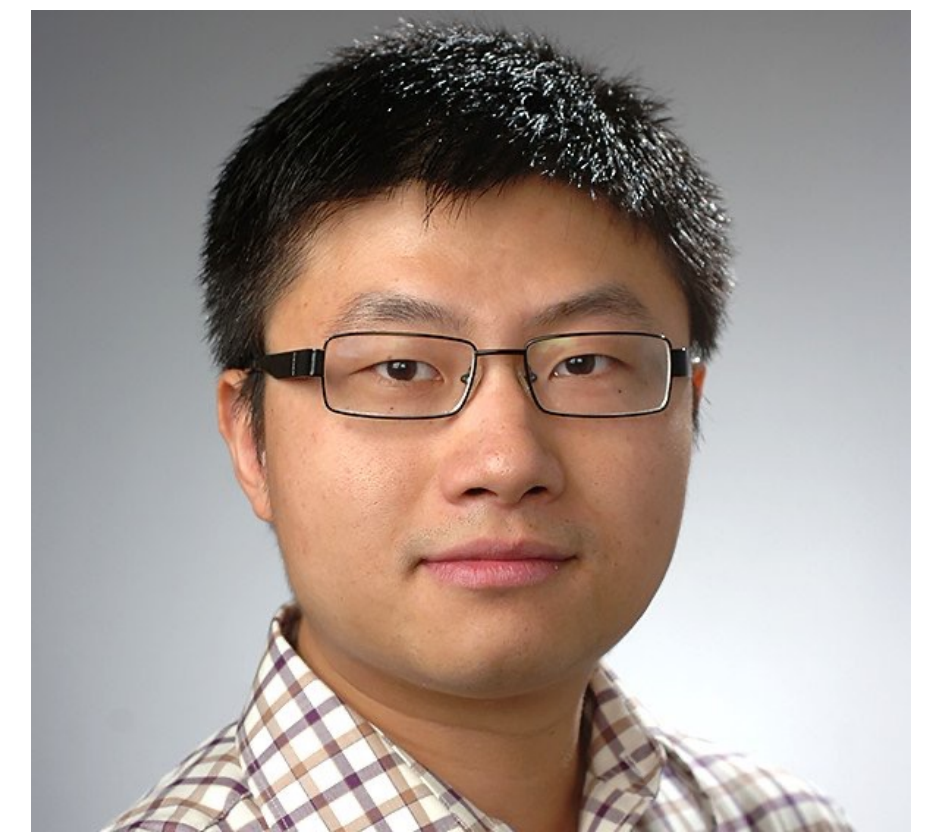# Collaborative: SaTC: EDU: Instructional Labs for Developing Blockchain Security Applications

Yuzhe Tang, Jing Lei, Farzana Rahman (Syracuse University)

Hongmei Chi (FAMU)

Introduction

- Blockchain is a multi-trillion USD economy

- Growing workforce demand

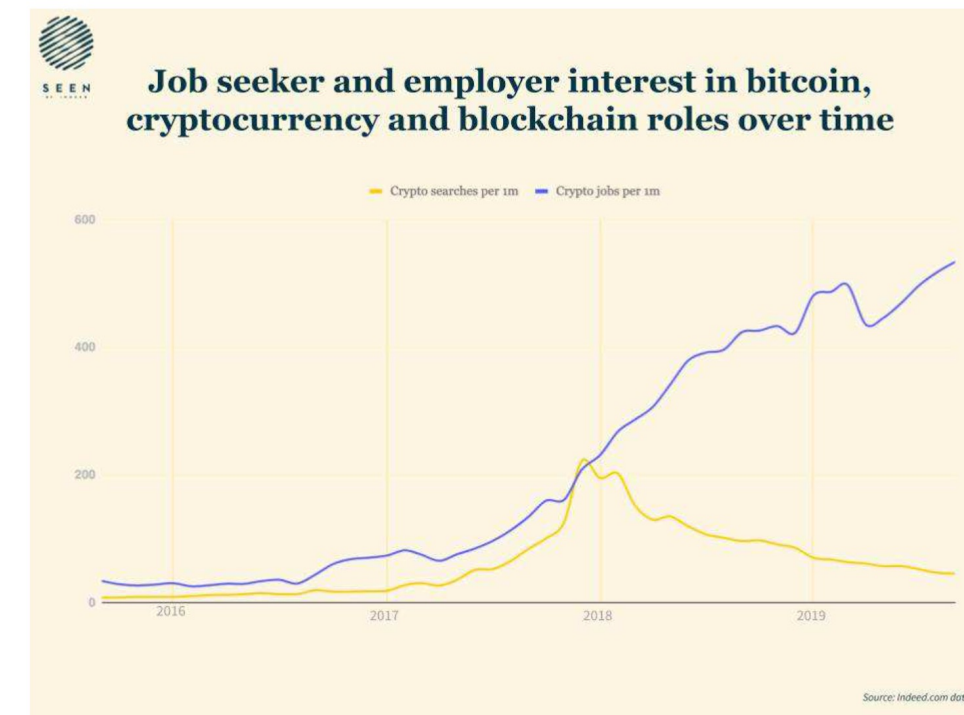- "14 jobs for each current blockchain developer."

