COLUMBIA | ENGINEERING
The Fu Foundation School of Engineering and Applied Science

CENTER FOR DIGITAL FINANCE AND TECHNOLOGIES

RIBBON-CUTTING

Friday, November 4, 2022
Columbia University in the City of New York

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The Fu Foundation School of Engineering and Applied Science

Center for Digital Finance and Technologies Ribbon-cutting

Friday, November 4, 2022 | 10:00AM - 3:00PM
Beacon Conference Room, Columbia University
Northwest Corner Building, 14th Floor, 550 W 120th St @ Broadway

Participants

Rajeev Bamra, MS
Head of DeFi & Digital Assets Strategy, Moody's

Rajeev oversees Moody's DeFi & DigitalAssets strategy, which focuses on translating blockchain, DeFi, and cryptoassets-related business needs and implementing a digital finance roadmap that brings together analytical, technology, product, process, and domain experts from across all business units and functions to identify high-value use cases to help upgrade existing workflows around content ingestion, processing, and distribution.

Lauren Berta
CBDC Product Manager, Ripple

I graduated from the University of Miami in 2019 and shortly after began my career in Product Development at CitiGroup. I moved to New York, and stayed with Citi for about two years working in their wholesale transaction banking division. I decided to join Ripple based on my excitement for CBDCs and for the company's reputation as a leading crypto solution. While at Ripple I have focused on the development of our CBDC Private Manager. In my free time, I enjoy reading and cooking.

J. Austin Campbell, MBA
Head of Portfolio Management; Chief Risk Officer, Paxos National Trust

Austin Campbell is the head of portfolio management at Paxos, managing the reserves behind all of the Paxos Stablecoins products (the 3rd largest Stablecoin platform in the world). Previously he has run fixed income derivative trading desks at JP Morgan and Citi and has been a portfolio manager at Stone Ridge, the parent of NYDIG. He holds a BS in Mathematics from CSU Chico and a MBA from NYU Stern. Austin lives in Park Slope with his wife Rajashree Campbell and their two children.

"Crypto and the Real World"
Over the past year, there has been increasing integration of crypto to the real world in payments, bridging assets on-chain, and spontaneous organization of community. What are these use cases, which of them will last, and what is coming next?

Agostino Capponi, PhD
Associate Professor of Industrial Engineering and Operations Research; Director of the Center for Digital Finance and Technologies, Columbia University

Agostino Capponi is an Associate Professor in the IEOR Department at Columbia University, and the founding director of the Center for Digital Finance and Technologies. His research interests are in financial technology, market microstructure, and economic networks. Agostino's research has been recognized with the 2018 NSF CAREER award, and with the JP Morgan AI Research Faculty award. Agostino is a fellow of the crypto and blockchain economics research forum, and an academic fellow of Alibaba's Luohan academy. He serves as an editor of Management Science in the Finance Department, co-editor of Mathematics and Financial Economics, and area editor of Operations Research Letters.

Bruce Choy, PhD
Managing Director Research, Global Risk Institute

Bruce Choy is the Managing Director (Research) for the Global Risk Institute and an adjunct professor at the Rotman School of Management, University of Toronto. Dr Choy has a track-record in university research, executive financial institution leadership and management consulting, with extensive global financial services experience in North America, Asia and Australasia. He was awarded a doctorate from the University of Sydney, Australia, for his research on the mathematics for risk management. He is a University and R.A. Priddle Medalist from the University of Sydney's Faculty of Engineering and a Sloan Fellow from the Stanford Graduate School of Business.

"Navigating the risks of financial innovation"
Financial innovation is important to increase efficiency to the movement of capital, allow broader access to financing, and increasingly to ensure consumers' protection so they have a better picture of their financial well-being. However, any disruption not only brings opportunity but also carries risk. It is important to look at these innovations from at least three different risk management perspectives: (a) the critical path and its challenges to operationalizing the financial innovation, (b) what happens if our assumptions are incorrect (i.e. unintended consequences), and (c) what recourse, actions or backstops, are needed to be put in place for when thing fail. Comprehensive risk management must go hand-in-hand with innovation.

Frank Fan, MBA, MSc
Partner at Arcane Group; Founder of Arcane Labs; Ex- Senior leadership role at Huobi & Microsoft

Frank Fan is the partner of Arcane Group, a boutique Singapore based Web3 venture arm managing more than 200M USD. He was also the strategic investment director of Huobi covering global business expansion and investment for the past 4 years. Frank has launched the first fiat-crypto exchange for Huobi, built a high profile research and investment team, and empowered native Dapps to attract mainstream adoption. Frank practiced his global vision and Asia insights by working in Microsoft and top MNCs for his first 10 years of career life. Frank is also an alumnus of Columbia University.

