

## Department of Computer Science



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 **Date: 7 February 2023 (Tuesday)**

 **Time: 9:30am – 10:30am**

 **Registration: <https://bit.ly/cs-ereg>**

(\*Zoom details will only be provided to registrants)

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## Semantic-aware Code Analysis for Improving Software Security

### **ABSTRACT**

Malicious and vulnerable software has become one of the most important battlegrounds in computer security. To combat these critical security issues, more accurate code analysis techniques are needed to defeat malware and detect vulnerabilities. In this talk, I will present my unique approach that combines static/dynamic program analysis with other techniques, including deep learning, model checking and virtual machine introspection (VMI), to perform semantic-aware code analysis in mobile, PC software and blockchain domains, and further solve real-world security issues. First, I will present a novel technique named DeepBinDiff, an unsupervised deep neural network-based program-wide code representation learning technique for binary diffing. Second, Android packers, as a set of code transformation techniques, have rendered existing malware detection techniques obsolete. I will talk about DroidUnpack, which is a VMI-based Android packing analysis framework, to perform the first large-scale systematic study on Android packing techniques, and report some surprising findings. Third, I will present VetSC, an automated tool that can perform safety vetting for smart contracts in decentralized applications by recovering code semantics using NLP and model checking techniques.

### **BIOGRAPHY**

Yue Duan is currently a Gladwin Development Chair Assistant Professor in the Department of Computer Science at Illinois Institute of Technology. He had postdoctoral training at Cornell University and the University of Utah, working with Prof. Elaine Shi & Prof. Mu Zhang. Before that, he obtained Ph.D. in Computer Science from UC Riverside advised by Prof. Heng Yin. His research interests mainly lie in different aspects of Computer Security, including blockchain security, mobile security, software testing and AI security. His work has been extensively published in top conferences and journals such as ACM CCS, NDSS, RAID and IEEE TDSC. He received multiple awards, including NSF CRII award, ACM CCS 2022 best paper honorable mention and RAID 2019 best paper award.

### **ENQUIRY**

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