

## Cybersecurity and Cloud Computing Research

Cleveland State University (CSU) offers a proven track record of expertise in cybersecurity and data science in partnership with Center for Cybersecurity and Privacy Protection. CSU researchers partner and collaborate with government and private industry to develop and deliver innovative engineering solutions in network security, information security, hardware-oriented security, Blockchain, and data science field.

### RESEARCH CAPABILITIES

We create, design and develop innovative cybersecurity and data science systems:

- Network security and privacy-preserving systems
- Fault- and intrusion-tolerance techniques for the next generation secure and dependable computer systems
- Hardware-oriented security including side channel attacks and fault injection attacks along with Aerosol Jet 200 electronics printing
- Big data processing and Blockchain & cryptocurrency
- Cyber-physical security in smart grid
- Security in industrial IoT such as Rockwell PLC work stations
- Baxter (Rethink Robotics) and Beam Telepresence Robots
- Develop intellectual property available for licensing to private sector

### CURRENT PARTNERS AND SUPPORTERS

- Center for Cybersecurity and Privacy Protection
- CSU Faculty: Professors Pong Chu, Sunnie Chung, Sathish Kumar, Sanchita Mal-Sarkar, Nigamanth Sridhar, Haodong Wang, Chansu Yu, Hongkai Yu, Wenbing Zhao, and Ye Zhu
- CSU Research Laboratories: Secure and Dependable Systems Laboratory, Network Security and Privacy Research Laboratory, Big Data Analytics, AI and Cyber Security Laboratory, and Mobile Computing Research Laboratory
- Sponsors & Supporters - US National Science Foundation (NSF), US Department of Energy, Cleveland Foundation, Ohio Development Services Agency, and Greater Cleveland Regional Transit Authority (GCRTA)

### NEWS AND AWARDS

- US National Science Foundation supports several projects
  - "A Spiral Computer Engineering Lab Framework" (Chu)
  - "An Integrative Hand-on Approach to Security Education to Undergraduate Students" (Mal-Sarkar, Yu)
  - "CSforAll RPP: Learning from a District-Wide CSforAll Implementation" (Sridhar)
  - "Composing Pathways for Collaboration between CS Researchers and Practitioners" (Sridhar)
  - "Game-Based Cyber Security Education on Anonymous Communication" (Zhu)
  - "Securing Mobile Devices with Memorable, Usable, and Security" (Zhu)
- US Department of Energy supports "Secure Data Logging and Processing with Block-chain and Machine Learning" (Zhao)



- Cleveland Foundation supports the project
  - “Protect Privacy in a Distributed Learning Platform w/ a Natural Language Processing Example” (Chung)
  - “Integrating Wireless Sensors and Data Streams into Virtual Reality of Smart Buildings” (Wang)
  - “An Indoor Navigation and Localization System” (Yu)
- The Greater Cleveland Regional Transit Authority (GCRTA) supports the project “Implementing On-Board Sensor and Real Time Data Acquisition Capabilities in Transit Vehicles” (Sridhar)



## CURRICULUM AND COURSES

Students enrolled in the PhD, MCS and MSSE degree program (Masters of Computer Science and masters of Science in Software Engineering) are offered the following advanced courses (600-level or above) that are relevant to this group’s research. It is strongly recommended to take thesis option for MCS/MSSE students, which requires research under the guidance of a faculty member, culminating in the writing of a thesis.

CIS 600 Advanced Computer Architecture  
 CIS 611 Relational Database Systems  
 CIS 620 Advanced Operating Systems  
 CIS 634 Software Engineering  
 Metric/Economy/Management  
 CIS 636 Software Quality Assurance  
 CIS 666 Artificial Intelligence  
 CIS 693 Blockchain and Cryptocurrency  
 CIS 694 Anonymous Communication  
 EEC 684 Parallel Processing  
 EEC 693 Computer Vision

CIS 606 Analysis of Algorithms  
 CIS 612 Advanced Topics in Database Systems  
 CIS 632 Mobile Computing  
 CIS 635 Software Engineering  
  
 CIS 660 Data Mining  
 CIS 675 Information Security  
 CIS 694 Computer Network II  
 CIS 694 Android Sensor Programming  
 EEC 688 Secure & Dependable Computing  
 EEC 693 Hardware-Oriented Security and Trust

