

HONORARY SYMPOSIUM
FOR AZIZ FOUAD (PAGE 6)

ANSON MARSTON DISTINGUISHED PROFESSOR
VIKRAM DALAL (PAGE 1)



CONNECTIONS

SUMMER SEMESTER 2014

IOWA STATE AT WAR

ECpE Alum **Lyle Morse** recalls his experience on campus during the second world war.



Greetings from Iowa State. By the time this issue reaches you, the 2014-15 academic year will be underway. We welcome each new semester as an opportunity for renewed focus and as a chance to continue the long ECpE tradition in education and research.

In this issue of *Connections*, we take a look back to an uncertain time in the department's – and the country's – history. **Lyle Morse**, a 1944 graduate in electrical engineering, lived through and impacted some of the most incredible events in American history. We are pleased to feature his story this semester (Page 10).

The department continues to grow and change with the times. This fall we project to welcome **1,625** students through our doors, a record. The department already has taken steps to absorb these new students, including the creation of the Transformative Learning Area and the renovation of the Student Services Suite.

Currently, the area that houses the **Complete Support Group** (CSG) is being renovated to better serve the department's evolving needs. This project will provide new equipment and a modernized space, and will streamline how the department deploys its technological resources. The renovation will be finished at the end of the fall semester, and the Complete Support Group will be renamed **ECpE Information Systems and Technology** (IST). This change better reflects the group's continuing role within the department: To aid students, faculty and staff in getting the most from department hardware, software, and electronic resources.

Whether we are looking back at alums that have done important work or looking forward to the future of Coover Hall and the department, one common thread emerges: ECpE's commitment to education and research is unwavering.

Please enjoy the Summer edition of *Connections*.

David Jiles

David C. Jiles

Anson Marston Distinguished Professor, and
Palmer Endowed Department Chair
Department of Electrical and Computer Engineering

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The Iowa State campus, ca. 1942

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DALAL NAMED ANSON MARSTON DISTINGUISHED PROFESSOR

BY BROCK ASCHER

Vikram Dalal, Thomas Whitney Professor of electrical and computer engineering and director of the Microelectronics Research Center (MRC) will be named an Anson Marston Distinguished Professor by Iowa State Senior Vice President and Provost **Jonathan Wickert** in a ceremony on Sept. 22.

Dalal, who has directed the MRC since 1999, has been working in the solar energy research field for four decades. He is a Fellow of the IEEE, the APS, and the AAAS and served as Associate Chair of the Department of Electrical and Computer Engineering from 2006-10.

"It is an honor to be recognized for many years of work in the field of solar energy research," said Dalal. "Solar energy technology is very important for people in developing countries who lack grid-connected electricity and I am very happy to be working in that exciting field."

Dalal has extensive experience in both industry and academia. After earning a PhD in electrical engineering from Princeton in 1969, he served as a research scientist at Princeton and as the manager of the device group at the University of Delaware's

Institute of Energy Conversion. Dalal spent eight years in industry prior to his 1988 appointment at Iowa State, including a three-year term (1981-83) as Vice President of Research and Development at Chronar Corporation.

"I was at a stage in my life where I felt that, with my industrial research experience, I would be able to contribute both to the education and research training of young people in important technological fields, and to continue important research on solar energy materials," Dalal said. "Iowa State offered an excellent opportunity to pursue that dream."

Dalal has graduated 28 PhD students, and holds 11 U.S. patents.

The Distinguished Professorship within the College of Engineering is named for Anson Marston, the first Dean of Engineering at Iowa State and namesake of Marston Hall, the Marston Medal, and the Marston Water Tower. ■



Vikram Dalal
Anson Marston
Distinguished Professor



THE DISTINGUISHED PROFESSORSHIP

A Distinguished Professorship is awarded for exemplary performance in research and/or creative activities as reflected by a national or international reputation in the awardee's discipline.

A Distinguished Professor's accomplishments in research, and/or creative activities must have significantly impacted, or improved the quality of, that discipline. In addition, a Distinguished Professor must have demonstrated outstanding performance in at least one other area of faculty responsibility: teaching and advising; extension/professional practice; or institutional service. A base salary addition of \$6,500 is granted, and the awardee retains the title for the remainder of his or her career at the university.



Doug Jacobson
University Professor

IOWA STATE EXPANDS INFORMATION ASSURANCE GRADUATE PROGRAM

Program will include a Cyber-Physical System (CPS) Security focus and a CPS-based cyber defense competition.

BY BROCK ASCHER

Iowa State University's Department of Electrical and Computer Engineering and the Information Assurance Center will expand their Information Assurance Graduate Program and Cyber Defense Competition to include a Cyber-Physical System (CPS) Security focus beginning in the fall 2014 semester.

The expansion will improve two premiere components of the department's cybersecurity and information assurance education initiatives. These initiatives helped earn Iowa State's re-designation as a National Center of Academic Excellence in Information Assurance/Cyber Defense Education by the National Security Agency (NSA) and the Department of Homeland Security (DHS).

"Adding a cyber-physical component to our lineup of cyber defense competitions (CDC) enables Iowa State to maintain its leadership in inquiry-based cyber defense competitions," said **Doug Jacobson**, University Professor and Director of the Iowa State Information Assurance Center. "Our CPS-based CDC will become a model for other schools across the country and will be included in our nationwide release of the CDC software."

