee shop I’d be using these skills.

2) Participating in the honors program
   I joined the Honors College after hearing a lecture by Dr. Bhatia (head of the program at the time) who described the program to international students during orientation. My participation in Honors was nothing but pure intellectual fun. Demanding at times, but I came out of it a confident writer, proficient speaker, and unafraid explorer willing to tackle topics out of my comfort zone. All these qualities became essential to me in my experiences as an entrepreneur where one has to do a little of everything.

3) Soaking up the college experience at WSU
   As a foreign student new to the United States, I made it a point to live the college experience. From living in the dorms and ritualizing Martin Stadium to traveling the Pacific Northwest with my new friends, I learned about new cultures and befriended a diverse group of people quite different from those I knew back home in India. Once again, this experience proved essential in today’s global business environment where one does business with people from

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all over the world and manages highly skilled knowledge workers from many cultures.

VeriSign Inc. is the trusted provider of Internet infrastructure services for the networked world. Billions of times each day VeriSign helps companies and consumers all over the world engage in trusted communications and commerce. They have two major lines of business: 1) Providing security and authentication for companies and people doing business on the Internet and 2) Running the entire domain infrastructure for all “.com” and “.net” domains on the Internet. Most readers will recognize the VeriSign check mark on almost all major eCommerce and financial websites on the Internet because they use VeriSign’s SSL (secure sockets layer) technology to encrypt and secure transactions and communication. VeriSign is a public company with annual revenue of over $1 billion and a worldwide employee base of over 2,000 people.

Paul Hohenschuh, ’64 BS & ’70 MS Chemical Engineering
Vice President of Manufacturing, Genentech (retired)

George Austin, who was department chair of chemical engineering and my advisor, and Harry Stern were particularly instrumental in my success. I could talk to the chair or my professors, and I felt like they cared about me. Early on, Austin emphasized that chemical engineers do their work in the gap between chemistry and engineering. The WSU professors constantly prepared us to explore and strive to understand new knowledge that fell in this gap. My education prepared me to take on new things, so that the basic training that I had in the 1960s in Pullman, Washington, in chemical engineering meant that 25 years later, I could be successful in an industry that nobody had even dreamed of.

Genentech is a leading biotechnology/pharmaceutical company. Started more than 30 years ago, the company is considered the founder of the biotech industry. In 2009, it was acquired by the Roche Group.

Mike Jobes, ’94 BS & ’01 MS Architecture
Principal, The Miller|Hull Partnership LLP

During my time in the School of Architecture and Construction Management, the culture of debate and collaboration within the design studios gave me the tools to lead highly collaborative cross-disciplinary teams toward innovative projects today. With buildings responsible for nearly half of all U.S. energy consumption, our firm is dedicated to meeting the challenges of global climate change by reducing energy consumption and carbon emissions in our projects. But to achieve this level of performance-based design requires a high level of collaboration from the very beginning with engineers, building owners, and occupants. Our ability to get the best out of our project teams through a collaborative and performance-based approach has resulted in 17 LEED (Leadership in Energy and Environmental Design) certified projects, five Top Ten Earth Day Awards, and a Living Building Challenge project in progress, the highest standard for green buildings.

At WSU we were shown a design approach for buildings that grow out of a response to the climate and site to have the smallest possible footprint on the environment. The earliest work by Dave Miller and Bob Hull expanded on the concepts of sustainable design, employing passive solar design techniques they learned from their professors such as Dave Scott at WSU. The Site Design Studio led by Professor Paul Hirzel continues to impact my approach to integrating a building into its site. With work that is underpinned with a strong orientation toward the environment, our firm has been well-positioned in the current economic downturn as our clients seek us out for our expertise in sustainable design.

The news website The Daily Beast earlier this year listed Washington State University among the top 29 colleges in the nation doing the best job educating technology leaders. WSU is ranked number 22 in the nation by the site.

To prepare the list, The Daily Beast looked at the biographies of key technology executives from the nation’s biggest companies and most promising startups to identify “which colleges have turned out the most undergraduates destined for high-tech greatness.”

Among the notable alumni, The Daily Beast mentions Joe Langevin, CEO of the web startup Instant and currently a sophomore in electrical engineering, and Gerri Martin Flickinger, CIO of Adobe and a 1985 computer science graduate.

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The Miller|Hull Partnership is widely recognized as a design leader in the Pacific Northwest and the firm’s national and international reputation continues to grow, having received over 150 design awards in 33 years, including the 2003 Firm Award from the National American Institute of Architects. Two books on the firm have been published.

The Miller|Hull Partnership has its roots in the powerful landscape of the Pacific Northwest. Founded in 1977 by Washington State University graduates David Miller and Robert Hull, and joined by partners Norman Strong and Craig Curtis (also WSU grads), the firm consists of 65 staff and has offices in a refurbished warehouse on the Seattle Waterfront. Miller|Hull’s design philosophy centers around two essential architectural ideas. One is to use a building’s structure and program to create a significant place within a site, and the other is to be sensitive to climate and to respond to environmental demands with the form of the building. These ideas have allowed Miller|Hull’s projects to convey a harmonious balance between form and nature and promote the principles of sustainable design.

Navin C. Dimond, ‘85 BS Construction Management
‘85 BA Business Administration, WSU
‘86 MBA, University of Denver
President/CEO, Stonebridge Companies

My experience at WSU touched many areas—it covered many disciplines and appeared to cast a wide net and that is what has helped me.

My most valuable experience was the interaction with faculty and quality of teaching and exposure to subject matter.

Founded in 1991 by Navin Dimond, Stonebridge Companies is a privately owned hotel development and management company located in Englewood, Colorado. With a proven track record in hotel development, real estate investment, and asset management, Stonebridge provides distinguished hospitality for its guests and returns excellent financial and investment opportunities for its partners.

Stonebridge currently operates 39 leading brand hotels, with over 6,000 guest rooms, and employs approximately 1,600 employees. Their diverse portfolio includes select-service, extended stay, mid-scale, and full-service hotels in primary and secondary markets.

Celeste Beeks Mastin, BS Chemical Engineering
CEO, MMI Products Inc., an Oldcastle Company

It must be said that we Cougars know how to persevere. I was never afraid to be an “underdog” after going to WSU sporting events because I saw the “underdogs” win some thrilling battles. As an industry leader there are good and bad days, and a bunch of tough ones to get there, but the ability to persevere makes a difference. At WSU I learned how to solve problems using data peppered with some assumptions, in a quality manner. I think good problem-solving skills are a key for success in any career.

