The future is what we do.

Iowa State University
Department of Electrical and Computer Engineering
The Department of Electrical and Computer Engineering at Iowa State University is steadily on the rise. Our enrollment has reached an all-time high of 2,550 students, with an increase in women and underrepresented minorities. This year, our faculty have been awarded over $18 million in new, highly competitive and innovative research projects. We have two new National Science Foundation CAREER Award winners, bringing the total to 21. Some of this year’s research highlights include development of innovative ECE curriculum design and delivery techniques, design of faster and safer next generation network protocols, realization of smarter and secure energy infrastructures, design of efficient mechanism for on-chip wireless power, fabrication of nanoscale sensors to detect Alzheimer’s disease and an engineering approach to combine drugs for personalized cures.

This year we embarked on developing a new strategic plan for the department. Our plan, rooted in diversity and inclusion, was built from the bottom up, with input from a variety of voices within and outside our department, including students, faculty, staff, alumni and our External Advisory Council. The strategic plan shall carry us to a brighter future, including a new B.S. degree program (pending Board of Regents approval) in Cyber Security Engineering. We believe the cyber security problems of tomorrow require a workforce trained in an engineering approach to solving these problems. While this undergraduate major is new, we at Iowa State have been teaching and researching cyber security since 1995, making it one of the oldest programs in the country. Here at Iowa State ECE, our faculty, staff and students are the spark, the energy, the catalyst – the generators of ideas. Demand for ECE graduates is ever growing, and Iowa State ECE graduates are among the best!
2,577 Students Enrolled

$13.6M in Research Expenditures

90% faculty with research expenditures

5 patents received

92% faculty involved in scholarly publication work

169 Journal Publications

376 Conference Publications

2018 U.S. News Rankings:
EE: 23rd Public/39th Overall
CE: 23rd Public/43rd Overall
EE: Up 3 spots from 2017
CE: Up 11 spots from 2016

56 Total Faculty Members
49 Tenured/Tenure Track
7 Non-Tenure Track

21 NSF CAREER Awards
24 Endowed/Named Professorships
4 Professional Society Awards

23 U.S. News Public Schools EE/CE Ranking

30 Professional Society Fellowships
Students

3 Student Best Paper Awards

3 Research Excellence Awards

92 Senior Design teams

432 graduate students:

- 196 Ph.D.
- 236 M.S.

90+ Undergraduates engaged in research

Degrees Awarded 2017-18

339 Bachelor of Science

84 M.S. and M.Eng.

31 Ph.D.

ECE: The future is what we do.

Our 2,144 undergraduate students are studying...

- 557 Electrical Engineering
- 802 Computer Engineering
- 785 Software Engineering

Sarah Huber, EE alum and Tesla employee

Logan Kinneer, SE senior

Imran Maszeri, SE sophomore

Resy Verma, CE grad student

Parker Bibus, CE junior
IT-Olympics is a two-day event and is a competition for high school students in the areas of robotics, game design and cyber defense. One main goal of IT-Olympics is to spark an interest for students in continuing down the path of STEM fields.

Neelam Prabhu Gaunkar is a Ph.D. student. She is also a two-time IBM Fellowship winner and a recipient of the Graduate Teaching Excellence Award, the Zaffarano Award and the ASNT Fellowship Award.

Eta Kappa Nu (HKN) is a mentoring program dedicated to connecting freshmen to underclassmen in ECE. The upperclassmen help freshmen with networking, resumes and classes, building their background for the future.

The Institute of Electrical and Electronics Engineers (IEEE) in ECE is a student-run organization that is also part of the national professional organization. The members meet weekly to help students learn about computer and electrical engineering-related careers.

Cyber Defense Competitions are fast-paced, real-world competitions challenging students. Teams must build and secure a network providing required services in a limited amount of time. The networks are then attacked and the team is scored based on security of their network.