The Information Assurance Graduate Program

will feature a new course and will update existing courses to reflect the program's increased focus on cyber-physical security. Iowa State has one of the nation's oldest information assurance graduate programs and these additions provide students with additional options.

"The new cyber-physical focus area in the graduate information assurance degree program will provide students a unique opportunity to gain knowledge of CPS security and enter the workforce better able to secure the nation's critical infrastructure," said Jacobson.

The updated cyber defense competition and curriculum expansion come as a direct result of Iowa State's participation in the SmartAmerica Challenge organized by the White House Presidential Innovation Fellows program. As part of a team that includes a number of industry partners (Scitor Corporation, National Instruments) and national laboratories (MITRE Corporation and NREL) along with the University of Southern



Manimaran Govindarasu
Mehl Professor

Department

Students

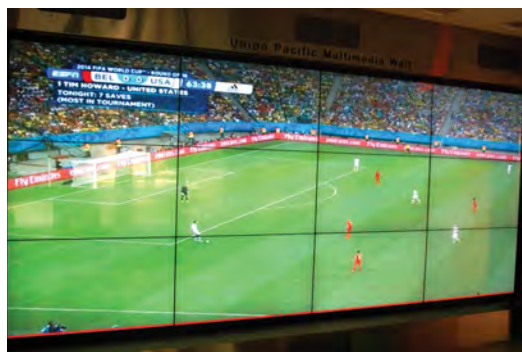
Alumni

California's Information Science Institute (USC/ISI), North Carolina State University, Penn State University, and the University of North Carolina at Chapel Hill, Iowa State is working to strengthen the security and resiliency of power grids against cyber-attacks using state-of-the-art CPS platforms, algorithms, and tools enabled by integrated, extensible testbeds.

Iowa State is the home of PowerCyber, a state-of-the-art CPS Security Testbed for the Smart Grid. Supported by the National Science Foundation, PowerCyber integrates industry-grade cyber and power system hardware and software through a hybrid testbed environment composed of real, emulated and simulated components. One of the goals of the team's SmartAmerica Challenge project is to demonstrate the synergistic capabilities of PowerCyber and DETER, the University of Southern California's large-scale cyber security testbed. Using the capabilities of both testbeds, the team is developing secure CPS architectures and secure wide-area monitoring-protection-control algorithms, in addition to conducting realistic attack-defense experiments and accelerating the transition of CPS security theory into practice.

"The SmartAmerica Challenge provided an ideal platform to develop this futuristic research initiative," said **Manimaran Govindarasu**, Mehl Professor and Associate Chair of ECpE. "It also laid out an excellent process for synergistic collaboration among academia, industry and national laboratories. This collaboration to envision and develop technology building blocks and educational programs will transform society."

Govindarasu demonstrated the team's research accomplishments and initiatives at the 2014 SmartAmerica Expo at the Washington DC Convention Center on June 11. ■



UP MULTIMEDIA WALL UPDATE

The Union Pacific Multimedia Wall entered its second year of service over the Summer semester. The department has counted a number of successes with the UP Wall and will expand its capabilities and usage during the fall and spring semesters.

ECpE hosted showings of numerous FIFA World Cup matches, which provided students and faculty on campus during the summer a well-earned break. Recreational use of the wall is one area that will see expansion, as the department has installed high-definition cable service and plans to feature broadcasts of NCAA Men's Basketball Tournament games and the Super Bowl.

On the educational side, phase one of the department's "CyRIS" senior design project is complete, with phase two beginning this Fall. Students have completed four fully-functioning applications, including a campus map with real-time CyRide integration, an air hockey application, a hub for looking through webcams all over campus and an enhanced drawing application. Phase two students will refine these apps and add functionality - improving resolution and quality of webcam feeds, or integrating 3-D building layouts in the map, for example.

Future considerations for the wall include facial recognition software, voice recognition, gesture control with Microsoft Kinect integration, real-time event and weather monitoring, and much more.

The UP Multimedia Wall is primarily funded by the Department of Electrical and Computer Engineering. Union Pacific provides additional funding through a \$150,000 naming-rights partnership announced last February. ECpE and Union Pacific collaborate to create content and applications that benefit students and enhance the department. ■

DEPARTMENT HEADLINES

IOWA STATE REMAINS A NATIONAL CENTER OF ACADEMIC EXCELLENCE FOR CYBER SECURITY

Iowa State University has once again won designation as a National Center of Academic Excellence in Information Assurance/Cyber Defense Education from the National Security Agency and the U.S. Department of Homeland Security. The designation covers the academic years from 2014 to 2021. Iowa State was one of the first seven universities to earn the designation in 1999 and has had it ever since.

"This goes to show our leadership in this area," said **Doug Jacobson**, University Professor and chair of the ISU Information Assurance Center.

TATA SONS APPOINTS GOPICHAND KATRAGADDA AS GROUP CHIEF TECHNOLOGY OFFICER

Tata Sons Ltd named **Gopichand Katragadda** (MSEE '92; PhDEE '96) as group chief technology officer on Monday. Katragadda holds master's and doctorate degrees in electrical engineering from Iowa State University, Ames, Iowa. His graduate studies at Iowa State were funded by grants from Nasa and the Gas Research Institute.