MMI Products Inc. is a steel fabricator with a portfolio including Ivy Steel & Wire, Meadow Burke, and Merchants Metals. Ivy and Meadow Burke make products that make concrete a more functional and stronger construction media. Merchants Metals is one of the nation’s largest manufacturers and distributors of fencing products. MMI Products Inc. had over 2,500 employees prior to the recession.

Scott Crump, BS Mechanical Engineering
CEO, Stratasys Inc.

Receiving his bachelor’s degree in mechanical engineering at WSU helped prepare Crump to be a leader in industry, he says. In particular, studies in fluid dynamics, heat transfer, and materials were helpful for his future career. Crump adds that the most valuable experience during his time at WSU was the freezer dryer project that he did for Lincoln ARC Welding. The project won him a $1,000 prize.

Stratasys Inc., headquartered in Eden Prairie, Minnesota, has approximately 380 employees worldwide. The company is a worldwide manufacturer of three-dimensional printers and high-performance rapid prototyping systems for the office-based RP and direct digital manufacturing markets. Their 3D printers and high-performance RP systems provide 3D computer-aided design users a fast, office-friendly, and low-cost alternative for building functional 3D parts. They develop, manufacture, and sell a broad product line of 3D printers and DDM systems that create physical models from CAD designs. They also offer production part manufacturing services and sell proprietary consumable materials.

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James H. (Jim) Clark, ’75 BS & ’76 MS Civil Engineering
Vice President, Black & Veatch

The quality classroom technical training and encouragement to “think outside of the box” by many of the professors prepared me for understanding how the profession works. Having easy access to the professors to discuss questions and issues I had was a useful bonus. I also participated in the student chapter of ASCE, which provided some leadership training and ability to interface with visiting professionals. In graduate school, I was encouraged to publish my thesis in a respected industry journal, to make a presentation at an industry conference, and to become active in professional organizations. This has proven to be some of the best advice I ever received.

The most valuable experience at WSU for my future career was the research I did in graduate school, and the encouragement to publish the results and present at a regional water quality conference. I met a number of industry leaders and had the opportunity to see the profession from a much broader perspective.

Black & Veatch is a leading global engineering, consulting, and construction company with approximately 8,600 employees located in more than 100 offices around the world. Major business lines are energy, water, telecommunications, and management consulting.

Gary Steele, ’84 BS
Computer Science
CEO, Proofpoint Inc.

My experience at WSU set my career on a course of entrepreneurship. During my time in Pullman, I had the opportunity to see the transformative potential that technology can have on both business and society. That experience excited and encouraged me to become an entrepreneur and pursue a career building high-growth companies through technology innovation.

There was no one experience that set me on that course. But my overall exposure to the innovation process was clearly the most valuable experience for me at WSU. It was that exposure that helped me understand what I truly enjoy doing every day for work—working with teams of smart engineers to build new, innovative products and the businesses associated with them.

Proofpoint Inc. (headquartered in Sunnyvale, California) helps more than 4,000 enterprises, government organizations, and universities—including WSU—take control of email risks. It’s the leading provider of software-as-a-service solutions for email hosting, security, and compliance. Proofpoint’s solutions help customers reduce the costs of email while improving its usability and security. Solutions include email hosting, spam and virus prevention, privacy protection, data loss prevention, and email archiving. Today, the company employs about 300 people worldwide. The analyst firm Gartner Inc. positions Proofpoint as a leader in its 2010 Magic Quadrant for Secure E-mail Gateways.

William A. (Bill) Gaines, ’78
BS Electrical Engineering

‘84 MBA (emphasis in finance), University of Puget Sound
’04 Stanford Executive Program (SEP), Graduate School of Business, Stanford University
Director/Chief Executive Officer, Tacoma Public Utilities

My WSU engineering education helped me develop an ability to break complex problems into solvable components, a lifelong curiosity about how and why things work the way they do, and helped me “learn how to learn.”

The WSU environment is unique in that essentially everyone is from “out of town.” Students develop comfort making new acquaintances and forming networks to learn and make new discoveries. Many of those relationships endure beyond WSU and prove useful in the business world.

Tacoma Public Utilities (TPU) operates the power and water utilities that provide service to more than 300,000 people in Tacoma and surrounding areas of Pierce County, Washington, and a short-line railroad that provides switching services in the Port of Tacoma. TPU has approximately 1,400 employees and annual revenues of approximately $500 million.

Thanks to our alumni who let us know how their WSU experience impacted their future careers! If you want to send us a note about your time at WSU, we may add your comments to a future publication or on the web (www.cea.wsu.edu). Please contact thilding@wsu.edu or 509-335-5095 to tell us your story.
Digilent Named Manufacturer of the Year

Digilent Inc., a Pullman company started by a WSU alumnus and faculty member, was named manufacturer of the year by Seattle Business magazine.

The magazine recently honored Washington state’s top manufacturers through their first annual Washington Manufacturing Awards. Digilent was the winner in the small company category.

“Manufacturing in this state is not only alive and kicking even in the midst of a brutal economic recession, it’s also a thriving generator of innovative ideas, companies, products, technologies and people,” according to the magazine.

Along with former student Gene Apperson, Clint Cole (‘87 BS Computer Science, ‘00 MS Electrical Engineering) started Digilent in 2000 to manufacture and market circuit boards for educational purposes.

While teaching entry-level digital design classes in the 1990s, Cole noticed that the simplicity of the circuit boards in use restricted students to designing and building only the simplest circuits. And in the more advanced classes, they could only design the circuits on paper and couldn’t actually try them out. So Cole began tinkering. Using a programmable computer chip that is used in industry, Cole designed a circuit board that could be used to design a variety of projects, from simple circuits to complex micro-processors.

He started by building 15 circuit boards for his advanced class. For the next version, he built 400 boards, sending 300 of them to colleagues at other universities. They were well received, and demand started growing.

Cole and Apperson have designed more than 200 products, and their products are in more than 1,000 universities in 70 countries around the world. The company, with 45 employees, has offices in Romania, China, and Taiwan.

Earlier in his career, Cole, a former paramedic, also helped to found Heartstream, which developed early portable defibrillators that are now commonplace in places like malls, airports, and casinos. The company was later bought by Hewlett-Packard.

“Digilent is one of many companies that have come out of Washington State University’s thriving research environment,” said Candis Claiborn, dean of the College of Engineering and Architecture. “It is one of many examples of the real impact that our engineering and architecture alumni, professors, and researchers have on our state’s economy and quality of life.”
Could Nanosprings Solve Global Warming?

So how could tiny springs help to address climate change, which is possibly the biggest environmental and human challenge of the 21st century?

