**Information Systems Technology and Design (ISTD)**

**PhD Oral Defense**

## Directed Stateful Fuzzing of Wireless Protocols

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**Supervisor: Prof. Sudipta Chattopadhyay**

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Venue: LT 5 (Building 2, Level 5, Room 2.505)

**Abstract:**  Technological innovations have greatly improved the quality of life for humanity. With the advent of Internet-of-Things (IoT) and increasing interest in Smart City Infrastructure (SCI) globally, these platforms have unfortunately attracted the attention of adversaries. As digital threats on these emerging technologies become prevalent, digital forensic investigators (DFI) and law enforcement agencies would require relevant tools, techniques and knowledge to respond to these threats and cybercrime. To empower investigators and law enforcement agencies globally, we put forward the thesis: *How can DFI correlate, coordinate and consistently execute digital forensic investigations, particularly in emerging fields such as IoT and SCI?*

This dissertation aims to broaden the knowledge of digital forensics, especially in emerging areas such as IoT and SCI. We gather the challenges faced by DFI in their investigation and identify types of digital evidence within IoT and SCI that could be used in digital investigations. We explore the correlation problem and attempt to mitigate the challenges DFI face in investigating attacks.

This body of work further explores and defines SCI, providing a standard reference for further discussion on digital forensic investigation. Based on the defined SCI, we methodically model threats, cybercrime and the corresponding digital evidence required for such investigations. Considering that SCI investigation may require global cooperation and inter-agency collaboration, we propose a SCI-focused ontology.

This dissertation also serves as a call to action for digital forensics research on emerging technologies and increased global cooperation to combat cybercrime. Specifically, we urge researchers and practitioners to pre-emptively address the challenges before DFI are overwhelmed, and potential damages in SCI occur. In summary, we hope our research serves as a foundation for future digital forensic research on emerging technologies.

**Speaker Bio:**

TOK Yee Ching is a PhD candidate in the Information Systems Technology and Design (ISTD) pillar at the Singapore University of Technology and Design (SUTD), under the supervision of Prof. Sudipta Chattopadhyay. He received his MSc in Information Security from Royal Holloway, University of London in 2017 and was awarded the SG Digital Scholarship (Postgraduate) [formerly National Cybersecurity Postgraduate Scholarship (NCPS)] to pursue his PhD. Yee Ching also serves as a Committee Member in the Association of Information Security Professionals (AiSP) and as a Handler in the SANS Internet Storm Center (ISC). His research interests include digital forensics, attack detection and security assessments of systems, application, Internet-of-Things (IoT), Cyber-Physical Systems (CPS) and Smart Cities.