Katragadda, who was earlier managing director of GE India Technology Centre, will join on 3 August, reporting to Tata group chairman, **Cyrus P. Mistry**. Katragadda will be responsible for technology at the group level and share his expertise in managing research and development operations, and act as an evangelist for innovation across group companies, Tata Sons said.



MORE ONLINE

Keep up with the latest news online
www.ece.iastate.edu



ECpE STUDENTS WIN IEEE BEST PAPER AWARDS

Gunjan Pandey and **Kanishka Singh** were awarded 'Best Paper' accolades at the IEEE International Conference on Networking, Sensing and Control (ICNSC).

BY MICHAEL STILL

Two students from Iowa State University's Department of Electrical and Computer Engineering were selected as "Best Paper" award winners at the 11th annual IEEE International Conference on Networking, Sensing and Control (ICNSC). The 2014 conference was held in Miami, Fla., and provided a remarkable opportunity for the academic and industrial communities to address new challenges, share solutions, and discuss future research directions. Participants had the opportunity to attend speeches, industrial panel sessions, funding agency panel sessions, interactive sessions, and other special sessions over the course of three days.

Gunjan Pandey received a Bachelor's degree in electrical engineering from the Indian Institute of Technology in Kanpur, India. Pandey later came to Iowa State to start work on his Ph.D. in 2009, and graduated in the spring. In addition to his "Best Paper" award, Pandey also recently received a Research Excellence Award for his work at Iowa State.

"I attended the conference and presented my work in a talk during the special session on 'Emerging Technologies for Environmental Sensing and Information Exploitation,'" said Pandey. "It's always a big learning experience to meet with peers working in similar areas, and it helped me become more aware about the current work in sensing technologies."

His paper concerns a new antenna which was developed for underground soil-sensing application. The antenna transmits information about soil moisture and salinity to the external

world and this data is then used to decide whether or not more moisture or fertilizer needs to be added.

"This award means a lot as it recognizes the work we put toward the research during the last five years," Pandey said. "Getting an award for it is a great feeling."

Kanishka Singh, started his journey at Iowa State in 2011 as a Ph.D. student in the Electrical and Computer Engineering department. During his time at ISU Singh worked closely with his advisors **Ratnesh Kumar**, professor, and **Robert Weber**, professor emeritus, in the ECpE department. Kumar and Weber were Singh's primary encouragement for submitting his award-winning paper.

"My paper focused on harvesting energy from ambient vibrations, such as those from thunder, using a nonlinear bistable piezoelectric cantilever," said Singh. "This energy can be used to supplement batteries in powering up remotely-located sensors, such as underground soil sensors."

Energy is a topic that Singh is very passionate about, and upon completing his Ph.D., Singh hopes to continue working in the field. Ideally, he would like to make contributions that would result in major energy advancements for the future.

By attending the 2014 IEEE ICNSC and participating in the paper competition, Singh feels that his efforts in the field are being acknowledged and appreciated.

"This was my first conference, and it was a good opportunity to meet people working in different areas of networking, sensing and control, and talk to them about their work," said Singh. ■

Department

Students

Alumni

AUGUST 25
Fall Classes Begin

SEPTEMBER 1
University Holiday
Offices Closed

SEPTEMBER 11
ECpE Scholar's Fair
Transformative Learning Area

SEPTEMBER 12
IEEE Distinguished Lecture
Tim St. Pierre
3043 ECpE Addition; 1:10 p.m.

SEPTEMBER 26
Distinguished Lecture Series
Muhammad Ashrafal Alam
3043 ECpE Addition; 1:10 p.m.

OCTOBER 9
External Advisory Board
Meeting
3043 ECpE Addition; All Day

OCTOBER 9
Scholarship and Awards
Banquet
Iowa State Alumni Center; 5:30 p.m.

OCTOBER 10
Distinguished Lecture Series
Daniel Stancil
3043 ECpE Addition; 1:10 p.m.



MORE ONLINE
See the full calendar at
www.ece.iastate.edu

DEPARTMENT SPONSORS CYBER SECURITY SHORT COURSE

Course offers cyber security training for electric utilities; hands-on lab sessions with Heartbleed bug.

BY BROCK ASCHER

The Iowa State University Department of Electrical and Computer Engineering, in conjunction with the Electric Power Research Center, held a two-day short course that covered basic principles of cyber security. The course, called 'On Cyber Security of the Electric Power Grid with Attacks-Defense Training,' was offered July 15-16 in the ECpE Addition.

The course, now in its second year of existence, covered specific problems and regulations unique to electric utility cyber security. Using the simulated environment provided by ISEAGE (Internet-Scale Event and Attack Generation Environment), participants were given hands-on experience with cyber attacks and defenses. This year's iteration included an enhanced hands-on lab session that included Heartbleed, a widespread security vulnerability in OpenSSL systems discovered in early 2014.

The class was designed to appeal to engineers that work in operations,

communications, or any other business area where cyber security might be a concern. The class also serves as an early step in the Iowa State Information Assurance program's increased focus on Cyber-Physical System (CPS) Security.

Colin Christy, Program Manager for EPRC, organized the course.

