

ELECTRICAL AND COMPUTER ENGINEERING

2007 Student Research Colloquium participation:
27 students, 10 presentations, 7 sponsors

Award-winning student research

- Josh Boesche, Justin Ficker and Joe Idziorek, Denise M. McGuire Student Research Award (DMMSRA) \$300, SRC Best Poster \$500, Student Research Fund Award (SRFA) \$1,500 (fall) \$1,500 (spring), IEEE Twin Cities Section Paper Contest Second Place, General Dynamics UGV Competition, First Place for "Vulcan: Unattended Ground Vehicle." Sponsor: Mark Petzold (See p. 32.)
- Andrew Nere, David Busacker and Tim Guertin, DMMSRA: \$350, SRFA \$500, IEEE Twin Cities Section Paper Contest First Place for "Wireless Restaurant System." Sponsor: Michael Glazos
- Matt Eiden, Cory Frank and Taimour Ahmed, DMMSRA Participation, SRFA \$400 (fall) \$400 (spring), IEEE Twin Cities Section Paper Contest Third Place for "Weather Monitoring System with Wireless Capability (WMS)." Sponsor: Petzold
- Brandon Smith, Adam Schulz and Matthew Plautz, SRC Best Poster Semi-finalist, SRFA \$750 for "Remote Perimeter Access via Wireless Fingerprint Identification." Sponsor: Ratchaneekorn Thamvichai
- Brandon Smith, SRC Best Poster Semi-finalist, SRFA \$750 for "Irradiation Patterning of CO/CU/CO GMR Layers for Use in Magnetic Random Access Memory." Sponsor: Timothy Vogt
- Justin Henspeter and Derek Olmscheid, SRFA \$1,000 for "Intensity Measurement Device for LED Warning System." Sponsor: Vogt
- Bipin Karmacharya, Komgrich Opasnawakun, Rajish Shakya, SRFA \$443 for "Internet Telephony." Sponsors: Xidong Deng, Ling Hou and Glazos.
- Bruce Svare, Pinkle Patel, Abdourahamane Balde, SRFA \$1,300 for "Anemometer (Wind Speed and Direction Detector)." Sponsor: Petzold

Honored alumnus leads EE team into the future

A1986 graduate who majored in electrical engineering and mathematics was named recipient of the 2007 College of Science and Engineering Alumni Leadership Award.

Nominated for the award by Professors Sura Lekhakul, department chair, and Yi Zheng, Joel Goergen is a daily presence in Electrical and Computer Engineering.

That's because, since 2006, both graduate and

undergraduate students have had the opportunity to work under the collaborative direction of Goergen and Zheng. Their project involves several aspects of one of information technology's major milestones: engineering the first 100GB per second Internet device.

Goergen is vice president of technology for Force 10 Networks, a California-based pioneer in building and securing reliable, high performance networks. Already a leader with its advances in high density gigabit and 10-gigabit ethernet switching, routing and security, Force10 delivers the technologies that allow customers to transform their networks into strategic assets.

And at St. Cloud State University, Force 10 Networks is investing approximately \$60,000 per year in the Electrical and Computer Engineering department. The grants provide assistantships for graduate students and funding for the senior design projects that are contributing to the development of the next generation signal integrity design tools, beginning with the world's fastest Internet device.

Through Goergen, Force 10 Networks is also contributing to the development of future electrical and computer engineers.

"The five students currently in the project are researching methods we have been developing for several years and writing programs to simplify the efforts within industry. I have additional funds for faculty support, which is for Yi Zheng," Goergen said.

And rarely have SCSU graduates-turned-professionals personally contributed so much.

"I spend time with everyone on my team," said Goergen, who meets regularly with Zheng and the team.

"We have built several parts of the tool already, as well as validated work over the first several years."

Goergen is also a member of the department's Industrial Advisory Council.

2007 master's theses

- Deepak Kumar, "Simulation of a Joint Multipath and Doppler Fading Channel." Adviser: Petzold
- Yuting Feng, "Coded Excitation for Detection of Tissue Vibration Using Multiple Focusing in Diagnostic Ultrasound." Adviser: Zheng

J. Michael Heneghan, Professor. Ph.D. 1972, University of Washington.

electromagnetic, computer interfacing

ECC 215

phone: 320.308.4845

heneghan@stcloudstate.edu

<http://web.stcloudstate.edu/jmheneghan>

Ling Hou, Associate Professor. Ph.D. 2000, University of Notre Dame.

control systems, discontinuous dynamical systems, hybrid dynamical systems, signal validation, stability analysis

ECC 205

phone: 320.308.4977

lh@stcloudstate.edu

<http://web.stcloudstate.edu/lhou>

Selected Presentations

Hou, Ling and A. Michel. Stability of Continuous, Discontinuous and Discrete-Time Dynamical Systems: Unifying Results (Global Results) in the proceedings of the 17th International Symposium on Mathematical Theory of Networks and Systems July 24 – 28, 2006, Kyoto, Japan.