One of the big challenges of climate change is that through our economic activity, humans burn fossil fuels and emit gigatons of carbon dioxide every year. Carbon dioxide traps heat, acting as an increasingly thicker blanket in our atmosphere. Scientists have determined that our very necessary human activities are contributing to the warming of the climate.

So far, however, capturing carbon dioxide as a way to mitigate our emissions has proved elusive. While capturing carbon dioxide from smokestacks is possible, building pipelines and pumping it into the ground at this time is considered cost-exorbitant, possibly unsafe, and untested.

That’s where Nanosprings come in, says Tim Kinkeade, CEO of GoNano Technologies.

The researchers recently began looking at applying their Nanosprings to a process that uses titanium dioxide to catalyze carbon dioxide with the help of sunlight. When it is catalyzed, the carbon dioxide is converted to a number of useful and valued products, including formaldehyde, formic acid, methane, and methanol. These products can be used as chemical feed stocks for plastics or for natural gas production. While the process has been understood since the 1970s, researchers have only been able to demonstrate a maximum conversion rate of 8 percent, making the process economically unviable.

With its large and highly accessible surface area, however, researchers at GoNano have been able to demonstrate a conversion efficiency rate at more than 30 percent, 400 percent more efficient than their closest competitor. The researchers are helping the catalyst to work better than it ever did before, says Kinkeade, and they see the Nanospring technology as a way to mitigate CO₂ emissions for industries such as coal.

“The process,” he says, “turns CO₂ into a commodity rather than a waste product.”

The researchers have a prototype at the laboratory scale, and they are beginning to test their process at the University of Idaho wood-burning plant.

Improving Catalytic Converters

In the meantime, the researchers are working to use their Nanosprings to develop better and less expensive catalytic converters for automobiles.

Catalytic converters, which are used in about 40 million cars that are built each year, convert harmful hydrocarbons, carbon monoxide, and nitrous oxide to less harmful carbon dioxide and water. They require the use of precious metals in the process. By growing Nanosprings inside the cores of the catalytic converters, the researchers are able to enhance the surface area of the converters, making the conversion process vastly more efficient. With increased efficiencies, catalytic converter manufacturers need less precious metal to build their product, saving money.

In the next few months, GoNano researchers are developing a production facility to produce catalytic converters and carbon capture and recycling panels. So far, they have scaled up production of their processes by 1000 percent.

“This is the green economy,” says Kinkeade. “We believe that through the creation of this production facility, we can create many high-paying, sustainable jobs in the Palouse region.”

From the University to Innovative New Technologies

GoNano and all of its future potential is innovation that grew out of the hotbed of university research, says Kinkeade. On the practical side, the association has allowed the company to develop and maintain service center agreements with the universities, allowing the company access to university facilities that would otherwise be cost prohibitive for a start up.

More importantly, though, has been the access to brain power that comes from being tied to both universities.

“The most critical component of our association with Washington State University is that it has allowed us access to a highly trained pool of technical talent,” he says.

UPDATE:

GoNano Technologies has received $147,000 through a National Science Foundation Small Business Innovation Research (SBIR) grant for work to continue developing their Carbon Capture & Recycling™ (CCR) technology.
The Composite Materials and Engineering Center (CMEC) is an international leader in research, education, technology transfer, and public service. WSU has the premier wood engineering program in North America. CMEC’s technologies have impacted the forest products and composite materials industries in Washington and beyond. Here are some examples.

- More than **40% of the $1 billion wood-plastics industry** in North America uses material formulations developed at Washington State University.
- Textbooks by CMEC faculty include *Design of Wood Structures*, used by more than 70 universities throughout the United States, and *The Engineering Guide to LEED New Construction: Sustainable Construction for Engineers*.
- CMEC has **more than 30 patents or inventions** in areas such as nondestructive evaluation of wood materials, wood-plastic composites, and composite materials processing.
- Two former faculty members formed a company, **Metriguard Inc., that is the world leader** in machinery for nondestructive grading of lumber and veneer.

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- CMEC hosts the annual International Wood Composites Symposium—an industry focused forum for wood composite panel/engineered wood product producers, suppliers, and researchers with participants from more than 20 countries.
- Provide technical assistance to numerous commercial startups and economic development councils.
- Participated in a FEMA reconnaissance team to evaluate the damage from Hurricane Katrina. Their recommendations and report have resulted in several proposed code changes to improve home construction in high wind regions.
- Featured in a Public Broadcasting Network television program titled “Disaster Resistant Housing.” Several million people will watch the show and understand how to design and build new houses to resist disasters such as earthquakes, hurricanes, and floods.
- Provided leadership in developing and technical review of FEMA publications including Home Builders’ Guide to Seismic Resistance Construction and Home Builders’ Guide to Coastal Construction. These publications will reach more than 250,000 people during the first year alone.
- Chaired the Building Seismic Safety Council (BSSC), which writes the design provisions for all seismic design in the United States. The effect of these provisions has been shown to reduce the losses associated with earthquakes in the United States by 20-30%. For an earthquake such as the Northridge earthquake in 1992, this translated to a reduction in economic loss of $8-12 billion, and countless lives saved.
- Advised the student group Engineers Without Borders and helped them design replacement school buildings destroyed by the tsunami in Sri Lanka as well as a water supply system in a remote area of the Yakama Nation.
- Served on international commissions in Canada, Chile, and New Zealand related to mitigating seismic hazards to buildings and their occupants. See next page for more on CMEC.

Your Gifts in Action: Berrys Provide Gift for a Lifetime of Students

From their years at Washington State University, George and Joan Berry remember how their favorite faculty members changed and positively impacted their lives. They wanted to ensure that future students have the same chance.

“If you can help to attract and retain quality instructors, you’re going to impact all the students who walk into the classroom,” says Joan. And that is a lot of students.

Wanting to provide the best experience for as many students as they could, the couple is providing support for the Berry Family Directorship for the Institute for Sustainable Design.

During his time at WSU, George enjoyed his studies in mechanical engineering, especially quality professors such as Clayton Crowe who enlivened the classroom.

“They had an excellent faculty and small classes,” he says. “It was a good environment in which to learn.”

At WSU, he learned to seek solutions to problems on his own.

“In high school, you are force fed information,” he says. “At the university, I would be given some information, but I had to get most of it myself. Then I could do as much as I wanted to with it.”

Later, when he began his career, he was working on underwater design. “It was all a logical spin-off of what we did at WSU,” he says. “WSU really provided a good start for me.”

“WSU provided an excellent foundation,” Joan says. “We learned how to think and apply the information that we were taught.”

After graduation, George eventually began an architectural and engineering design firm and later moved into real estate development. He says that while he ended up using little of his actual mechanical engineering training, he did use many of the problem-solving skills that he had learned during his time at WSU.