Doug Jacobson, University Professor, **Julie Rursch**, lecturer, **Manimaran**

Govindarasu, Mehl Professor and ECpE Associate Chair, and **Blake Vermeer**, ECpE graduate student, provided instruction. A number of Iowa State

faculty and staff joined attendees from outside the university as part of the class.

Christy says the course offers a benefit to a wide variety of people, and more courses are likely to be offered in the future.

"We are pleased with the continuation and enhancement of this class," Christy said. "The results look very positive and it is a great topic for industry-university interaction." ■

The class serves as an early step in Iowa State's increased focus on Cyber-Physical System Security



Aziz Fouad
(PhDEE '56)
ECpE Faculty,
1960-1996

ECpE HOSTS HONORARY SYMPOSIUM FOR AZIZ FOUAD

Above
Jim McCalley (left) and Aziz Fouad (right) engage in dialogue during the honorary symposium at the Iowa State Memorial Union

The life and career of **Aziz Fouad** (PhDEE '56), distinguished professor emeritus of the Department of Electrical and Computer Engineering at Iowa State, was celebrated during an honorary symposium July 7 at the Memorial Union. Friends, family and colleagues joined in the Campanile Room to honor Professor Fouad and welcome him back to campus.


"Whether you've been gone 10 years or 20 years – and I've been gone 20 – Iowa State will be the same as it has ever been to you," Fouad said. "It's a wonderful place to be at and to be from."

Fouad joined the Iowa State faculty in 1960 as an assistant professor and rose through the ranks to earn numerous honors and awards, culminating in his election to the United States National Academy of Engineers (NAE) in 1996. NAE membership is among the most prestigious honors awarded to engineers.

"He is certainly one of the most celebrated and accomplished figures in the department's history," said **David C. Jiles**, Anson Marston Distinguished Professor and Palmer Endowed Department Chair of ECpE. "His efforts helped give the department's power engineering program its legacy of success, a legacy that continues today."

One of Fouad's most enduring contributions to the ECpE department was the establishment of the Power Affiliate Research Program with Paul Anderson in 1963. This program was established to further research and graduate education in electric power systems and to strengthen industry ties to the department. The Power Affiliate Research Program became the Electric Power Research Center (EPRC) in 1988 and furthers its legacy to this day.

Fouad was named an Anson Marston Distinguished Professor by Iowa State in 1990 and is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). The IEEE also awarded him with the Herman Halperin Electric Transmission and Distribution Award in 1994. In addition, he received the David R. Boylan Eminent Faculty Award for Research from the College of Engineering at Iowa State.

"Although technical excellence surely pervaded all that he did," said **Jim McCalley**, Harpole Professor of electrical and computer engineering, "perhaps his true legacy lies in the time he invested in others, the relationships that resulted, and the ultimate contributions to the lives of those individuals." 

Department

Students

Alumni

Keep in touch

We want to hear about your career moves and personal news for future issues of *ECpE Connections*! Please fill out the form below or online at www.ece.iastate.edu/alumni (click Alumni News Form) to share your news.

Name: _____	Graduation year(s) and degree(s): _____
Address: _____	City: _____
State: _____	Zip code: _____
Country: _____	E-mail address: _____
Home phone: _____	Business phone: _____
News I'd like to share: _____	

Support the Department

The ECpE department relies heavily on the support of our alumni and friends to ensure that students have access to scholarships and the latest lab facilities and classroom spaces, that faculty can continue to support graduate students and conduct state-of-the-art research, that department facilities remain updated for staff to do their jobs efficiently, and that student organizations and department events can continue to thrive.

If you would like to help the department continue to be one of the best in the country, you can support the department through several funds. Additional opportunities are available to support endowments and building space. Please check the appropriate box below if you want to offer your support today, or visit www.foundation.iastate.edu. For more information about the funds, contact the ISU Foundation's Adam Laug at 515 294-4883 or alaug@iastate.edu.

I'd like to support:

Electrical/Computer Engineering Excellence Fund

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ECpE Coover Hall Building Project

☐ \$1,000 ☐ \$500 ☐ \$250 ☐ Other \$ _____

Please contact me about supporting:

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- ☐ laboratories and classroom space
- ☐ ECpE Coover Hall Building Project

Payment Type:

☐ Check enclosed (payable to ISU Foundation)
☐ Credit Card Select Type: ☐ Visa ☐ Mastercard ☐ Discover

Credit card number: _____ Name as shown on credit card: _____
Expiration date: _____ Cardholder signature: _____

Thank You!

Mailing Instructions: Detach this form along the perforated edge. Fold the form in thirds so that the ECpE address shows on the outside. Tape the form closed and place your stamp in the labeled box. If you're mailing a check, remember to completely seal the edges of the form or send the form along with your check in a standard envelope.

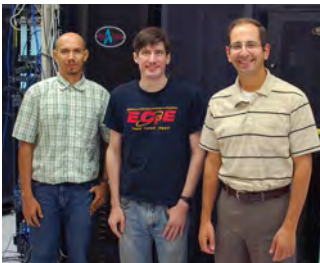
ISU STUDENT WINS MEMOCODE DESIGN CONTEST

Kevin Townsend, ECpE graduate student, won first prize in the 2014 MEMOCODE Design Contest. Participants in the pure performance category were given one month to develop a system to find the k-nearest neighbors of a given point from a multidimensional dataset, which is useful for pattern recognition and machine learning applications.

