Blockchain

Session Co-chairs:

Giulia Fanti, Carnegie Mellon University, and Shigeya Suzuki, Keio University

Session abstract:

More than ever, the 21st century is characterized by a lack of trust. Populations are increasingly losing faith in traditional power structures like governments and banks, and abuses of power are becoming increasingly subtle and difficult to detect. This is particularly true as power has become synonymous with control over digital assets like data.

Blockchains were originally designed as a tool for maintaining a shared financial ledger without needing to trust a single central party, such as a bank. However, in the decade since blockchains were proposed, the possible uses of blockchains have expanded from financial systems to more general applications like computation engines and supply chain management platforms.

Despite the promise of blockchains, they have not achieved the kind of widespread adoption that was initially projected. Although cryptocurrencies are widely-held, they are not used for everyday payments; in non-financial domains, blockchains are still viewed as a fringe technology. The purpose of this session is to explain what blockchains are, why they can be useful, and what is preventing them from being adopted more widely. In particular, we will discuss how technological limitations fit into the picture, and what innovations are most likely to impact real-world blockchain adoption.

Our first speaker, Dr. Sreeram Kannan, assistant professor at the University of Washington Seattle, will give an introduction to blockchains and an overview of the major technical challenges facing them today. The second speaker, Ms. Kristina Yasuda will provide how blockchain can be useful to implement decentralized identifiers, with potential use of the technology. The third speaker, Dr. Ewa Syta, assistant professor at Trinity College, will discuss the technical underpinnings of building secure data-sharing applications supported by blockchains. The fourth speaker, Dr. Akihiro Fujihara will also discuss scalability challenges from the perspective of the underlying network diversity, while observing applicability of blockchain on AI and IoT for smart city services.

Specific questions to be addressed are: What kinds of applications can blockchains be useful for? What are the current technical and human barriers to adoption? What is the role of digital identity and identifiers in developing blockchain-based applications, and also how can digital identity – especially on Self-Sovereign Identity – be implemented

on top of blockchain? What emerging technologies today are most promising in terms of enabling that adoption?

Session Speakers

1. Dr. Sreeram Kannan, Assistant Professor of Electrical Engineering at the University of Washington, Seattle

Sreeram Kannan is an assistant professor at the University of Washington, Seattle, where he runs the information theory lab focussing on information theory and its applications in communication networks, machine learning and blockchain systems. He was a postdoctoral scholar at the University of California, Berkeley and a visiting postdoc at Stanford University between 2012-2014 before which he received his Ph.D. in Electrical and Computer Engineering and M.S. in Mathematics from the University of Illinois Urbana Champaign. He is a recipient of the 2019 UW ECE Outstanding Teaching Award, 2018 Amazon Catalyst award, 2017 NSF Faculty Early CAREER award, the 2015 Washington Research Foundation Early Career Faculty award, and the Van Valkenburg outstanding graduate research award from UIUC.
https://infotheory.ece.uw.edu/bio.html

2. Ms. Kristina Yasuda, Identity Standards Architect, Microsoft Corp.

Kristina works as an Identity Standards Architect at Microsoft Corp. She represents Microsoft in standards development organizations such as OpenID Foundation (OIDF), Decentralized Identity Foundation (DIF), ISO, W3C, and IETF. Kristina is a main editor of Self-Issued OpenID Connect specification in OIDF AB/Connect Working Group. As a liaison officer between OIDF and DIF, her current focus lies in securing interoperability among multiple decentralized identity implementations and building a path towards adoption of decentralized identity by enabling the usage of Decentralized Identifiers and Verifiable Credentials in widely used protocols such as OpenID Connect. She also serves as a technical advisor for several Japanese customers who are using Microsoft's Decentralized Identity Service. Kristina is an appointed member of two committees convened by the Cabinet of Japan: TrustedWeb and Blockchain/Distributed Ledger Technology. She also serves as a board member at MyData Global, an award-winning international nonprofit whose mission is to empower individuals' rights to self-determination regarding their personal data. Kristina graduated summa cum laude from SciencesPo Paris in international law. She was selected for MIT Technology Review Japan Innovators under 35, Forbes 30 Under 30 in Politics (2019(and JCI's Ten Outstanding Youth Persons Award (2020) for her work of providing digital identity to disenfranchised populations as a means of self-reliance and financial inclusion at an international NGO InternetBar.org, which is her passion project.

3. Dr. Ewa Syta, Assistant Professor of Computer Science at Trinity College

Ewa Syta is an assistant professor of computer science at Trinity College. She obtained her Ph.D. from Yale University in Computer Science. Her research interests lie in computer security and distributed systems, with a focus on applied and theoretical aspects of building secure and trustworthy infrastructures. She is particularly interested in the security and privacy issues users face as a result of engaging in online activities. Consequently, she has worked on effective identity management methods, stronger anonymous communication technologies, scalable public randomness protocols, and ways to keep Internet authorities honest and accountable. Most recently, she has been working on scalable ledgers, building secure-data sharing solutions for blockchains, provably secure public key infrastructure and asynchronous coordination and consensus.
http://ewa.syta.us/index.html

4. Dr. Akihiro Fujihara, Professor, Chiba Institute of Technology, Department of Information and Communication Systems Engineering

Akihiro Fujihara received the Ph.D. degree in science from Yokohama City University in 2006. He was a Post-doc Researcher at Kwansei Gakuin University for seven years since 2007. In 2014, he joined Fukui University of Technology as an Associate Professor. In 2017, he joined Chiba Institute of Technology, where he is currently teaching graduate and undergraduate courses in the area of information and communication systems. He is a Full Professor with the Department of Information and Communication Systems, Chiba Institute of Technology. He has published a number of research articles on stochastic processes, human mobility, IoT, and blockchain. His research interests include blockchain architecture to resolve the blockchain scalability problem and the use of public blockchain in combination with AI and IoT for smart city services.