



TEXAS TECH UNIVERSITY

Department of Computer Science

Security of Cellular Networks

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BIOLOGY LH100 or Zoom

https://sites.google.com/view/tsalman/teaching/cs5120_sp23

Abstract: As the world moves to 5G cellular networks and next-generation is being envisioned, security and privacy are of paramount importance and new tools are needed to ensure them. In the talk, after discussing motivating trends in wireless communications, we present LTEInspector a model-based testing approach for cellular network protocols. LTEInspector combines a symbolic model checker and a cryptographic protocol verifier in the symbolic attacker model. Using it, we have uncovered 10 new attacks along with 9 prior attacks, categorized into three abstract classes (i.e., security, user privacy, and disruption of service), in three procedures of 4G LTE. Notable among the findings is the authentication relay attack that enables an adversary to spoof the location of a legitimate user to the core network without possessing appropriate credentials. To ensure that the exposed attacks pose real threats and are indeed realizable in practice, 8 of the 10 new attacks have been validated and their accompanying adversarial assumptions have been put through a real testbed. We then overview on-going research projects.

Bio: Elisa Bertino is Samuel Conte professor of Computer Science at Purdue University. She serves as Director of the Purdue Cyberspace Security Lab (Cyber2Slab). Prior to joining Purdue, she was a professor and department head at the Department of Computer Science and Communication of the University of Milan. She has been a visiting researcher at the IBM Research Laboratory in San Jose (now Almaden), at Rutgers University, at Telcordia Technologies. She has also held visiting professor positions at the Singapore National University and the Singapore Management University. Her recent research focuses on cybersecurity and privacy of cellular networks and IoT systems, and on edge analytics for cybersecurity. Elisa Bertino is a Fellow member of IEEE, ACM, and AAAS. She received the 2002 IEEE Computer Society Technical Achievement Award for “For outstanding contributions to database systems and database security and advanced data management systems”, the 2005 IEEE Computer Society Tsutomu Kanai Award for “Pioneering and innovative research contributions to secure distributed systems”, and the 2019-2020 ACM Athena Lecturer Award.