Townsend's team's approach centered on creating a large, heavily-pipelined array of processors mapped to the ECpE Reconfigurable Computing Lab's high-performance system. This approach gave no considerations to cost,


but rather attempted to yield the best system performance possible. The team's implementation boasted a 0.54s runtime and was nearly 30,000 times faster than the reference implementation provided by MEMOCODE coordinators.

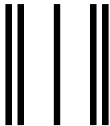
"We have been continually competitive in international design competitions such as MEMOCODE, and this is a real testament to our strengths in Reconfigurable Computing and Application Acceleration," said **Joseph Zambreno**, ECpE associate professor. "Kevin [Townsend] has shown a high aptitude for breaking down applications to their key mathematical kernels and



← **Left**
From left: Philip Jones, assistant professor; Kevin Townsend, graduate student; Joseph Zambreno, associate professor

combining algorithmic tweaks with cutting-edge hardware acceleration techniques."

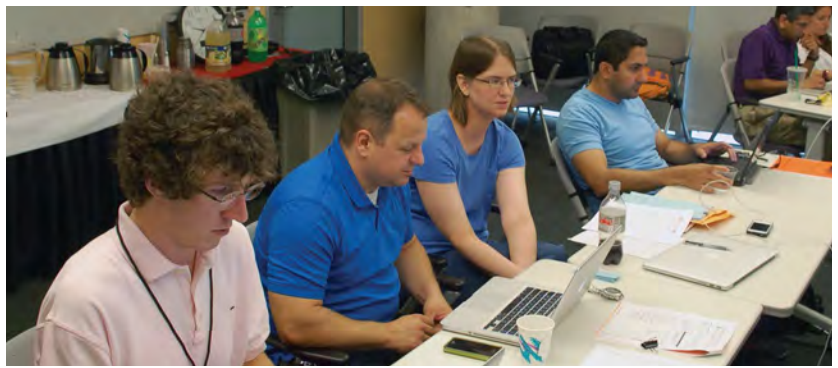
The team will present its award-winning entry at the MEMOCODE'14 conference in Lausanne, Switzerland in October. 



IOWA STATE UNIVERSITY

Dept. of Electrical and Computer Engineering
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Ames, IA 50011-3060





ECpE HOSTS GENI CAMP

Students from across the country come to Iowa State for a week-long camp to learn about the GENI virtual laboratory.

BY BROCK ASCHER

The Iowa State Department of Electrical and Computer Engineering hosted a week-long camp to teach students about Global Environment for Network Innovation (GENI) infrastructure in July. The camp was supported by funds from the National Science Foundation and the BBN Technologies GENI Project Office.

"We wanted to have a chance to host the camp for our students and faculty, and for other students in the U.S.," said **Yong Guan**, associate professor of ECpE. "Among the 30 students involved in the

camp, 10 are from other states, including New York, Kentucky, Missouri and others."

GENI is distributed system that provides a virtual laboratory for networking and distributed systems research and education. It allows users

to tap into computing resources from around the country and perform

experiments using those resources. As a result, researchers can run experiments at-scale on a real network using the most advanced technology available.

Students participated in labs,

Researchers can run experiments at-scale on a real network using the most advanced technology available

tutorials and team-based projects during the week. Each team gave their final presentations on the closing day of the camp.

"In the past, we taught networking and distributed systems classes through simulations," Guan said. "We did experiments using a small, local testbed and scale was always a problem."

GENI's features allow educators to run large-scale experiments without the need for simulations or a local testbed. The system's infrastructure allows for the development of new routing protocols and new applications than can then be tested in real-time on a national network.

"Iowa State has a strong tradition in networking and distributed systems," Guan said. "We have many faculty working on network-related areas, including security, routing, wireless and more. It's only logical for us to host this camp." ■



Yong Guan
Associate Professor



Lyle Morse
(BSEE '44)

Founder, Morse
Equipment Company

Department

Students

Alumni

IOWA STATE AT WAR

ECpE Alum **Lyle Morse** recalls his experience on campus during the second world war.

BY BROCK ASCHER

Lyle Morse (BSEE '44) grew up on a farm west of Ames near Rippey – just north of where Snake Creek spills into the Raccoon River. He didn't know it growing up, but his life's adventure would take him to far-off places where he would work with top-secret, cutting-edge technology that would help the allied armies defeat the axis powers and win World War II. But before that could happen, Morse needed to make the thirty-mile move from Rippey to Iowa State.

"When I graduated from high school, I basically knew one thing and that was that I did not want to be a farmer," Morse said. "I went to Iowa State because it was nearby and it had an engineering school."

Morse displayed an early affection for electrical circuitry and decided electrical engineering was the major for him. He left home for Ames in the fall of 1941, but quickly ran into problems.

"My main problem at school was that I didn't have any money," Morse said. "My parents didn't have any money either, so I spent a lot of time working."

Morse took odd jobs around campus to pay the bills. He started at the physical plant unloading lumber from delivery trucks, then moved on to become a pin setter at the Memorial Union bowling alley for four cents a line.

Above
The Iowa State
campus, ca. 1942.
Special Collections
Department / Iowa
State University Library

"This was before the days of automatic pin setters," Morse said. "We had to actually reach down to pick up the pins and put them in a rack. It allowed us to make a couple dollars in the evening, which was pretty good money back then."

