Ninety years and still going strong

Ninety years have gone by quickly for electrical engineering adjunct Professor Carl Johnk. Born in Schleswig-Holstein, Germany, on October 22, 1919, he emigrated as a five-year-old through Ellis Island with his family in 1924. “As I look back, it’s been pretty fast. Time seems to be accelerating. We can consider the relevance having been born only a few years after the vacuum tube was invented, and radio, superheterodyne and all, began in its infancy.”

At a time of life when many choose to sit back and take life easy, Johnk teaches two courses each semester. On the days he teaches, he “feels obligated to get up at 5 a.m. to go to work, and typically I don’t get home until 8 p.m. I grade my graduate and senior class papers because I feel more intensity is required at these levels than the average student grader can put into it.” Johnk teaches electromagnetic fields courses. “Sometimes it surprises me that teaching two classes, in the manner I feel they should be taught, requires about 40 hours a week. It seems that may be called half-time but I feel that it is needed.”

Johnk began his college education in 1937 at Shurtleff College in Alton, Illinois. “I got a very strong mathematical background, as well as one in chemistry and physics. I tossed between choosing a major in chemistry or physics early on,” he says. In the end he chose electrical engineering (EE). In 1942, he received his bachelor of science degree in EE from Missouri School of Mines (now University of Missouri at Rolla).

“This was near the beginning of World War II. I served from 1943 to 1945 in the U.S. Navy as a chief ordnance officer, working on electronics and ocean testing of mines and torpedoes at the Naval Ordnance Laboratory in Washington, D.C.,” says Johnk. “In the earliest days of the war, the highest frequencies that we could successfully work with—and get adequate power from—were with vacuum tube sources at 100-200 MHz. In those days, radio and radar sources began to improve, especially with our invention of the magnetron, which allowed the Allies to come out with effective radar before the Japanese and the Nazis got hold of it.”

Johnk received both his master’s and doctoral degrees in electrical engineering from the University of Illinois at Urbana-Champaign under the guidance of Edward Jordan and Raymond Duhamel. After beginning his teaching career as a graduate student, Johnk next became an assistant professor in EE at the University of Colorado at Boulder in 1954.

At a time of life when many choose to sit back and take life easy, Johnk teaches two courses each semester.
"Engineering is on the Move!"

Engineering is on the move! Good day and welcome, dear readers. This is the most exciting time in my life, to be writing the dean's page for the inaugural issue of this newsletter and to be working for the consolidated institution, University of Colorado Denver, because many things are happening. First, this newsletter stands for connection and reconnection—to connect with our students, faculty, staff and friends; to reconnect with our alumni; and to strengthen our connection to the community and with our industry friends by sharing the news on the state of the college and the university.

You likely have learned that CU Denver and the CU Health Sciences Center were consolidated by the Regents in 2004, and our new name is University of Colorado Denver with the Downtown Campus and the Anschutz Medical Campus in Aurora. We are a leading public university with a global reputation for excellence in teaching, research, creative works, community services and clinical care with a diverse student population. The university has more than 115 undergraduate, graduate and first-professional degree programs in 13 schools and colleges with a combined external research funding of nearly $400 million. We are riding high on the wave of consolidation in good positive spirits. Now I am excited to share with you the good news about UC Denver Engineering.

Riding the Wave of Consolidation. To me this is a dream come true. I have always wanted our university to become a truly first-class university. I remember the day I joined other faculty, staff and students marching to the state capitol in protest of a proposed merger of UC Denver with Metro State College. Now UC Denver is here. Most faculty and students are excited, and so am I. Good things are happening in the College of Engineering! We have new faculty hires, a new department offering graduate degree programs in bioengineering is likely in March 2010, our labs have been modernized, our enrollment continues to grow (9.24 percent this fall) and the positive and proactive spirit of the faculty toward their educational, research and service missions alongside the staff members’ increasingly positive attitude toward their contribution to the administrative tasks show our team spirit. An effort toward a new engineering building has been initiated, and the strong industry support is shown in the membership of the Engineering Leadership Council.

Expansion. This is my 35th year serving UC Denver. In the past two decades, the Business School, the School of Education & Human Development and the College of Liberal Arts and Sciences have all experienced tremendous growth in student enrollment, faculty and staff. The tables have now turned to the College of Engineering and Applied Science. I believe that it is time for the college to expand its service domain into national and global communities and its research and teaching into areas covering sustainable technology, nanotechnology and bioengineering; all while seeking advancement in traditional engineering education and research. To accomplish the above objectives, we need a building that provides sufficient space for teaching and research. Challenges are ahead, and your help and encouragement are needed. Our vision is to provide one of the best engineering educations in the nation and the world, aimed at equipping our graduates with the most advanced knowledge and skills necessary to be effective in an increasingly competitive world market.

