Spring 2016 Distinguished Speaker Series

QUANTITATIVE ANALYSIS OF STEPPING STONE ACCESS TO CYBER-PHYSICAL ASSETS

MONDAY JANUARY 25, 2016
11:00 AM – HEC 450

One thrust of UIUC's Science of Security center is development of quantitative models of security threats. Such models can be used to inform decision-makers, e.g., in allocating resources to improve security where the improvements have the greatest impact.

This talk describes one aspect of this effort, quantitative assessment of the threat of stepping-stone attacks against cyber assets that control physical systems such as the power grid. Our approach identifies potential stepping stone attack pathways, and considers the problem of assessing the breadth and difficulty of acquiring such pathways. We show that in the general case the problem of finding the easiest-to-exploit pathways is NP-Hard, but that under less general assumptions the assessment problem is tractable. We describe how to link such capability with impact assessment analysis used on power grid models, to provide power grid operators prioritized identification of attack pathways with greatest impact on the operation of the power grid.

DR. DAVID M. NICOL
University of Illinois at Urbana-Champaign

David M. Nicol is the Franklin W. Woeltge Professor of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign, and Director of the Information Trust Institute (iti.illinois.edu). He is PI for two recently awarded national centers for infrastructure resilience: the DHS-funded Critical Infrastructure Reliance Institute (ciri.illinois.edu), and the DoE funded Cyber Resilient Energy Delivery Consortium (cred-c.org); he is also PI for the Boeing Trusted Software Center, and the NSA-funded Science of Security lablet. Prior to joining UIUC in 2003 he served on the faculties of the computer science departments at Dartmouth College (1996-2003), and before that the College of William and Mary (1987-1996). He has won recognition for excellence in teaching at all three universities. His research interests include trust analysis of networks and software, analytic modeling, and parallelized discrete-event simulation, research which has lead to the founding of startup company Network Perception, and election as Fellow of the IEEE and Fellow of the ACM. He is the inaugural recipient of the ACM SIGSIM Outstanding Contributions award, and co-author of the widely used undergraduate textbook "Discrete-Event Systems Simulation".

He received the M.S. (1983) and Ph.D. (1985) degrees in computer science from the University of Virginia, and the B.A. degree in mathematics (1979) from Carleton College.

Hosted by: Dr. Gary T. Leavens

UCF