Department of Electrical Engineering
香港城市大學
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**CityU Architecture Lab for Arithmetic and Security (CALAS) Seminar Series**

# Design for Security and Privacy in PUF and In-Memory Computing Architectures

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## Abstract:

With the rapid development of edge computing and the Internet of Things (IoT), a growing number of intelligent devices are being deployed at the network edge to perform local data processing and decision-making. However, these resource-constrained systems face increasing risks of security breaches, data leakage, and identity forgery. As a lightweight hardware security primitive, the Physical Unclonable Function (PUF) provides intrinsic and unclonable features that enable secure device authentication and key generation without requiring complex cryptographic modules. This work presents a series of PUF design architectures that enhance reliability, uniqueness, and resistance against modeling attacks, including implementations based on emerging memory technologies. In parallel, in-memory computing (IMC) has emerged as a promising paradigm for efficient data processing within memory arrays, but its tight coupling of storage and computation introduces new security and privacy concerns. To address these challenges, ongoing research focuses on privacy-preserving and encryption mechanisms for IMC systems, together with the synergistic integration of PUF and IMC architectures to build trustworthy and energy-efficient computing platforms for edge intelligence.

## Biography:

Jiang Li received his bachelor's degree in Information Engineering and the Ph.D. degree in Integrated Circuits from Nanjing University of Aeronautics and Astronautics (NUAA) in 2020 and 2025, respectively. His research focuses on hardware security, physical unclonable functions (PUFs), in-memory computing, and emerging memory technologies. He has published several papers in leading journals and conferences, including IEEE TCAD, TNANO, and DATE.

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