"Bridging East and West in Web3: Challenges and unique opportunities in the Asia-Pacific with Arcane"
This topic is to provide a comprehensive overview of the characteristics, historical development process, and current state of the Asian cryptocurrency industry. Introduce Arcane, our investment philosophy, and our understanding of our role as an Asia-based fund in empowering innovators in the region and supporting outstanding overseas projects and funds to launch in Asia and grow the Web3 movement.

Lawrence R. Glosten, PhD
S. Sloan Colt Professor of Banking and International Finance, Columbia Business School; Adjunct Professor, Columbia Law School

Lawrence R. Glosten is the S. Sloan Colt Professor of Banking and International Finance at Columbia Business School, and an adjunct professor at Columbia Law School. He is co-director of the Program in the Law and Economics of Capital Markets. He has been at Columbia since 1989, before which he taught at the Kellogg Graduate School of Management at Northwestern University. He has published articles on the microstructure of securities markets; asset pricing and capital market regulation. Larry was an editor of the *Review of Financial Studies* and associate editor of the *Journal of Finance*.

Vineet Goyal, PhD
Associate Professor of Industrial Engineering and Operations Research, Columbia University

Vineet Goyal is Associate Professor in the Industrial Engineering and Operations Research Department at Columbia University where he joined in 2010. He received his Bachelor's degree in Computer Science from Indian Institute of Technology, Delhi in 2003 and his Ph.D. in Algorithms, Combinatorics and Optimization (ACO) from Carnegie Mellon University in 2008. Before coming to Columbia, he spent two years as a Postdoctoral Associate at the Operations Research Center at MIT. He is interested in the design of efficient and robust data-driven algorithms for large scale dynamic optimization problems with applications in revenue management and healthcare. He received the 2021 INFORMS Revenue Management and Pricing Section prize and 2019 MSOM Society Best Paper in Operations Research Prize. His research has been supported by grants from NSF, DARPA and the industry including the NSF CAREER Award and faculty research awards from Google, IBM, Adobe and Amazon.

Ronghui Gu, PhD
Tang Family Assistant Professor of Computer Science, Columbia University; Co-founder, CertiK

Ronghui Gu is the inaugural Tang Family Assistant Professor of Computer Science at Columbia University. He is the primary designer of CertiKOS, the first verified concurrent OS kernel--a major milestone toward building secure systems software. Gu co-founded CertiK, a Web3 cybersecurity company valued at $2 billion. For his work in systems verification, Gu received: an OSDI Jay Lepreau Best Paper Award, three Amazon Research Awards, an SOSP Best Paper Award, a CACM Research Highlight, and a Yale Doctoral Dissertation Award. He obtained his Ph.D. degree from Yale University in 2016 and bachelor's degree from Tsinghua University in 2011.

“Securing the Web3 World”
The growing adoption of smart contracts and blockchains poses new security risks that can lead to significant monetary loss, while existing approaches either provide a very low security rate or require huge manual effort. In this talk, we will present how we build tools and products to scale the code auditing and blockchain monitoring at CertiK that are used by more than 3,500 clients to secure more than $300 billion worth of crypto assets.

Shai Halevi, PhD
Research Fellow, Algorand Foundation

Shai Halevi is a cryptographer and obtained his PhD from MIT in 1997 under the supervision of Prof. Silvio Micali. Shai's research spans advanced cryptographic constructions, with topics such as homomorphic encryption, code obfuscation, and secure computation. Shai is a fellow and the vice president of the International Association for Cryptologic Research, he authored well over a hundred research articles, and is the recipient of the 2017 ACM-SIGSAC Outstanding Innovation Award and several best-paper awards. Shai is also the creator of HElib, the world's first open-source software library for homomorphic encryption. At the Algorand Foundation, Shai is part of the cryptography research group and also holds responsibilities for the governance platform.

“Private Computing on Public Blockchains”
Public blockchains have emerged over the last decade as a promising architecture for distributed computing. Using "smart contracts" with public execution backed by agreement protocol, public blockchains provide a compute environment with highly dependable results. However, the public nature of this architecture also makes it challenging to use secret data in the computations. In this talk I will survey a line of recent works on storing and processing secret information on public blockchains. Our main tool is a flavor of secure multiparty computation (MPC) that we call YOSO - "You Only Speak Once".

Tyler Holmes, PhD
Security Researcher, Ethereum Foundation

Tyler Holmes began researching applied reverse engineering as a PhD student at Texas A&M University. He left the program to work as a vulnerability researcher at Raytheon before joining the Ethereum Foundation's security team. He spends most of his time manually auditing consensus layer clients and developing tools to automate and test ethereum critical infrastructure.

"Post Merge Ethereum"
We are now living in a post-merge world on Ethereum. "The Merge" was only one stop on the Ethereum roadmap. In this talk, we will discuss how we got here and most importantly where we are going.