Working two jobs and attending class didn't leave much time for studying. Morse's first-quarter grades were not impressive, by his own admission, and without a renewed emphasis on his academics he would have to leave school. Morse needed to focus; but while he considered how to do that, the country was shocked into war.

A WARTIME CAMPUS

"I remember it was a Sunday," Morse said of December 7th, 1941. "At that particular time, I had an older sister living downtown Ames and I was at her house for Sunday dinner. We turned on the radio and heard the words 'Pearl Harbor.' Immediately after that, war was declared."

After Pearl Harbor, much on campus changed. Many of the male students left through the draft or through enlisting. As a land-grant institution, Iowa State became something of a de facto military school, and much of campus was retrofitted to support the war effort. Over the next few years, Friley Hall and many of the dormitories – among other areas – would be earmarked for military use.

While Iowa State was being transformed to meet the war effort, Morse was transforming his study habits. He had finished his freshman year and decided to use the summer period to bring his sagging grades up.

"I got a D in trigonometry during one of my first quarters," Morse said. "I needed to get my grades up, so I retook it during the summer. I ended up getting an A."

A renewed focus and an improved grade-point average allowed Morse to become more comfortable around campus and around the department.

He worked with **Benjamin Willis**, who headed the power lab at the time, and learned about generators, alternators and transformers. He took classes from **Warren B. Boast** and was even able to get another job; this time waiting tables in the girls' dormitories.

"That was the best job on campus,"

Morse said with a grin. "We were paid with meals, which was all right by me. It was a great place to spend time."

Despite the uptick in his academic fortunes, Morse was still a young man with the specter of the draft hanging over his head. He recalls seeing his friends and acquaintances leave campus after their numbers had come up.

"More and more students that I knew were being called into the draft," he said. "Most of them were perhaps a year older than me at the time, but they were being taken away. You would look up and those people wouldn't be around anymore."

The constant threat of being drafted, and his concern with where he might end up should that become a reality made him think seriously about enlisting. If he enlisted, he would avoid the crapsheet of the draft and have some control over where he could go. With a preference for the Navy over the Army, Morse began to look into the numerous on-campus training programs that Iowa State sponsored for military servicemen. One of them, the Navy's V-12 Program, seemed the most logical fit.

V-12

Morse signed up for the Navy's V-12 Program, which was created in July of 1943 to solve two problems at once. First, the program would train young men to become much-needed commissioned officers in the United States Navy. Second, the program would provide additional students and tuition money to participating colleges, which had been hit hard by plummeting male enrollment because of the war. Morse was one of 125,000 men enlisted in the program nationwide. However, his enrollment was not without difficulties.

Iowa State had recently switched from quarters to semesters to better align with military schedules. Morse had completed the first AC Machines class and was registered for AC Machines 2 when he received some bad news.

"My Navy schedule and my previous academic schedule overlapped to make me miss the DC Machines 1 class," Morse said. "Without that class, they told me I wouldn't be able to take AC Machines 2. I would have to wait a whole year until it would be offered again."

Morse went to see Professor and former EE chair **Fred Fish** about his

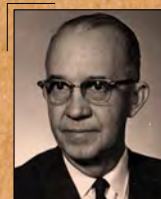
► Benjamin S. Willis

joined the staff at Iowa State as an Instructor in electrical engineering in 1924. As a teacher, Willis taught classes on circuits and machines, electromagnetic power conversion, and illumination. His main interest at Iowa State



Benjamin S. Willis
EE Faculty,
(1924-1969)

was with the machines laboratory and illumination. He wrote the laboratory instruction manual for the Electrical Engineering Department. Willis received the Alumni Citation from the Iowa State University Alumni Association in 1958 and the Governor's Citation from the State of Iowa for 35 years of service in 1961.



Warren B. Boast
EE Dept Chair,
(1954-75)

▼ **Warren B. Boast** began his career at Iowa State in 1934 as PhD student in electrical engineering. In 1936, he was hired as an instructor. He eventually was promoted to professor in 1948, later department head, and ultimately Anson Marston Distinguished

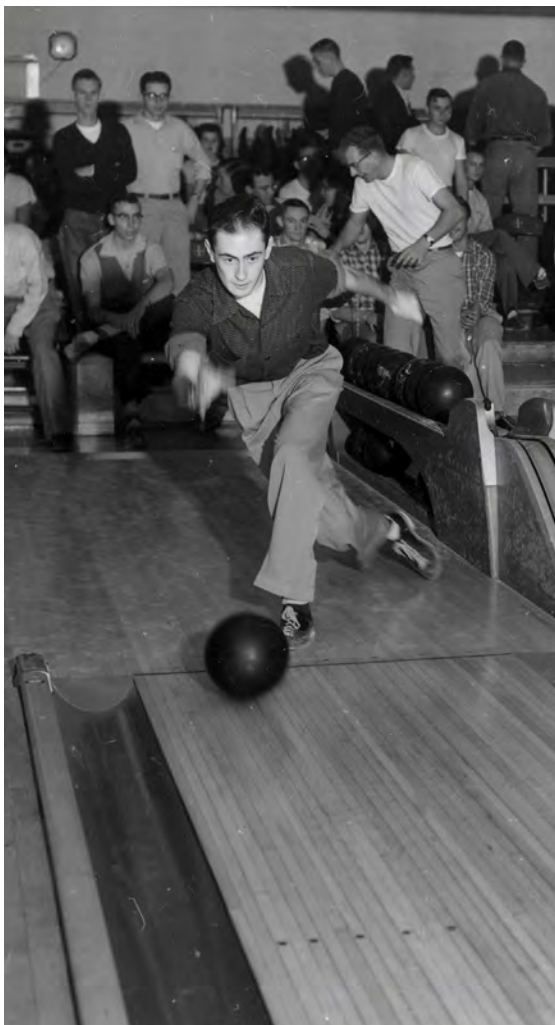
Professor in 1964. Boast and Professor John D. "Jack" Ryder designed and built the first 10-kilohertz AC Network Analyzer in 1949. Boast and Ryder also designed the Electrical Engineering Building (now Coover Hall). The Department's undergraduate teaching award is named in Boast's honor.