“I often had no preparation for problems I encountered,” he says. “But I was able to pick up what was needed. It was often a ‘winging-it’ type of process.”

The Berrys are providing support for faculty excellence in the areas where they received their educations, specifically liberal arts, education, and the College of Engineering and Architecture. Through their gifts, they are working to ensure that future students will have similar valuable learning experiences to what they had and access to the highest quality educators.

Support from the Berrys provided an initial seed for the Institute for Sustainable Design and supports the program’s directorship. The institute, which was officially launched in October 2008 with a Weyerhaeuser Foundation grant, aims to be a catalyst for sustainable design, leading changes in design and construction through an interdisciplinary approach. The new institute serves as a global technical and design resource for sustainable architecture and construction and will form strategic alliances with industry to advance research and education about resource efficiency and affordability. It builds on existing strengths in renewable building materials and sustainable design, particularly through the work of the Composite Materials and Engineering Center (CMEC).
When John Bowser, CEO of New Wood Corp., became interested three years ago in possibly refurbishing and reopening a factory in tiny Elma, Washington, he started by wanting to learn more about wood plastic composites (WPCs).

His Internet search led him to one place: Washington State University’s Composite and Materials Engineering Center (CMEC), where he learned that WSU is one of the world leaders in the material—“if not the foremost leader,” said Bowser.

The 300,000-square-foot facility in Elma was originally built for the manufacturing of WPC-based products. It is unique in that it relies exclusively on the waste stream, such as urban wood waste and post consumer and post industrial plastic films, for its raw materials. Traditionally, these waste materials have made their way to landfills or been recycled for lower end uses, such as mulch. In addition to saving money for industries that produce such waste, reusing the materials and developing them into high-end products is environmentally friendly, helping to reduce the use of forest resources and fossil fuels.

“This is a do-good business,” says Bowser.

After reading about CMEC, Bowser called one of the contacts listed on the website and chatted with Karl Englund, assistant research professor. Bowser eventually met and worked with researchers, including Englund, Vikram Yadama, Mike Wolcott, and Bob Tichy.

He learned that CMEC had been involved in developing a pilot project in the mid-1990s that made use of the technology in the plant.

“They worked on this technology long before the plant was ever built,” says Bowser. “When I called, their knowledge of the technology was a tremendous help.”

The researchers at CMEC suggested ways for Bowser to enhance the technology to take their product into new markets. Originally, the facility was constructed for the manufacturing of residential siding. But with the slowing of housing construction during the recession, Bowser needed to look at new markets. Working with CMEC, Bowser explored the technology to develop products such as sheet material for crating and pallets. They also helped him to make contacts in those markets.

Approximately 30 percent of harvested lumber in the United States goes for the production of pallets, says Bowser. Pallets made from WPCs have the advantage over wood pallets of being more durable and more sanitary.

CMEC’s role was to provide technical advice, says Yadama. In addition, CMEC helped to connect Bowser with economic development officials in the state and helped him look at potential markets.

“They helped me get through these three years and have assured me the technology is solid and that this recycled product is viewed as desirable,” said Bowser. “They have helped to keep us focused to where we are today.”

Residents in Elma, in Grays Harbor County, are now getting ready to celebrate the opening of a new factory that will employ as many as 150 people. It’s exciting news for the small town of 3,000 people that has struggled economically over the years.

Bowser sees the new facility as a possible catalyst in the area and as a hub in new efforts in sustainable development. The facility, he says, is an opportunity to create a new paradigm in business for the way that the region uses its resources.

“Now we’ve done a good thing,” he says.
When people think about a greener planet, they don’t usually think about asphalt.

But a group of Washington State University researchers are testing a new, environmentally-friendly bioasphalt that they hope can someday replace petroleum-based asphalt. The bioasphalt, made of waste cooking oil, looks similar to petroleum-based asphalt, but on close inspection, one can smell the difference—a faint whiff of deep fat fry.

“It’s made from 100 percent waste products,” says Haifang Wen, assistant professor in the Department of Civil and Environmental Engineering.

The researchers recently received a $150,000 Small Business Technology Transfer (STTR) grant to develop and test bioasphalt. Working with United Environment and Energy LLC, a New York-based company that develops environmentally friendly and energy efficient technologies, the researchers hope to have the new material on roads within the next five years.

The use of traditional, petroleum-based asphalt raises concerns about its contribution to climate change and pollution as well as our continued dependence on foreign oil. In addition, the cost of petroleum-based asphalt has risen dramatically in recent years, so that building one mile of road can cost between $1 and $2 million. And the material is often in short supply.

Pavement engineering has become one of the largest industries seeking to use recycled materials, including fly
ash, rubber from tires, and recycled asphalt and concrete materials, in the road. Wen is working to develop and test several products composed of recycled materials, including recycled concrete and fly ash, as an aggregate for asphalt. Wen’s team on the bioasphalt project also includes assistant professor Shihui Shen, graduate student Sushanta Bhusal, and two undergraduate students.

Finding a more environmentally friendly alternative to asphalt, though, is a sticky challenge—literally. Bioasphalt has to flow easily as it’s applied to roadways, but then be hard and tough enough to withstand significant abuse, including truck traffic. It shouldn’t crack during a Minnesota winter or melt during a hot, Texas summer.

How will it act on a road? To find out, the researchers are conducting numerous tests in the laboratory. Using samples that are eight millimeters in diameter and two millimeters thick, the researchers conduct a shear test that is similar to what many of us do with an Oreo cookie. At various temperatures, they squish and then twist it, to find out how much stress it can take. The researchers are testing 10 samples at a time, tweaking the recipes to find the optimal mix. While a few researchers are studying bio-based asphalts, WSU’s group is the only one that is using a bio-based product made from waste cooking oil. In the next few years, the researchers will move up to a bench-scale project and then will create a full-sized test strip.

Meet Graduate Student Nathan Bower

Originally from Selah, Washington, Nathan Bower became interested in engineering as a youngster, when he used to watch his grandfather, a skilled carpenter. “It was fascinating to me that he could take ordinary boards and make useful things out of them,” he said. “Being only five or six years old, I was not allowed to use power tools, so I began building things out of Legos instead.”

Eventually, Bower headed to Washington State University, where he received his undergraduate degree in civil engineering in May 2009. As he started graduate school this fall, Bower received a prestigious Eisenhower Graduate Fellowship. The program provides a stipend and aims to attract students to the field of transportation research.

Why WSU for graduate school?
I wanted to stay at WSU because of the great faculty we have on campus. I already know most of them, and they are always willing to help me with any questions or concerns I have. I like being able to have a personal relationship with my professors in addition to an educational one. I also enjoy the Pullman campus. I have some really great memories as an undergrad. I just couldn’t picture myself going to school anywhere else. Once a Coug, Always a Coug.

