



Department of Computer Science

Cyber Security of Embedded Networks in Heavy Vehicles

Dr. Indrakshi Ray
Colorado State University

Hosted by Shantanu Sharma

Date: Friday, April 29, 2022

Coffee: 11:15 AM – 11:30 AM

Time: 11:30 AM to 12:30 PM

Location: GITC 4402 (4th floor Seminar Lecture Hall)

WebEx Link: <https://njit.webex.com/njit/j.php?MTID=m6f7faea6a57be9ed2ba9d77697061b21>

<http://cs.njit.edu/seminars>

Abstract:

Trucks play a very important role in driving the nation's economy, moving more than 70% of all the freights transported in the US by weight. Any event that grounds all trucks even for a few days, have severe consequences, including food shortages, hospitals exhausting their oxygen supplies, and gas stations running out of fuel. While we have not yet faced such a situation, the way modern heavy vehicles are designed, this increasingly looks like a distinct possibility. Modern day trucks are equipped with numerous sensors, embedded controllers, communication networks, and electro-mechanical systems that work in tandem to improve their performance, efficiency, safety, connectivity, and user-experience. However, they also bring up serious cyber threats to the truck's operation. This talk discusses cyber security vulnerabilities our group has identified that span across all modern day heavy vehicles and allow a hacker to access the embedded controller network of a truck to cause different types of attacks. We present some approaches for detecting attacks in real-time and show how we can distinguish them from safety-critical events. We have developed reporting tools and techniques that can aid the heavy vehicle drivers in near real-time to make informed decisions in the event of a cyber attack. We also discuss how we can achieve cyber-resiliency and conclude by discussing some of our future research directions in heavy vehicle security.

Bio:

Dr. Indrakshi Ray is a Professor in the Computer Science Department at Colorado State University. She is the Director of Colorado Center for Cyber Security at Colorado State University. She is also the Site Director of NSF IUCRC Center for Cyber Security Analytics and Automation. Dr. Ray has been a visiting faculty at Air Force Research Laboratory, Naval Research Laboratory, and at INRIA, Rocquencourt, France. She obtained her Ph.D. in Information Technology from George Mason University. Dr. Ray's research interests include software assurance, data analytics and security. She has published almost two hundred technical papers in refereed journals and conference proceedings with the support from agencies including Air Force Research Laboratory, Air Force Office of Scientific Research, National Institute of Health, National Institute of Standards and Technology, National Science Foundation, the United States Department of Agriculture, and industries from the US, Norway, and Japan. Dr. Ray is on the editorial board of IEEE Transactions on Services Computing, International Journal of Information Security, Computer Standards and Interfaces, and Associate Editor of IEEE Security & Privacy. She was a member of the editorial board of IEEE Transactions on Dependable and Secure Computing. She serves on the program committees of various prestigious conferences and has chaired many of them. Dr. Ray is a senior member of the IEEE and a senior member of the ACM. Dr. Ray was awarded the Professor Laureate Award by the College of Natural Sciences at Colorado State University.