



## COLLEGE of ENGINEERING AND PHYSICAL SCIENCES

---

SCHOOL OF COMPUTER SCIENCE

# MSc Defence

**Friday August 12, 2022 at 10am via Zoom**

**Le Wang**

*Confidential Distributed Ledgers for Online Syndicated Lending*

**Chair:** Dr. Mark Wineberg

**Advisor:** Dr. Xiaodong Lin

**Non-Advisory:** Dr. Ritu Chaturvedi

**Non-Advisory:** Dr. Yuanfang Lin [School of Business]

### **Abstract:**

With the boom of Fintech in emerging markets, online syndicated lending enables Internet borrowers to apply for loans through an agent bank and receive the result within seconds. It is of great significance to build a trusted, fair, and regulation-complaint collaboration model while maintaining confidentiality to protect the sensitive financial information of individual syndicate lenders. Although multi-party computation (MPC) is promising, the current solutions do not fit the “collection-then-distribution” financial model of the online syndicated loan and will expose participants’ sensitive information. Besides, it also poses a great challenge to building a privacy-preserving auditing function. In this paper, we present a novel collaborative financial ledger for online syndicated lending, which may also be of independent interest. The proposed ledger-enabled MPC leverages homomorphic encryption/commitment to enable the efficient reuse of intermediary transactional states without breaking the privacy promise during the full life-cycle of a loan.

Our system further minimizes the privacy leakage in the settlement phase by carefully aggregating daily loan share and repayment information. Besides, our framework enables the regulator to efficiently verify the encrypted key transactional activities. We streamline the framework design to optimize performance for the real-world requirements and develop a prototype system on a permissionless blockchain platform. Our experiment shows satisfactory performance on a real workload with a large syndicate of 100 lenders.