How did you come to work with Professor Haifang Wen?
I really enjoyed Dr. Wen’s CE 400 Highway Pavement Analysis class my last semester at WSU. I had the most fun in the lab. Any time I am able to do “hands-on” work it helps me understand the theoretical concepts we learn in class.

When Dr. Wen said in class that one of his graduate students needed help with lab experiments, I pursued and got the position. Working in the lab, I was able to talk with some of the students about graduate school. I think that was the first time I became interested in it. I found their experiments very interesting, and I wanted to learn more.

What is your long-term career goal?
After starting in an entry level position, getting experience, and becoming a project engineer, my dream job would probably be a regional administrator in a large infrastructural engineering firm. I would oversee and give feedback to a group of project engineers so that I could see multiple projects being designed at once.

What are you most excited about regarding graduate school at WSU?
I am most excited about getting to perform my own research and study experiments in depth. I also like the idea of being able to make my own decisions in the lab.

Interests besides engineering?
I go snowboarding several times each winter either by myself or with friends. Besides snowboarding, I enjoy pretty much anything outdoors.

Congratulations, also, to Thiyagarajah Sutharsan.
He also received an Eisenhower Fellowship and will be working with Professor Balasingam Muhunthan on a project to develop an improved mechanistic model for granular materials in transportation infrastructures.
Small Business Grant Gives Company a Start on a Great Idea
With Help from WSU

Leroy Ohlsen, a Washington state entrepreneur, had an idea and needed some research help to get it underway.

Working with Su Ha, assistant professor in the Gene and Linda Voiland School of Chemical Engineering and Bioengineering, Ohlsen last year received a Small Business Innovation Research (SBIR) seed grant to prove that his unique idea for a ‘Flow Cell’ could work. The researchers hope to prove that the flow cell could someday provide an efficient replacement for gasoline-powered turbine engines or provide energy storage for alternative fuels, such as solar or wind power.

Working with university researchers, SBIR grants allow small companies to investigate ideas, says Ha. If they work, the ideas lead to private investment, new products, and company growth.

Ohlsen is not new to entrepreneurship. A chemist by training, he founded Bothell-based Neah Power Systems in 1999 because of his interest in fuel cells. At the age of 30, he was named a young innovator by Technology Review in 2004.

Ohlsen had been working with fuel cells for about eight years at Neah Power before he first became interested in the Flow Cell project. Fuel cells are expensive and have a tendency to stop working when they have impurities. For his Flow Cell idea, he became interested in electro-chemical reactions based on unique compounds called polyoxometalates (POMs) and began “testing materials in my basement.” The results looked promising, so he approached one of his former professors at UW, who suggested that he talk to Ha.

“I’m not a millionaire,” said Ohlsen. “This is an idea in my head, and the SBIR grant was a way to gain resources and to raise money.”

With his previous work in formic acid fuel cells, Ha had expertise in identifying materials for electro-chemical reactions and had worked with logistic fuels, said Ohlsen.

Ohlsen and Ha are working to develop a flow cell that could someday be a much more efficient and quiet replacement for gas turbine engines. Instead of burning fuel to produce electricity as a traditional gasoline turbine engine does, the Flow Cell works by directly pulling electrons out from fuel electro-chemically to produce electricity. Called ‘cold combustion,’ the Flow Cell extracts energy from fuels using POMs to capture and release electricity without the need for expensive catalysts made from precious metals.

If such a Flow Cell is developed, it would be far more efficient and quieter than gasoline/turbine engines because it requires no moving parts, says Ha. It would also require less maintenance than gasoline engines do. Although the Flow Cell requires fuel to operate, it would require much less than is currently required to operate gasoline/ turbine engines.

Furthermore, he added, the Flow Cell could also be potentially used as an electric energy storage device. There is an increasing demand for wind or solar power, but these cleaner energy sources have the problem of being intermittent. An efficient electric energy storage device could address the reliability problem, says Ha.

The researchers were encouraged to submit a full proposal to the U.S. DOE Advanced Research Projects Agency–Energy (ARPA-E) and plan to apply for a second phase SBIR grant to continue the research.
The stories happen every year in Washington and elsewhere: Heavy rainstorms bring flooding and overflowing creeks. Homes are damaged, and occasionally lives are lost.

With support from a Transportation Northwest (TransNow) grant, researchers in the Department of Civil and Environmental Engineering are working with the Washington State Department of Transportation, one of the biggest producers of storm water runoff, on ways to lower the environmental impact of its highways.

A national permitting process that is meant to protect the environment and regulate pollution is slowly being implemented, and Low Impact Development (LID) has become a priority in the state of Washington, says Liv Haselbach, associate professor in the Department of Civil and Environmental Engineering.

The simple idea of LID is to design buildings and roads that keep water where it falls, rather than directing it elsewhere where it can cause pollution, flooding, and damage to property.

Haselbach is working with the WSDOT transportation engineers on ways to increase the use of natural or engineered dispersion on roadways. Sometimes when roads are built, a retention pond or culverts are built to direct storm run-off downstream. Such systems have to be continually maintained, or they can contribute to flooding problems. Dispersion instead aims to mimic natural processes and let water run off the roadways and seep into the sloped ground nearby.

“Natural dispersion is a best management practice for managing storm water and is considered the most Low Impact Development option, since it both treats the stormwater and disperses the runoff,” says Aimee Navickis-Brasch, a graduate student working on the project.

Dispersion is commonly used in rural areas because it requires a lot of area for the water to be absorbed into the ground.

The researchers are working to better understand and incorporate the entire hydrology of dispersion areas, including the stormwater that may disappear through evaporation or transpiration from plants. Their goal is to allow for the use of smaller dispersion areas, making it possible for them to be used more often, even in urban areas.

The engineers at WSDOT, Haselbach emphasizes, are already doing a lot to minimize the impacts of the roads that we drive on.

“They already know about good designs, but they are trying to modify their practices so they are more LID-friendly,” she says. “Around the country, Washington is going to be a leader in this area.”

The researchers will have recommendations for WSDOT engineers by the end of the year.
Working with the University of Washington and Northwest power industry organizations, a group of Washington State University researchers has received $2.5 million from the Department of Energy to develop a program to train engineers in clean energy and the smart electric power grid.

The program is one of 54 around the United States that is set to receive Recovery Act funds for smart grid workforce training projects. The three-year project will develop a set of courses in clean energy and smart grid engineering.