Figure 1: The trend of blockchain-related jobs over time (from Forbes [12] and Indeed [41]): It can be seen the unfilled jobs start to increase significantly from 2018.

Challenge:

- How to identify blockchain-centric lab scenarios for cyber-security learning objectives

- Dissemination of labs to the HBCU community

Scientific Impact:

Develop cybersecurity workforce to build

- Decentralized applications in various domains

- Secure next-gen. blockchain and decentralized systems

Solutions

- 9 labs proposed to develop

- "Blockchain for security" at the DApp layer

- "Blockchain by security" on the consensus & network layers
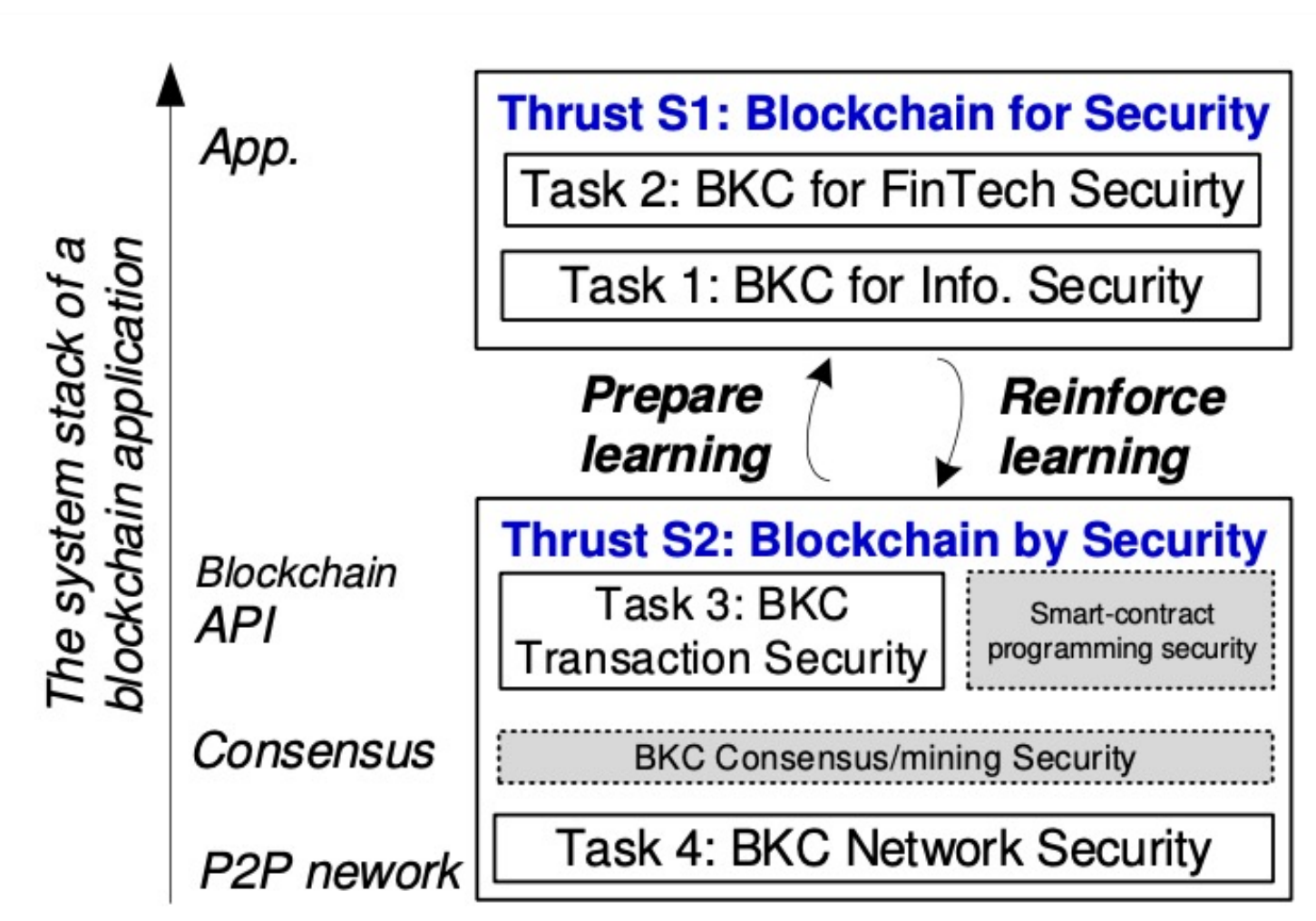
Example lab