Spirit of Serving. The engineering faculty and staff stand ready to serve the interests of their constituencies. “We take pride in serving you, and our pay is for a job well done!” is our motto, and it is a continual reminder of providing better services. We strongly believe that students are our customers, and we want to provide them with the best engineering education available. The College of Engineering faculty and staff collectively serve the interests of all students and faculty as well as the engineering community and industry.

I invite you to join me and see how your College of Engineering is on the move!

With warm regards,

Nien-Yin Chang
Interim Dean, College of Engineering and Applied Science
Change in leadership

On June 30, 2009, Dean Renjeng Su, who had been with the college for eight years, ended his tenure to become dean of Maseeh College of Engineering at Portland State University in Portland, Oregon. Civil Engineering Professor Nien-Yin Chang is serving as interim dean. Chang has been at UC Denver since 1975, became a full professor in 1985 and has served twice as chair of the Department of Civil Engineering. Read about his new role on page 2. A search for a new dean is under way.

Faculty honored at university level

On September 11, 2009, two members of the College of Engineering and Applied Science faculty were honored at the University of Colorado Denver Faculty Excellence Awards. Stephan Durham, assistant professor of civil engineering, was an Excellence in Service honoree. David Mays, assistant professor in civil engineering, was an Excellence in Teaching honoree. Congratulations to both!

New faculty

For the 2009-2010 academic year, four tenure-track faculty joined the college. Assistant Professors Wesley Marshall (CE), Yiming “Jerry” Deng (EE) and Jae-Do Park (EE) joined fall 2009, and Mark Golkowski (EE) joined spring 2010.

Additionally, four assistant professor, clinical teaching track (nontenure track) faculty also joined us this fall: Dan Connors (EE), Fred Rutz (CE), Cheng-Yu Li (CE) and Richard Osborne (CSE).

Sponsored by a grant from the National Science Foundation (NSF), scholarships are available to talented, financially eligible students who are enrolled full-time in one of our four engineering majors.

Applicants must demonstrate financial need, academic achievement and a commitment to pursue a career in science, technology, engineering or mathematics. The program also provides students a network of academic and social support aimed to help them achieve academic success, complete their baccalaureate degree in a timely manner and pursue a career in their field.

Computer Science and Engineering Professor Gita Alaghband, the program director, says, “It is wonderful to see the REACH scholars work together, help each other and care about each others’ success. I look forward to their frequent visits to my office with reports of their successes, experiences and new challenges.”

This NSF grant of $499,527 runs from Sept. 15, 2006, through Aug. 31, 2011. Learn more at www.cudenver.edu/REACH.

IGERT

In 2007, UC Denver received a $3.2 million National Science Foundation Integrative Graduate Education and Research Training (IGERT) grant in sustainable urban infrastructure. IGERT spans the UC Denver colleges of engineering, architecture and planning, public affairs and liberal arts and sciences. The award will support 26 PhD fellowships from 2007-2012 to answer the question: “How can we design future urban infrastructures to make our cities environmentally and economically sustainable, healthy and resilient?” IGERT Fellows have many opportunities including international experience, industry and government internships and cross-disciplinary research. Civil Engineering Professor Anu Ramaswami is the IGERT program director. For details, visit www.cudenver.edu/IGERT.

More than a name change

The University of Colorado Denver has undergone some major changes in the past few years. In 2004, University of Colorado health sciences programs, including the School of Medicine, the College of Nursing, the School of Dental Medicine, the School of Pharmacy and the Graduate School, consolidated with the University of Colorado at Denver, forming the University of Colorado Denver and Health Sciences Center. In 2007, the name of the consolidated university officially became the University of Colorado Denver. In 2008, the health sciences programs moved from Ninth Ave. and Colorado Blvd. to the brand new Anschutz Medical Campus in Aurora. As enrollment numbers rise and new programs are developed, UC Denver will continue to evolve; the quality of faculty and students will continue to be the best.
Department chairs and the dean work closely throughout the academic year. Pictured left to right: Gita Alaghband (CSE), Sam Welch (ME), Interim Dean Nien-Yin Chang, Kevin Rens (CE), Mike Radenkovic (EE).