“WSU’s power engineering program has been a leader in developing a safer, more reliable electric power grid,” said Candis Claiborn, dean of the WSU College of Engineering and Architecture. “Now, this grant will help WSU to better prepare our students to address the grand challenge of safe, reliable, and clean energy in the 21st century workplace.”

The power industry is facing the challenge of an aging workforce, with one third of its workforce eligible for retirement in the next ten years. Furthermore, the number of programs educating power engineers has decreased. Many of the existing programs do not have the resources to incorporate rapid advances in technologies, both in clean energy and in the smart electric power grid, into their curriculum, says Anjan Bose, Regents Professor in the School of Electrical Engineering and Computer Science.

While the WSU/UW project will strengthen existing degree programs in power engineering, it also allows for the development of an undergraduate certificate, graduate level certificates, and a professional master’s degree in the area of clean energy and smart grid engineering. Those who are working in the power industry currently will be able to take the courses online, so that technicians, for example, will be able to receive an undergraduate certificate or those who have an engineering degree will be able to receive graduate training to allow them to become involved in research and development.

“The project team proposed here is perfectly positioned to train and educate the engineering workforce needed to operate, maintain, deploy, design, and innovate in the areas of clean energy and smart grid,” said Bose. “We recognize that due to retirement and attrition, 46 percent of engineering jobs in the power industry could be vacant by 2012.”

—2007 Center for Energy Workforce Development Workforce Survey Report

Did you know?

Due to retirement and attrition, 46 percent of engineering jobs in the power industry could be vacant by 2012.
that it is not enough to train the engineering workforce needed to deploy new clean energy sources and operate the smart grid. We also need to cultivate the engineering talent that will invent and design the next generation green technologies and information technologies for the power sector.”

Washington State University and the University of Washington are the largest engineering colleges in the Northwest. Both have a long history of cooperation with the power industry in the region. Washington State University received a gift in 2008 from Puget Sound Energy (PSE) for the development of a renewable energy course. Both universities are also part of a U.S. Department of Energy regional smart grid demonstration project throughout the Northwest that is designed to expand upon existing electric infrastructure and test new smart grid technology.

Your Gifts in Action: Avista Recognized for Longtime Support of WSU

Avista Corporation has been recognized as a Washington State University Laureate for its longtime significant support of the university and of the School of Electrical Engineering and Computer Science. Laureates are individuals or organizations who have cumulatively contributed $1 million or more to the university.

The company has provided its most significant support through the power professorship program. Established in 1972, the program supports undergraduate power education and research related to producing efficient, innovative, and safe sources of power. The program has allowed for collaboration and long-time partnership between WSU and the electric power industry.

“WSU’s power program has been a point of pride for many years, both for the university and its alumni,” said WSU President Elson S. Floyd. “The program is a high-priority area for the College of Engineering and Architecture, WSU, the power industry, and the millions of customers it serves. Avista is a leader in the power industry and a major contributor to the power professorship, for which we are sincerely grateful.”

In addition to its longtime support of the power professorship, Avista is providing significant scholarship support to students through the Avista Scholars program. Established this year, the program allows students who are participating in WSU’s power program track to receive renewable scholarship support. The Avista scholars also have opportunities for site visits, mentoring, and consideration for internships with the company.

Avista was also the 2010 title sponsor of the EECS open house. The event, held in April, invited alumni, corporate associates, students, and friends for a showcase of student senior design projects and faculty research.

“Avista’s relationship with WSU through the years has been mutually beneficial,” said Dennis Vermillion (’85 Elec. Engr.), president of Avista Utilities. “We believe that by supporting the excellence in teaching and research that are the hallmarks of the university, our company and our region benefit from the high quality students who emerge to enter the workforce.”

“The power industry is dealing with many challenges right now and in the near future,” said Floyd. “We are looking forward to continued collaboration with Avista to turn these challenges into opportunities that will benefit not only those in the Pacific Northwest, but also people across the country and around the globe.”
Making a Difference Around the World

Scott Jones, ’09 BS Arch, recently returned from his third architecture mission trip to East Africa since graduation. He has developed a chimney system to improve indoor air quality as well as designed two orphanages in Rwanda and Kenya. Jones is pursuing his master’s of architecture degree. He is looking forward to working with architecture faculty and students and bringing his experience to the program, as well as continuing to develop his projects in Africa. Dan Blohowiak (architecture grad student) and Rick Jones (’78 BS Civil Engineering) joined part of Jones’ trip. See www.cea.wsu.edu/alumni/EastAfrica for more on Jones’ projects.

Your Gifts in Action

Pacific Gas & Electric Honored for Commitment to Technological Stewardship

PG&E has been honored for its longtime partnership with and support of Washington State University’s power engineering program. The program, established in the 1970s, connects industry leaders with WSU, supporting activities such as hands-on design projects for students as well as innovative research into ways to make electric power production and distribution safer and more efficient.

During the past three decades, PG&E has collaborated with researchers in the program, including co-authoring technical papers. Representatives from the company have attended WSU’s annual Western Protective Relay conference, and WSU representatives serve on PG&E’s technical advisory committee. In addition, the company employs a number of power system alumni.

“Over the years, PG&E has provided generous support to the power professorship program that has helped to create significant research and educational opportunities to address critical needs in the power industry, especially in the Western Interconnection,” said Behrooz Shirazi, Huie-Rogers Chair and director of the School of Electrical Engineering and Computer Science.

“Washington State University has been a strong partner with Pacific Gas and Electric Company, providing both high quality research in the latest grid technology and producing high performing engineering graduates that are needed to ensure the continued reliability of a changing grid,” said Fred Henderson (’03 Elec. Engr.), PG&E power system engineer.

Where’s the Donor Roll?

As part of our move toward sustainability, we are displaying our Honor Roll of Donors on the College of Engineering and Architecture website. We are proud and thankful for our alumni, friends, and corporate and foundation partners whose generosity ensures that our college will maintain excellence in undergraduate education and graduate research programs. Please take a moment to see who gave to the college from July 1, 2009, to June 30, 2010, at www.cea.wsu.edu/alumni.
WSU, OC Launch Mechanical Engineering Degree in Bremerton

The Washington State Higher Education Coordinating Board, the approval body for four-year degrees, has approved a new bachelor's degree program in mechanical engineering that is being offered by Washington State University at Olympic College. The degree was developed jointly by Olympic College and Washington State University.

The unique program, which is getting underway this fall, provides a more affordable way for place-bound students in Bremerton and surrounding areas to pursue a mechanical engineering degree.

“We are pleased that we are able to move forward with this collaboration,” said WSU President Elson S. Floyd. “By working together, WSU and Olympic College will bring these engineering courses directly to more students. The students will benefit, and by educating more students in this high-demand field, our institutions will be responding to an important need expressed by Washington businesses.”