- DEX is very popular on Ethereum

- Start from simplest exercise

  - Trusted protocol, running (not writing) code

- Gradually increase complexity

  - Order settlement w. atomicity

  - Order matchmaking: orderbook, AMM

- Online lab: shorturl.at/cgrLU
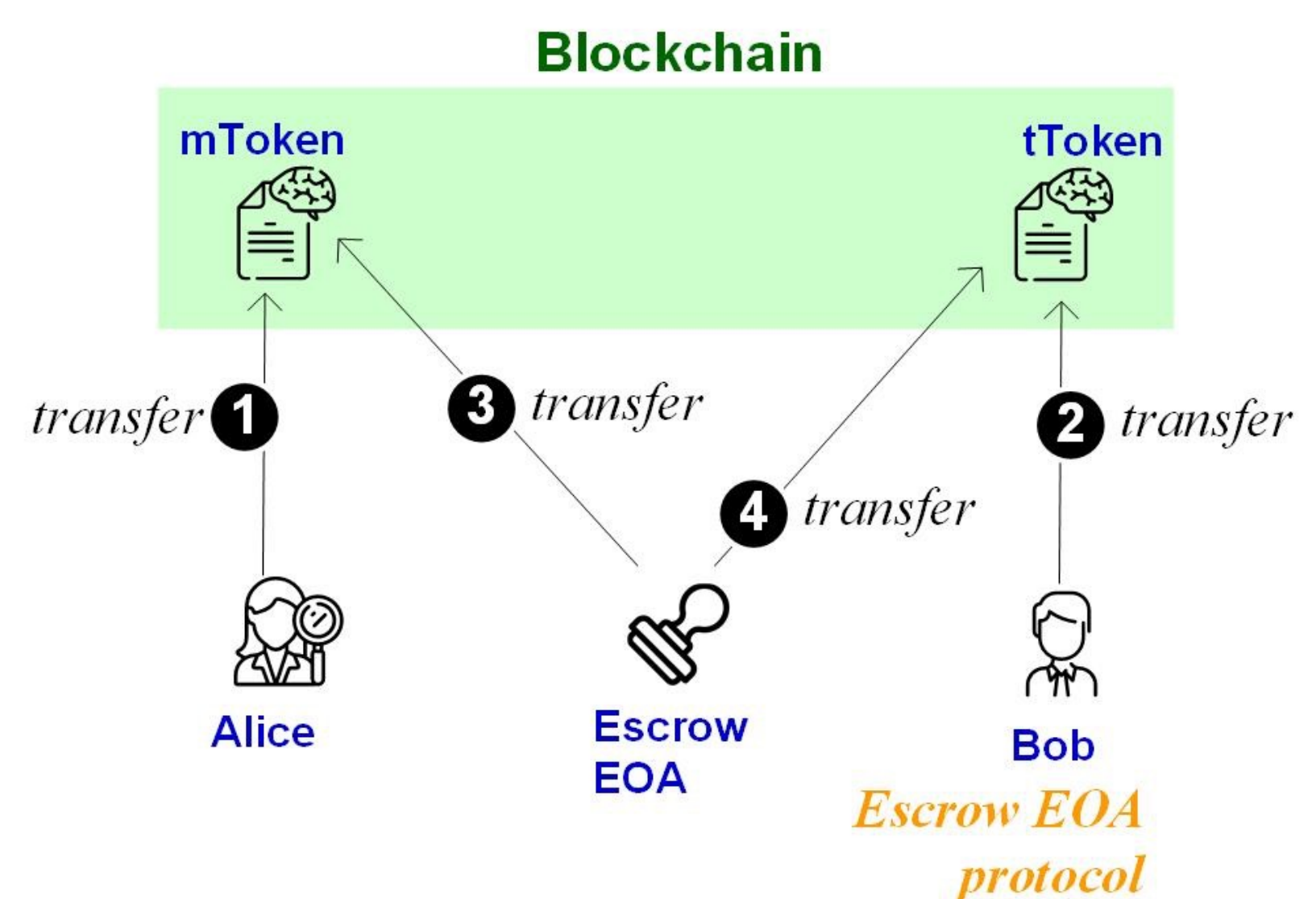
Broader impacts

- Lab use at SU

  - Taught a blockchain course CSE/FIN629

    - Crosslisted between CS and finance

  - Used the labs in CSE/FIN629 in Fall 2021

  - Student feedback

    - *Positive & adjusting lab difficulties.*

- Lab dissemination to the HBCU community

  - An organized workshop planned in 2023

  - Collaboration with FAMU faculty (Dr. Hongmei Chi)

Acknowledgement