Electrical Engineering (EE)

Acting Chair, Mike Radenkovic

The eleven faculty members in EE have expertise in systems and controls, signal processing, communications, microelectronics, photonics, power systems, robotics and computer engineering.

Mark Golkowski joined EE faculty ranks in spring 2010. His area of expertise is applied electromagnetics.

Yiming Deng, who joined the EE faculty in 2009, is exploring new research areas for both electromagnetic and biomedical imaging and image processing applications. He is leading an effort to apply advances in engineering, physics, mathematics and medicine to the development of advanced noninvasive or minimal invasive imaging techniques. He is developing an EE applied electromagnetic track that comes in three flavors: analytical, experimental and computational.

Jae-Do Park, who joined the EE faculty in 2009, brought his 12 years of industry experience on electric machine drive systems as well as his research on flywheel energy storage systems. He is offering new courses on electric machine and drives. Also he is working on building a state-of-the-art power laboratory in EE to offer students a hands-on experience on latest power, machine and drive technology. His research includes energy conversion systems for renewable energy applications, power quality control and distributed generation systems.

Dan Connors, who joined the EE faculty in 2009, works in the area of computer architecture, embedded system design and high-performance computing. He is currently exploring ideas in the design of low-power computer systems and multicore architectures. His research also includes parallel programming, optimizing compilers, run-time systems, operating systems and fault tolerant design. He is developing a computer engineering track of courses that includes system-on-a-chip (SOC) design, rapid prototyping using field programmable gate arrays (FPGAs) and real-time digital system design.

An engineering laboratory remodel was completed for fall 2009 by the Department of Electrical Engineering. The laboratory, generally referred to as the Junior Lab in North Classroom 2408, has new equipment, including electronics instrumentation from Agilent Technologies, personal computers, benches, comfortable lab stools, components cabinets and new décor, which includes new lighting, a tile floor, new paint, white boards, projector and projector screens.

Computer Science and Engineering (CSE)

Chair, Gita Alaghband

The nine CSE faculty members’ expertise expand several areas of research in algorithms, artificial intelligence, computer architectures, computer security, database systems, high performance computing, operating systems, parallel and distributed systems, software engineering, virtual reality and computer graphics.

Assistant Professor Rick Osborne, whose area of expertise is in software engineering and database systems, has joined the department in a new clinical teaching track position.

The department has revised its BS CSE program with more emphasis in key areas essential in the computer science and engineering field. The department has also revised its interdisciplinary computer science and information systems (CSIS) PhD program to add emphasis on key knowledge areas and support interdisciplinary research. The CSE department has developed a state-of-the-art multicore cluster computing laboratory to enhance educational support for graduate students. A new CSE Apple laboratory will support many of the CSE educational and design project requirements. The CSE department also has existing labs for computer graphics and distributed computing and networking.
Civil Engineering (CE)

Chair, Kevin Rens

The twelve full-time CE faculty members have expertise in environmental engineering, geotechnical engineering, structures, transportation and water resources and GIS.

This past May, a record six civil engineering doctoral students received their PhD degree: Mark Pitterle, Tim Hillman, Angela Hager, Jan Van Sickle, Hien Nghiem and Thang Phan.

On May 23-24, 2009, the UC Denver Steel Bridge Team, advised by Professor Stephan Durham, participated for the first time in the ASCE National Steel Bridge Competition, competing against 49 other top nationally-ranked teams in Las Vegas, Nev. Read about how they scored on page 6.

Beginning fall 2009, three new faculty members were added to our group: tenure-track faculty—Assistant Professor Wesley Marshall; nontenure-track faculty—Assistant Professor, clinical teaching track faculty, Fred Rutz and Cheng-Yu Li.

Looking to expand your horizons? As training and professional development for engineers becomes more essential, the Continuing Engineering Education Program (CEEP) strives to best meet the needs of the engineering work force.

Visit CEEP at www.cudenver.edu/ceep to check out this year’s courses, including FE and PE refresher classes. For more information, contact program manager Heidi Utt at 303-556-4907 or heidi.utt@ucdenver.edu. Bookmark this site for your future engineering education needs!

Mechanical Engineering (ME)

Chair, Sam Welch

The nine faculty members in ME have particular expertise in solid mechanics, fluid mechanics, bioengineering, thermodynamics, dynamics and controls and mechanical systems design. The Department of Mechanical Engineering offers BS, MS and MEng degrees.