Based at the Olympic College campus in Bremerton, the program offers engineering classes onsite to fulfill WSU mechanical engineering degree requirements. Several classes are broadcast via an AMS video service from WSU in Pullman to OC. Students admitted to the program at OC are following WSU’s semester system, and pay WSU tuition rates. Students will also be required to take some laboratory classes on the Pullman campus during the summers—at least initially.

As part of the new program, WSU is hiring three new faculty members in mechanical engineering, one of whom will teach full-time on the Olympic College campus. A renovation of WSU’s Sloan Hall this summer has made 12 new video classrooms available for distance-degree classes at OC.

The idea for the program initially came from a Kitsap County-based community group. Olympic College approached WSU with the idea.

The group and college officials cited a need for engineers in the region. The Puget Sound Naval Shipyard is a major employer in the area, with more than 2,000 engineers currently employed. Nearly half of those engineers are set to retire by 2018.

In 2009, the state legislature provided support for Olympic College to partner with a four-year program.

“This new joint program addresses two major concerns that affect the Washington state economy and its residents—the dramatic need for engineers and for more affordable higher education options in high-demand fields,” said Bob Olsen, associate dean of undergraduate programs and student services for the College of Engineering and Architecture. “It is a good example of how WSU continues to meet its land grant mission of providing valuable educational opportunities to the state's residents, allowing our bright and motivated students to pursue an engineering career.”

WSU is in the process of requesting that the accreditation of its mechanical engineering program in Pullman by the Accreditation Board for Engineering and Technology (ABET) be extended to this new program in Bremerton.

Which Way Now?

Wyatt O’Day, a graduate student in architecture, did a project to study WSU students’ movements through Sloan field. O’Day analyzed how students use the field as a walkway or gateway to and from campus, locating the highest and lowest cross traffic pathways. The findings were displayed as an installation on the site. Large fences appeared on a Monday morning and were constructed using 12 steel poles and over 500 yards of pink construction yarn. O’Day documented how the students reacted first to the field’s existing site conditions, and then how they responded to the fence obstructing their typical pathways. The project originated from his site design class with Professor Paul Hirzel, where the students were asked to abstractly analyze Sloan field. The class’ findings were then posted and presented in Carpenter Hall’s elevator.
A group of construction management and civil engineering students had the chance to bid on a real construction project, thanks to a unique class in the School of Architecture and Construction Management.

“Building is a very dynamic process,” said Professor Max Kirk. “Until someone goes through it, they won’t understand it.”

For the project, known as the Pine Creek Bridge project, students went through the entire DOT construction bidding process, submitting a bid along with other local contractors. The students had to get estimates from subcontractors, including minority contractors, to create a full proposal for rerouting and renovating the bridge.

“The state of Washington and businesses are really, really supportive of what we are doing,” Kirk said.

The teams of three students had to finish their estimates and prepare their bid proposals on the same day last winter that DOT opened and read all the bids aloud. They included the WSU student groups among the actual contractors.

After reading the bid proposals, the DOT chose a contractor, based on price. So, one of students’ main goals was to find the best prices.

However, Kirk also emphasized that the project was not a “race to the bottom,” instructing the students to keep quality in mind.

The class was co-taught by Darren Seaman, an engineer from Kiewit Pacific Corporation through Academic Media Services (AMS), although Kirk emphasizes that he and Seaman were not the only instructors for the course. As part of the course, the students had to call and ask questions of several local and regional business people.

Kirk created the unique program with DOT four years ago, thought to be the only one like it in the country.

DOT provided the construction plans free for the students, but, after that, the project was “95 percent real,” said Kirk. The students planned for building every aspect of the bridge in Whitman County. The other five percent would come in if the students’ projects could actually be picked by the DOT for building. Even if the students had the lowest bid, they were not considered for the project.

“The class is just a way that the classroom reaches out to the real world and the real world reaches into the classroom,” Kirk said.

The bids turned in by the students groups did very well. Out of 17 bidders, including 6 from WSU, the actual lowest bid was $2,301,453, submitted by a contractor. Out of the WSU student groups, the lowest bid was $2,395,088. The average for all six groups was $2,472,558. The DOT had estimated the cost of the project to be $2,530,052.

“You can’t get much better than that,” Kirk said.
People don’t realize how much construction management has to do with the economy of Washington. Even during these poor economic times, construction spending and the revenue it brings into the state coffers are instrumental in pulling the state and the nation out of our current recession.

—Max Kirk

How important is construction work in the state of Washington?

According to the Associated General Contractors of Washington, construction makes up approximately 11.2 percent of the state’s private sector workforce and accounts for almost 20 percent of all sales in the state. Even in the depths of a difficult recession, the top 25 construction projects generated $7.53 billion, and the top ten construction firms brought in approximately $3.18 billion in revenue in 2009, according to the Puget Sound Business Journal.

Facing a dramatic need for trained managers in the construction industry, a group of Washington state construction industry leaders got together several years ago and committed to provide support for a faculty member for the School of Architecture and Construction Management. Industry support came from a number of donors, led by Skanska, Hoffman, and Poe construction companies.

At the time, the high demand for construction managers meant that graduates usually received three or four job offers. The program, meanwhile, was not able to accommodate many students who wanted to enroll.

The faculty position, named for the late Donald Poe, allowed the department to hire faculty member Rick Cherf, and the unusual arrangement ended up having dramatic impacts on students and the department, says Max Kirk, assistant director in the School of Architecture and Construction Management.

With the hiring of Cherf, the number of construction management majors increased from 30 to 50 per year. Additional faculty time allowed for an increase in valuable, interdisciplinary activities between construction management, architecture, and civil engineering, including the school-sponsored Integrated Education Series. Furthermore, the curriculum was reformatted to offer more construction courses, including during the freshman year.

Cherf, with expertise in pre-construction services, project management, program management, and strategic planning, has been a popular teacher.

“It was a win, win, win,” says Kirk.

Since that initial effort and the establishment of the faculty position, the construction management program has continued to grow with three additional faculty members, including Tom Heustis, David Gunderson, and Jason Peschel. In 2009, the program had its highest number of incoming freshmen.

While the recession has meant a slowing down of job prospects for students, students are generally still finding employment after they graduate, says Kirk. Students are also working to widen their horizons, taking courses in a variety of disciplines such as green building, says Kirk.

