Announcing the Final Examination of Rachid Ait Maalem Lahcen for the degree of Doctor of Philosophy

Time & Location: July 2, 2020 at 3:00 PM in Virtual Defense
https://ucf.zoom.us/j/97395466549?pwd=S1JJMkpWSGg0S0UzVnRSc1RSN1h4dz09
Title: Interdisciplinary Cybersecurity for Resilient Cyberdefense

The goal of Cybersecurity is to protect confidentiality, integrity, and availability of enterprise assets. Confidentiality secures data from theft, integrity mitigates modification of data in a malicious way, and availability ensures continuation of systems' access and services. However, achieving those goals is difficult due the mushrooming of various cyber-attacks that come from individuals or state actors with motives ranging from ideological, financial, state-sponsored espionage, revenge, or simple curiosity and boredom. The difficulty also lies in the complexity of the cyber layers that have not been well-studied. These are the layers that interconnect and require effective communication and collaboration. To understand the complexity, one must seek an interdisciplinary approach to cybersecurity. It requires understanding of technology, mathematics, engineering, psychology, economics, human factors, and political science. This dissertation proposes an Interdisciplinary Cybersecurity framework for Resilient Cyber-defense (or ICRC) that includes (1) building behavioral aspects of cybersecurity with insider threat insights, (2) mastering encryption standards and requirements through the development of a novel encryption method, (3) understanding different cyber-defense strategies' costs and payoffs using game theory, (4) being able to assess vulnerabilities in the networks and planning ethical hacking in an audit, (5) studying machine learning in cybersecurity to improve tools and set new ontologies for insider threats, and (6) setting up overall requirement plans to increase trustworthiness. ICRC is more than the sum of the parts that are mentioned above but it is a new approach for cybersecurity professionals to consider expanding their expertise in the face of so many aspects which were taken for granted in the past. Finally, it appears from the numerous cyber breaches that cyber defenders are always one step behind cyber attackers. Reversing this order does not have to be a mission impossible if a new mindset is used when dealing with cybersecurity, and building cyber teams which are resilient.

Major: Modeling and Simulation

Educational Career:
Bachelor's of Chemical Engineering, BS, 1996, Batth College
Master's of Mechanical Engineering, MS, 2002, University of Central Florida
Master's of Modeling and Simulation, MS, 2018, University of Central Florida

Committee in Charge:
Ram Mohapatra, Chair, Mathematics
Zhisheng Shuai, Mathematics
Alain Kassab, Mechanical & Aerospace Engineering
Bruce Caulkins, Modeling & Simulation

Approved for distribution by Ram Mohapatra, Committee Chair, on June 25, 2020.

The public is welcome to attend.