ME students finished second in the regional ASME “Mars Rocks” student design and received an invitation to compete in the international finals held Nov. 15, 2009, at Disney World. During summer 2009 ME students converted a 1967 Triumph Spitfire into an electric vehicle and were featured on a KDVR (channel 31) news story.

Sean Wright is back from his yearlong leave of absence, during which he worked at EPRI. Professor Peter Jenkins just received a three year grant for $450k to work on microbial fuel cells with Jason Ren from CE and Atousa Plaseied from ME.

Ninety years

continued from cover

“At Boulder we were in the process of developing an electromagnetic group over a period of several years and were closely associated with NIST (formerly the Bureau of Standards) in Boulder. Dr. Sam Maley, my former PhD student (who became a professor at CU Boulder) played an important role in this group, and we worked together for many years. I was lucky to find someone of Sam’s superior caliber.”

The most interesting project Johnk recalls working on in conjunction with NIST was that of modeling antennas located over lossy regions. Johnk’s son, Robert Johnk, followed in his father’s research footsteps, receiving his doctorate in electromagnetics from CU Boulder, and currently is one of the electromagnetic group leaders at the Institute for Telecommunication Sciences in Boulder.

In the 1960s, Johnk began to teach part-time at UC Denver, then known as the Extension Center. “I came to Denver to teach graduate classes in electromagnetics, with much of the graduate material taught early on eventually becoming part of what is now covered in undergraduate courses,” he says. “Old-timers such as Paul Bartlett and Paul Hultquist also started in those days.”

For inspiration and heroes, Albert Einstein tops Johnk’s list, a man he refers to as “an admirable old cuss.” Inside UC Denver, Johnk fondly recalls Professor Clint Duvall, a chairman of the Department of Electrical Engineering. “He was the guy who, for better or worse, hired me. His background was in power heavy power generation and transmission, which are still important. I greatly admired the work he was doing.”

Johnk is known worldwide for his textbook, Engineering Electromagnetic Fields and Waves. The first edition was published by Wiley in 1975, and a second edition, published in 1988, is the one currently in use. The book has been a basic electromagnetic text for college courses and has been translated into several languages, the latest translation being Mandarin Chinese, although Johnk notes that he “has not kept up with how they have used it in China.”

So, what advice does a man who has seen so much change offer to current electrical engineering students? “Hit both analog and digital as hard as you can. Analog attitudes toward science are still, and will continue to be, extremely important,” Johnk explains. “Many people who specialize in digital sometimes forget the importance of analog problems. Analog has needed to be compressed to make room for digital courses.”

As for the present, Johnk says, “Now I find if I could talk my grandson Kevin into switching his major from civil engineering into electrical engineering, everything would be perfect.”
Every year, senior engineering students, no matter their area of expertise, must complete a senior design project. Project plans begin to take shape well before the semester begins, and then it’s all about project management. Some projects succeed, others do not. Thus begins the story of six mechanical engineering students and their senior design journey, Project VERV.

Q: What is VERV?
A: VERV stands for Victim Evacuation Robotic Vehicle. It’s a wireless remote-controlled vehicle designed to load and transport injured people out of dangerous situations.

Q: What is the goal of the project?
A: The goal is to allow for emergency medical service personnel to safely and efficiently rescue injured people in a variety of situations, especially those that put the rescuer in danger.

Q: How will it work?
A: On-board cameras will help the controller navigate VERV from a first-person perspective and assess the victim’s condition en route. The vehicle will include components like a protective shield, a removable backboard and a unique victim retrieval system (VRS). The VRS will move down an incline, take hold of the injured person under the arms and pull them onto VERV for transport.

The VERV system will fit in the bed of a standard pickup truck. It will be capable of speeds from less than one MPH to 10 MPH. It will run on rechargeable sealed lead acid batteries, and will have a six-wheel independent suspension with all-wheel electric drive. It will carry a person weighing up to 350 pounds and 6.5 feet tall.

The team has received a $3,600 grant through the UC Denver Undergraduate Research Opportunity Program, and they are still applying for funds from other sources. The design phase of the project was completed in December; the building phase concludes in May.

Check out the next issue of Engineering on the Move to see how the project is progressing. Or, follow the team at http://stefanselener.googlepages.com.

