**SEMINAR
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**Security of Cyber Physical Systems under Faults, Failures and Attacks**

**Wednesday, May 2, 2018
Stocker #103**

***(light refreshments will be provided to Seminar attendees)***

**Abstract:**

With the immense growth of Cyber Physical Systems (CPS’s) development and utilization in critical infrastructures such as unmanned aerial vehicles, autonomous transportation systems, and smart power grids assurance of their security and resiliency is yet of a significant challenge for industries. Rising concerns of the cyber-attacks on critical infrastructures is above and beyond its socioeconomic burden. Although defense mechanisms of CPSs have been significantly improved incorporating smart detection and control platforms, yet a similar growth in the generations and models of cyber-attacks cannot be discarded. Combinatorial forms of cyber-attacks are among the generation that conventional attack detection control systems are not optimized to respond to. A cyber or physical attack might cause a degradation in performance of the CPSs and trigger malfunctioning of their normal operations. Significant failures could also be triggered, if coordinated cyber-physical attacks are launched to compromise multiple subsystems of the system. This makes the traditional solutions more susceptible to inefficient attack prevention, detection and control. Furthermore, existing control and communication protocol strategies are not fully capable to prevent and respond to these types of cyber-attacks. This requires vulnerability identifications along with smart collaborative integration of controllers, sensors, actuators and communication protocols in real-time. The seminar discusses recently introduced mathematical approach to Time Delay Switch (TDS) attack as a comprehensive outlook for the new generation of cyber-attacks. A broad overview of domain applications of CPS’s in smart grid, autonomous vehicles and unmanned aerial vehicles with potential effects of cyber-attacks will be discussed. CPS’s under TDS cyber-attack will be formulated and control-coupled communication solutions to prevent, detect, and compensate will be presented.

**Biography**

Arman Sargolzaei received his M.S. and Ph.D. degrees in Electrical and Computer Engineering from Florida International University (FIU), Miami, FL, in 2012 and 2015. Dr. Sargolzaei currently holds the position of assistant professor in the department of electrical and computer engineering at Florida Polytechnic University (FPU), Lakeland, FL where He oversees Control Systems Lab. At FPU, Dr. Sargolzaei was recognized with the honor of “2017 Faculty Research Excellence” and “2018 Faculty Research Excellence” award. Dr. Sargolzaei’s undergraduate students were recently recognized as “President’s Choice Winner” award and “2017 BIO Expo 2nd place” award for projects, entitled “RFID-Based Tracking” and “Energy Production through Photovoltaic Cell Infused Paned Window”. Prior to joining FPU, He was research assistant professor of Electrical Engineering at FIU. Among his industrial working experience at PLC International Inc., Dr. Sargolzaei led the product development for RSM2M Gateway, a cloud-based industrial control platform. The product was selected as the winner of “Most Innovative Product” award for two consecutive years, ITEXPO 2015 and 2016. Dr. Sargolzaei’s peer-reviewed research on the theory and applications of cyber physical systems, control systems, and embedded systems has been published in more than 60 articles [H index = 12]. He has chaired first 2016 “IEEE Workshop on Machine Learning in Security of Cyber-Physical Systems” in Anaheim, CA, and has serves as a reviewer for IEEE Transactions on Smart Grid, IEEE Transactions on Cybernetics, IEEE Transactions on Energy Conversion, IEEE Transaction on Industrial Applications and IEEE Access. Dr. Sargolzaei has one patent and two pending for his research efforts on security of networked control systems.