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Research

2018 CAREER Award Winners

Chinmay Hegde

- Working toward bridging the gap between practical aspects of analyzing social network graphs, transportation networks and artificial intelligence systems and the theoretical tools for understanding and analyzing these graphs
- Received a grant for furthering advances in graph learning and interference
- “The award is an important milestone in the career of any junior faculty in STEM, such as myself,” Hegde said. “The support provided by NSF will be very useful to me in terms of building and sustaining my research and educational program.”

Neil Gong

- Developing security analytics using graphs to better protect systems from malicious websites or networks
- Will test different capabilities to evade detection and develop methods to recognize attacks and create attacker-resistant link prediction algorithms with techniques to add noise to confuse attackers
- “I am proud to have won this award,” Gong said. “I thank the department and university for supplying our team with enough resources to support the beginnings of our research. We will be developing adversarially robust graph-based machine learning methods to enhance the security of computer and network systems.”

Average H-Index: 24

18 IEEE Fellows
- 1 ABET Fellow
- 1 Royal Academy of Engineering Fellow
- 1 Institute of Electrical Engineers Fellow
- 1 American Institute of Ultrasound in Medicine Fellow

1 American Institute of Ultrasound in Medicine Fellow
2 American Society for Engineering Education Fellows
3 American Physical Society Fellows
3 American Association for the Advancement of Science Fellows
$13.6M in Research Expenditures
with $18.5 million new funds received

Engineering Education Research

- CyNet
  Hongwei Zhang, Ahmed Kamal and Arun Somani received an NSF award to develop End-to-End Software-Defined Cyberinfrastructure (CyNet) for Smart Agriculture and Transportation.

- Structured High-dimensional Data Recovery
  Namrata Vaswani and Chinmay Hegde received an NSF award to develop provably correct and fast algorithms for data recovery from slow-changing dynamic scenes.

- Design of Miniature, Low-Cost, Field Deployable Sensor to Advance Phenotyping
  Liang Dong’s team received a USDA award to develop wearable sensors to advance plant sciences and agricultural research.

- Mitigating Evasion Attacks to Deep Neural Networks
  Neil Gong received an NSF award to develop region-based classification techniques for mitigating evasion attacks in deep neural networks.

- Data Generation for Interdependent Power Systems
  Zhaoyu Wang received an NSF award to study modernizing of energy systems by laying the data foundation for future research in interdependent critical energy infrastructure.

- Best Paper Award
  Neil Gong, Yong Guan and their students received the Best Paper Award from the IEEE Systematic Approaches to Digital Forensics Engineering (SADFE) for their paper entitled “A Dynamic Taint Analysis Tool for Android App Forensics.”

- Tribocharging
  Jaeyoun Kim and Rana Biswas published work on tribocharging in the Nature Communications.

- Effective Drug Combinations
  Santosh Pandey’s team published work on effective drug combinations for Caenorhabditis elegans nematodes in Science Advances.

- Practical Coded Caching
  Aditya Ramamoorthy received an NSF award to investigate practical issues in the deployment of coded caching in networks.

ISU ECE New Faculty Hires

- Mohamed Selim, lecturer, computing and networking systems
- Mai Zheng, assistant professor, computer systems

Research Centers

- Microelectronics Research Center
- Electric Power Research Center
- Information Assurance Center
Starting fall 2019 (pending Board of Regents, State of Iowa approval)

This degree program stems from our belief that cyber security can no longer be an afterthought or an added layer; it must be an integrated component throughout the four-year curriculum. The major is new, but Iowa State has been teaching and researching cyber security since 1995, making it one of the oldest programs in the country. Students will gain a strong foundation in computer engineering concepts while applying engineering methodology to solve complex cyber security problems.

"We are very excited about creating a cyber security engineering degree, blending the core of computer engineering with cyber security. We believe our graduates will be able to solve the complex cyber security problems of the future."
—Doug Jacobson, ECE University Professor

Faculty leadership of the Cyber Security Engineering program. (L-R): Neil Gong, Mai Zheng, Yong Guan, Thomas Daniels, Julie Rursch, Daji Qiao.

Learn more at www.ece.iastate.edu/cybersecurity