VICEROY NORTHWEST INSTITUTE FOR CYBERSECURITY EDUCATION AND RESEARCH

CySER Virtual Seminar

Emilie Purvine
Pacific Northwest National Laboratory
Mathematics for Cyber Security
Mar. 18, 2024, 3:10 – 4PM Pacific
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Abstract:

The security of computer networks is crucial to maintain data privacy, intellectual property rights, and even to keep infrastructure functioning reliably. One might think that cyber security is the responsibility of computer scientists and network administrators. This is certainly true, but as adversaries change their tactics and become increasingly sophisticated, mathematicians are lending a hand. In this talk I will present some of the main challenges facing cyber security today and show how mathematicians, like myself, are applying their skills by using complex data models (e.g., graphs, hypergraphs, and topological models), anomaly detection, and machine learning to help provide situational awareness and keep computer networks resilient.

Bio:

Dr. Emilie Purvine is a Chief Data Scientist at Pacific Northwest National Laboratory. Her academic background is in pure mathematics, with a bachelor's degree from University of Wisconsin - Madison and a PhD from Rutgers University where she studied enumerative combinatorics and discrete dynamics. Her research since joining PNNL in 2011 has focused on applications of combinatorics and computational topology together with theoretical advances needed to support the applications. Emilie is a recognized expert in applied algebraic topology, which she has successfully applied in the cybersecurity, virology, power grid modeling, knowledge systems, and information integration domains. Emilie has been one of the driving forces behind PNNL's computational topology research and is widely recognized for her work in topology for graphs and hypergraphs and their application to science challenges in the national security space.

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