► Fred A. Fish

came to Iowa State College in 1905 as an associate professor. He was promoted to full professor in 1907 and then to head the new Department of Electrical Engineering (EE) soon after. As the department's first chair, Fish was reputed to be the "life of the department," and according to the 1914 Bomb yearbook, "in spite of his ferocious appearance, he is quite lenient and often forgets to give the scheduled exams." He remained with the department until 1951.



Fred A. Fish
EE Dept. Chair
(1909-1930)



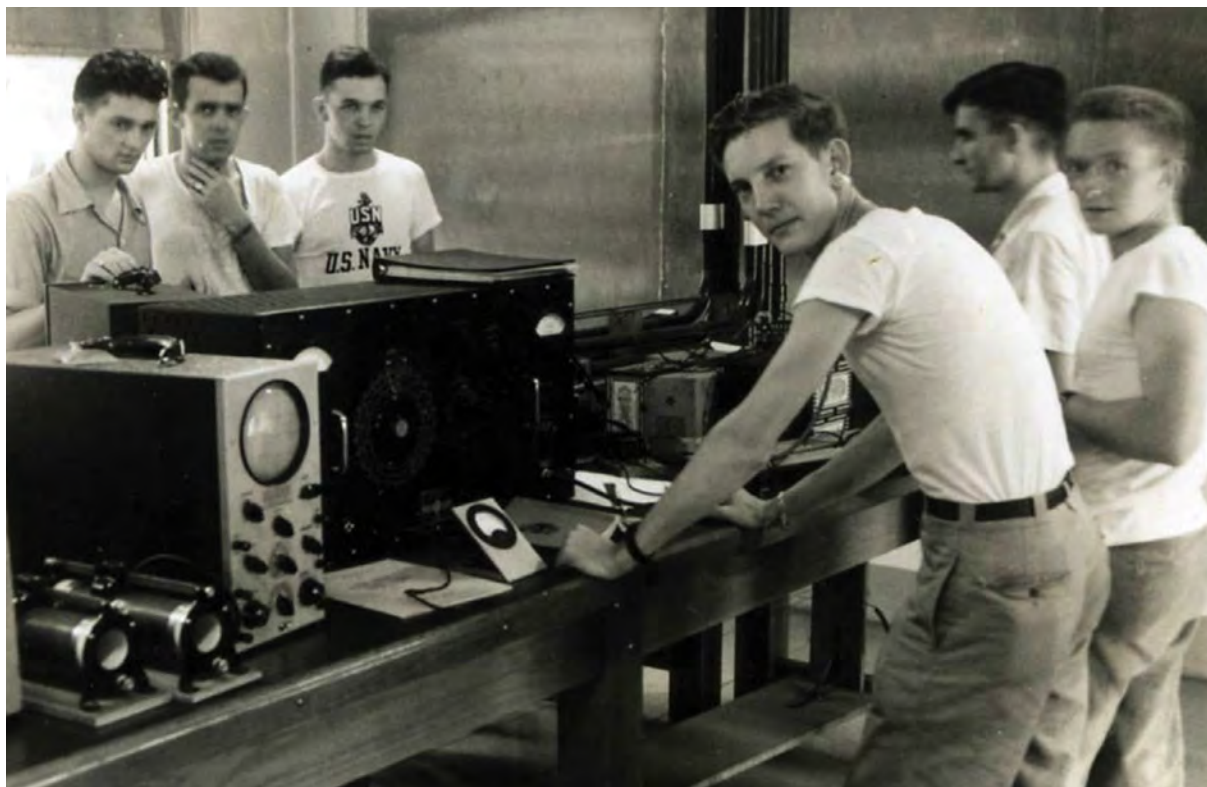
Clockwise from
above

The Memorial Union bowling alley, ca. 1940s.; Warren B. Boast, center, and students performing experiments; The Iowa State radio lab, ca. 1942; Members of the Navy V-12 Program pause for a photo in the EE lab.
*Special Collections
Department / Iowa State
University Library*

Department

Students

Alumni



problem. He and Dr. Fish devised a plan.

"Professor Fish gave me a packet with 25 problems to work on, and a textbook," Morse said. "I took them home and worked on them, then turned them in to him a few days later. He graded them on the spot and gave them back to me saying that two of them were wrong, but that was okay."