Mark Petzold, Associate Professor. Ph.D. 2001, University of Colorado, Colorado Springs.

computer simulation of communications systems, error correcting codes, spread spectrum communications, wireless communications

ECC 204

phone: 320.308.4182

mcpetzold@stcloudstate.edu

<http://web.stcloudstate.edu/mcpetzold>

Ratchaneekorn Thamvichai, Associate Professor. Ph.D. 2002, University of Colorado, Boulder.

1D and 2D digital signal processing, digital filtering and adaptive filtering, image processing

ECC 208

phone: 320.308.5503

rthamvichai@stcloudstate.edu

<http://web.stcloudstate.edu/rthamvichai>

Selected Presentations

Zhang, Z. K. with T. Bose, X. Li and R. Thamvichai. Performance Analysis of the Deficient Length EDS Adaptive Algorithm. IEEE Asia Pacific Conference on Circuits and Systems, December 2006, Singapore.

Publications

T. Bose, with M. Chen and R. Thamvichai. Stability of the 2-D Givone-Roesser Model with Periodic Coefficients. IEEE Transactions on Circuits and Systems, 54 (3) 566 – 578.

Tim Vogt, Associate Professor. Ph.D. 1997, Colorado State University.

integrated circuits, magnetoresistive memory, solid state devices

ECC 210

phone: 320.308.2997

tjvogt@stcloudstate.edu

Grants

\$25,502 for Study of LED vs. Conventional Lighting on Snow Plows. From the Minnesota Department of Transportation, 2006 – 2008.

Aiping Yao, Associate Professor. Ph.D. 1997, Beijing Institute of Technology, China.

digital and analog communications, digital signal processing, signal processing, ultrasound digital processing, wireless communications

ECC 207

phone: 320.308.3255

ayao@stcloudstate.edu

Selected Presentations

Zheng, Yi with A. Yao, J. Chen, and J. Greenleaf. Measurement of Shear Wave Using Ultrasound and Kalman Filter with Large Background Motion for Cardiovascular Studies. Proceedings of the 2006 IEEE Ultrasonics Symposium. 718 – 721.

Yao, Aiping and Y. Zheng. Peak-to-Average Power Reduction of OFDM Signals Using Adaptive Digital Filter. Proceeding of 2006 IEEE International Conference on Acoustic, Speech, and Signal Processing, pp. IV – 305 to 308.

Grants

\$265,000 for Multi-Dimensional Heart Imaging with Ultrasound with James F. Greenleaf of Mayo Clinic as principal investigator. SCSU Site PI: Yi Zheng, Co-I: Aiping Yao. Part of a \$2.3 million National Institutes of Health grant with Mayo Clinic, 2006 to 2010.

Yi Zheng, Professor. Ph.D. 1987, Iowa State University of Science and Technology.

digital and analog communications, signal processing, biomedical ultrasound, micro controller applications, EM sensors and sensor networks, electromagnetic wave propagation, signal integrity of high speed signal propagation

Selected Presentations

Zheng, Yi with J. Chen and J. Greenleaf. Measurement of Shear Wave using Ultrasound and Kalman Filter with Large Background Motion for Cardiovascular Studies. IEEE International Ultrasound Symposium, Vancouver, Canada, 2006.

Yao, Aiping with J. Chen and Y. Zheng. Peak-to-Average Power Reduction of OFDM Signals Using Adaptive Digital Filter. IEEE International Conference on Acoustic, Speech, and Signal Processing, 2006, Toulouse, France.

Publications

Zheng, Yi with J. Chen, Tan, Kinter, J. Greenleaf. Detection of Tissue Harmonic Motion Induced by Ultrasonic Radiation Force using Pulse Echo Ultrasound and Kalman Filter. IEEE Transaction on UFFC, 54 (2) 290 – 300.

Zheng, Yi with A. Yao, J. Chen, and J. Greenleaf. Measurement of Shear Wave using Ultrasound and Kalman Filter with Large Background Motion for Cardiovascular Studies. Proceedings of the 2006 IEEE Ultrasonics Symposium. 718 – 721.

Yao, Aiping and Y. Zheng. Peak-to-Average Power Reduction of OFDM Signals Using Adaptive Digital Filter. Proceeding of 2006 IEEE International Conference on Acoustic, Speech, and Signal Processing, pp. IV – 305 to 308.

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\$25,000/year for Signal Integrity of Computer Network Devices. From Force10 Networks Inc. Beginning Sept. 2007.

ECC 206

phone: 320.308.3926

zheng@stcloudstate.edu

<http://web.stcloudstate.edu/zheng/>