Students build bridges at regional and national competitions

In spring 2009, for the first time in the university’s history, the University of Colorado Denver American Society of Civil Engineers student chapter participated in the ASCE Rocky Mountain Steel Bridge Competition in Provo, Utah. At this competition they beat 14 universities, including University of Colorado at Boulder, Colorado State University, Colorado School of Mines and Air Force Academy. The competition requires a team of students to design and fabricate a 20-foot steel bridge. The day of the competition, each team’s bridge is judged on weight, deflection, aesthetics and construction speed.

In May 2009, under the leadership of senior and team captain Jeff Felling and Assistant Professor Stephan Durham, the UC Denver Steel Bridge Team competed in the ASCE National Steel Bridge Competition in Las Vegas, Nevada. Here they competed against 49 of the top engineering schools in the country. The team placed third in the deflection category and 17th overall. In addition, they placed eighth in construction speed with a time of 5:34, more than a minute faster than their regional time. They placed in the top 20 in every category but one.

The ASCE student chapter plans to participate in both the steel bridge and concrete canoe competitions this spring 2010.

Other 2009 student team members included: Brian Bern, Matt Schneider, Logan Young, Wyatt Foley, Roksana Taghizadeh, Samantha Bartz, Adam Kardos, Travis Bruce, Scott Meredith, Brian Pals and Brett Cochran.
Emeritus Dean Bartlett—a man who made an impact

“All in the engineering profession in metro-Denver and the state know Dean Emeritus Paul E. Bartlett. He had focused his entire professional life on the higher educational mission of the College of Engineering and Applied Science at UC Denver. While he retired after serving UC Denver for 51 years, his heart is still on campus. In fact, it is not just his, but his wife, Polly’s too.

I vividly remember that they would work so hard serving engineering students, alumni and faculty—a day’s work, usually 12 to 14 hours, Paul would still carry two full briefcases of documents to occupy his evening time. His impact to the college is immense and will be felt for many more years. In this inaugural issue of Engineering on the Move, he is gratefully acknowledged for his tremendous contribution toward the college’s development. Thank you, and Polly!”

Nien-Yin Chang, Interim Dean
UC Denver Alumni Association
www.ucdenver.edu/alumnievents

5-Night Western Caribbean Cruise
Feb. 6-11, 2010
Sail Celebrity Cruise Lines with fellow alumni and English Professor Teague Bohlen. See places like Ocho Rios, Jamaica and Grand Cayman.

Rock Bottom Ruckus Dinner & Auction
Feb. 28, 2010, 5:30 p.m. | Rock Bottom Restaurant and Brewery (16th and Curtis streets)
Come support university scholarships through an auction and gourmet dinner. More details are available online.

Alumni News

Mary Foote Gearhart, BS civil engineering ’79, was honored as a 2009 Woman of Distinction by the Girl Scouts of Colorado. In addition to serving the Girl Scouts and her other community service activities, Gearhart chairs the Engineering Advisory Council for the college. She also earned the 2006 Distinguished Service Award from the university.

Peter Marxhausen, PE, MS civil engineering ’04, is a senior staff engineer specializing in engineering forensics on structural, civil, geotechnical and plumbing engineering systems with Higgins & Associates, Inc. of Morrison, Colo. Marxhausen has taught Civil Engineering Senior Design for the College of Engineering as a lecturer since fall 2007. Marxhausen received the 2009 QBS COLORADO Award “in recognition of his efforts to educate his students on the importance of using qualifications-based selection while emphasizing professional ethics.”

J.J. O’Brien, PE, PMP, BS mechanical engineering ’97, MBA ’05, is a project manager with URS, EG&G Division, and an active member of the college’s leadership council. O’Brien has been working on winning the National Science Foundation Antarctic Support Contract, and last year he participated in the site visit of the U.S. Antarctic Program in Antarctica.

Abe Shukert, BS electrical engineering ’06, is an engineering manager at Rogue Engineering, Englewood, Colo. He designs custom electronics and embedded firmware for a variety of industrial products including solar battery chargers, ignition systems and hazardous location SCADA systems.

Stephanie Spencer, BS civil engineering ’08, is working at Goodbee & Associates in Denver on the new light rail expansion project. Spencer received the Silver Medal Award from Colorado Engineering Council in spring 2008.

What have you been up to?

We’d like to hear from you. To send us a class note, visit http://ucdenver.edu/classnotes. To update your information, visit http://ucdenver.edu/alumni update. Or complete the form below and send it to Marilee DeGoede, Campus Box 104, P.O. Box 173364, Denver, CO 80217-3364.

Look for your update in the next issue of Engineering on the Move.

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