Morse remembers asking Professor Fish when the final exam would be, and says he'll never forget what the professor's answer was.

"He told me 'final exams are just another problem.' I didn't know until the next semester that he had given me an A for five hours of DC Machines."

Morse graduated from Iowa State with a degree in electrical engineering after just three years and shipped off to New York City to attend midshipmen's school at Columbia University. Once there, he studied Navy protocol and learned how to act like an officer. His job, essentially, was to learn. After leaving Columbia, Morse's job would be to learn the ropes of a revolutionary new technology and teach them to Navy sailors.

CLASSIFIED WORDS

After earning his commission at Columbia, Morse was sent to Bowdoin College and the Massachusetts Institute of Technology (MIT) for his next assignments, but not before heading back to Des Moines to get married. Newly married and newly commissioned, Morse headed to Bowdoin and to MIT to work with a pair of new, top-secret technologies; the names of which could not be uttered aloud without inviting serious repercussions.

"When I went into my first day at MIT," Morse began, "they told us 'You're going to be studying – quote, unquote – RADAR. R, A, D, A, R. You are not to mention that word outside of the classrooms here. When you go home at night, you do not tell anyone what you're doing. RADAR is a classified word, you can't speak it.'"

Morse worked with SONAR machines at Bowdoin before moving on to RADAR at MIT. His job for

both positions was to become technically proficient with the advanced equipment so he could enter war zones in the Pacific onboard a ship and teach Navy sailors how to operate the systems and use them to position potential targets. It was the perfect task for a commissioned officer with an electrical engineering degree.

"There were a lot of advancements happening very rapidly in that field at the time," Morse said. "It was difficult to keep up with everything, but we did it."

VICTORY

"That was a pretty wild day. Everybody in office buildings or houses or wherever came out and the streets were packed with people."

Before Morse could sail into warzones to teach sailors about SONAR and RADAR, President Truman ordered the use of nuclear weapons on the Japanese mainland, and the war ended in August of 1945.

"I was in Cambridge when we got word," Morse said. "Most everybody had a bottle. The thought was, 'hey, let's have another one. The war just ended!'"

Morse left Cambridge for Hawaii – Pearl Harbor, no less – in December, 1945. The war was over, but there was still a need for engineers to teach the ways of SONAR and RADAR to Navy sailors. Morse was stationed in Hawaii for six months and returned stateside in June, 1946. He would remain in the

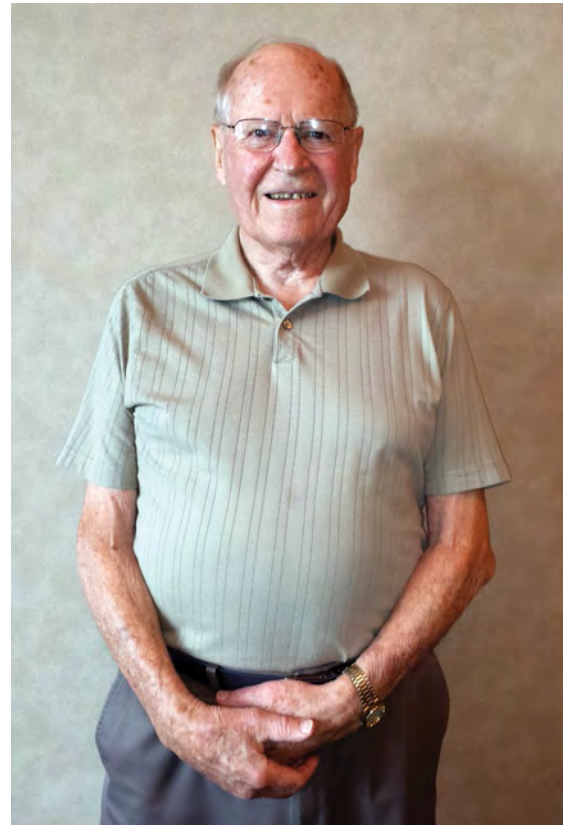
Navy reserve for a further 10 years, finally receiving his final discharge in 1957.

After returning home from Hawaii, Morse struggled

to find engineering work. The Sputnik-spurred explosion of the American science, technology and engineering was more than a decade away.

"There were very few jobs available, particularly in engineering," Morse said. "Nobody was hiring an engineer. All that would come later.

At Columbia, Morse had sold




 **Above**
Lyle Morse, August 22, 2014

advertisements for the Sideboy, a university publication similar to the Iowa State Bomb. In 1950, he considered being a salesman for a firm in Minneapolis. After all, as the saying went, If he could make it in New York, he could make it anywhere.

"They wanted me to be a salesman for their South Dakota market," Morse recalled. "I thought 'Salesman? Who wants to be a salesman? I'm an engineer!'"

Morse eventually caught on as a factory engineer in Sioux City and designed refrigeration units. Eventually, he returned to Des Moines and in 1962 started his own equipment company: Morse Equipment Company. He changed his tune on being a salesman, too.

"When I got to Des Moines I decided being a salesman wasn't so bad after all," Morse said. "My engineering background made sure I understood what the company was selling."

Morse Equipment Company continues operation to this day; one of many legacies for the kid from Rippey who went to Iowa State and became an engineer, a naval officer and a world traveler. 

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