The School of Architecture and Construction Management is soliciting pledges for the continued support of the Poe Professorship. If you are interested in supporting this effort, please contact Bridget Pilcher, associate director of advancement, at pilcher@wsu.edu or 509-335-0144.
Fifteen years ago, when the Boeing Company was developing their new 777 airplane, they needed to increase production from three to seven planes per month. Executives wanted to develop a moving production line as a whole new way of building wide-body airplanes. The plane, with four to five million parts, would be assembled while in motion, similar to automobile assembly lines.

“We don’t just receive an academic benefit,” says Skrobecki. “This program has an impact on our bottom line. It’s real, and it’s significant.”

“Everything had to change,” remembers Tad Skrobecki, a manager in the airframe engineering department at Boeing. Skrobecki, who was then a recent graduate of WSU’s Engineering and Technology Management Program, recalls that he and his team used much of the training they had received in the program to come up with a plan for their part of the new line. Rather than taking a conventional approach for the redesign, the engineers took information directly from their classes on operations research and theory of constraints and used those tools to make changes that optimized production.

“We were not only able to do the project, but we beat our targets,” he said.

WSU’s Engineering and Technology Management Program doesn’t get the attention of undergraduate programs and perhaps may not sound as exciting as the latest in cutting-edge research. But the small program, which graduates about 20 or 25 students per year, has significant and tangible results that show up in companies throughout the Northwest and the world.

“We don’t just receive an academic benefit,” says Skrobecki. “This program has an impact on our bottom line. It’s real, and it’s significant.”

The program started in the early 1980s. At that time, when engineers wanted to build their management skills, they returned to school for a MBA. Increasingly, however, they wanted to learn management skills that applied better to technical fields, says John Ringo, director of the program. Out of this need came the engineering management program, providing a more analytical approach than a traditional MBA program.

When people graduate with an undergraduate engineering degree, they have a reasonable knowledge of technology, but little practical experience, says Ringo. The ETM program, he says, teaches them how to efficiently manage all aspects of a project. Classroom activities are applied directly to the workplace.

As James Holt, who teaches in the program, said one student told him, “You are the most practical academic I’ve ever met.”

Most of the students in the program are engineers, although some students come from other disciplines, such as business. Students graduate with a master’s of engineering and technology management degree. The program also offers professional certificates in eight specialized areas.

Because the courses are for working professionals, they are taught online and generally from late afternoon until 10:00 p.m. Students take one to two courses per semester. Originally, the program used the Washington Higher Education Telecommunications System (WHETS) distance delivery system, but classes are increasingly web-based. The program includes four full-time faculty members, based in Spokane, Seattle, Vancouver, and Pullman, and two adjuncts.

“Students from around the world have live microphones and video cameras to feel a real part of the discussion,” says Holt. “A student in the Netherlands can ask a question and a student in Moldova joins in the discussion.”
Washington State University has been awarded a $105,000 Cyber-Grant from Boeing to expand mentoring opportunities for students studying in science, technology, engineering, and mathematics (STEM) disciplines.

The one-time gift from Boeing, a world leader in the aerospace industry, will support WSU’s Team Mentoring Program—a collaborative effort between the Office of Multicultural Student Services, the College of Engineering and Architecture, and the College of Sciences.

“Each of us understands very well the challenges associated with recruiting, retaining, and graduating underrepresented students in science, technology, engineering, and math,” said J. Manuel Acevedo, director of the Office of Multicultural Student Services. “We are very appreciative of Boeing’s gift as it will allow us to enhance this very important program.”

The Team Mentoring Program began three years ago at WSU as a way to identify underrepresented students majoring in the STEM disciplines and carefully track their academic progress.

Each faculty member in the program works closely with one or two high-performing junior or senior students who serve as student mentors. The student mentors work with up to 14 mentees helping them set goals, connect with faculty and resources within their college, promote opportunities to work on special projects, and help them apply for internships and graduate school. Student mentors receive a $1,400 scholarship each academic year they serve.

In addition to the personalized support offered by their student mentors, mentees have access to $750 scholarships, as an incentive to seek one-on-one faculty partnerships, and $250 in textbook support. With the funding provided by Boeing, the Team Mentoring Program will expand this year to include 14 student mentors. More than 220 mentees will be targeted with a goal of having 98 of them actively engaged in the program.

Bob Thomas, executive director of the International Association of Mechanists/Boeing Joint Programs, said his company needs more diverse engineers.

“When you look at the low number of underrepresented students entering the STEM disciplines in college and how few of them are graduating, it really grabs your attention,” he said.

Thomas said WSU’s early success with the Team Mentoring Program caught the eyes of Boeing’s grant reviewers. According to Acevedo, of the 84 mentees who started the program in 2007, 6 percent of them have already graduated with STEM degrees; 51 percent are still enrolled and are progressing towards a STEM degree. Nationally, only about 40 percent of students pursuing STEM degrees make it to graduation.

Alex Nocivelli, CEO of Luceat, a fiber optics company in Italy, rises at 4:00 a.m. to attend the WSU classes before his work day starts.

“WSU gave me the option to take a human behavior class in Italy and transfer it to WSU in order to complete my graduate requirements. But I find it much better to take courses from WSU,” he says. “They are the best I can get and having it delivered to my home is excellent. I’m always challenged, interested, and taught in wonderful ways. Because of WSU, I’ve doubled my profits and plan to double them again!”

According to Holt, a survey of 85 graduates of the program found that the students felt the program had helped them save, on average, approximately $70,000 on work projects.

“These working professionals bring the problems from their workplaces into the classroom for discussion,” he says. “They learn from each other as well as from excellent faculty guidance. They often comment on how much it means to see other industry problems because it helps them better understand how to fix their own.”

Skrobecki was one of about 15 or 20 Boeing commercial airplane engineers who went through the program in the mid-1990s. “WSU’s program was a perfect fit,” he said.

The program had an early distance-learning approach when many programs required students to come to campuses. Today, the program remains very connected to industry, and about 200 Boeing employees have been enrolled, he says.

Faculty who teach in the ETM program, he says, stay contemporary on industry trends. They were preparing students for virtual teaming in the 1990s, and now they are active leaders of sustainability, says Skrobecki. The faculty do a good job of making themselves available to students, which adds to the program’s strength. The program also provides a pathway of advancement for its students, says Skrobecki. Many of those who receive certificates go on to management and senior technical careers.

“These programs are vital to our industry success,” he says. “The university is doing a fantastic job.”
Then and Now

Do you remember how the time you spent at WSU changed your life? Please contact us at thilding@wsu.edu and tell us your story and memories so we can share them with your classmates and friends.

Do you want to help change somebody’s life? You can help to support the kind of educational experience that you once received. Please contact the CEA development office at 509-335-3342 or visit our website at www.cea.wsu.edu/givingopportunities.

Thank you for your support of the College of Engineering and Architecture at Washington State University.