Garud Iyengar, PhD
Tang Professor of Industrial Engineering and Operations Research and Senior Vice Dean for Research and Academic Programs, Columbia University

Garud Iyengar is the Tang Professor of Operations at Columbia Engineering. He received his B. Tech. in Electrical Engineering from IIT Kanpur, and an MS and PhD in Electrical Engineering from Stanford University. His research interests are broadly in control, machine learning and optimization. His published works span a diverse range of fields, including information theory, applied mathematics, operations research, economics and financing engineering. His current projects focus on the areas of large-scale power systems and supply chains, causal inference, and modeling of cellular processes. He was elected an INFORMS Fellow in 2018. He was the Chair of the Department of Industrial Engineering and Operations Research from 2013-19, and the Associate Director for Research at the Columbia Data Science Institute from 2017-19. He has been an Amazon Scholar since 2019. He is currently the Senior Vice Dean for Research and Academic Programs at Columbia Engineering.

Ruizhe Jia
Graduate Student, Columbia University

Ruizhe Jia is a Ph.D. student in the Industrial Engineering and Operations Research department at Columbia University. He received both B.S. and M.A. in Mathematics in 2018 from the University of California, Los Angeles (UCLA) under the Departmental Scholars Program. He is advised by Prof. Agostino Capponi. His research interests are: (1) Decentralized marketplaces, (2) Tokenomics, and (3) Platform design.

Omid Malekan
Adjunct Professor, Columbia Business School

Omid Malekan is the Explainer-in-Chief of blockchain technology. He's the author of *Re-Architecting Trust: The Curse of History and the Crypto Cure for Money, Markets, and Platforms* as well as *The Story of the Blockchain: A Beginner's Guide to the Technology That Nobody Understands*. He is an adjunct professor at Columbia Business School where he lectures on blockchain and crypto. An eight-year veteran of the crypto industry, his writing has appeared in the New York Times, Wall Street Journal, Financial Times, Harvard Business Review, Forbes, and his own blog on Medium.com. Malekan advises individuals and corporations on the intersection of the old and new. Learn more at www.omidmalekan.com

Antoine Martin, PhD
Financial Research Advisor, Federal Reserve Bank of New York

Antoine Martin is a financial research advisor in the Financial Stability Policy Research Division at the Federal Reserve Bank of New York. Antoine's recent research and policy work has focused on short-term money markets, monetary policy implementation, and payments, including digital currencies. He has published in a number of scholarly journals, among which Journal of Finance, Review of Financial Studies, Brookings Paper on Economic Activity, Journal of Monetary Economics, and Journal of Money, Credit, and Banking. Antoine holds a Ph.D. in Economics from the University of Minnesota.

"Distinguishing money and exchange mechanism"
The presentation will argue that when thinking about digital assets, particularly those that are intended to be used for payments, it is important to distinguish between the type of "money" such assets represent and the "exchange mechanism" on which it can be transferred. The type of "money" is related to what makes the asset a good store of value while the "exchange mechanism" is related to the asset's function as a medium of exchange.

Ciamac Moallemi, PhD
William von Mueffling Professor of Business, Columbia University Graduate School of Business

Ciamac C. Moallemi is William von Mueffling Professor of Business in the Decision, Risk, and Operations Division of the Graduate School of Business at Columbia University, where he has been since 2007. A high school dropout, he received S.B. degrees in Electrical Engineering & Computer Science and in Mathematics from the Massachusetts Institute of Technology (1996). He studied at the University of Cambridge, where he earned a Master of Advanced Study degree in Mathematics (Part III of the Mathematical Tripos), with distinction (1997). He received a Ph.D. in Electrical Engineering from Stanford University (2007). Prior to his doctoral studies, he developed quantitative methods in a number of entrepreneurial ventures: as a partner in a $200 million fixed-income arbitrage hedge fund and as the director of scientific computing at an early-stage drug discovery start-up. He holds editorial positions at the journals *Operations Research* and *Management Science*. Aside from his academic work, he regularly consults for fintech companies. His research interests are in the development of mathematical and computational tools for optimal decision making under uncertainty, with a focus on applications areas including market microstructure, quantitative and algorithmic trading, and blockchain technology.

“The Economics of Liquidity Provision”
In recent years, automated market makers (AMMs) such as Uniswap have emerged as the dominant mechanism for the decentralized trading of risky assets on blockchains. On the Ethereum blockchain, for example, such decentralized exchanges are the single most popular "application category" implemented through smart contracts. I will discuss the economics of passive liquidity provision on AMMs, and contrast them to electronic limit order books (LOBs), which are the dominant market structure for traditional, centralized exchange-based electronic markets.

Brett Mollin
Technical Partner Director, Central Banks, Ripple

Brett has been implementing enterprise software solutions in highly secure and critical environments for 20 years, starting with the nuclear power industry and currently focused on Central Bank Digital Currency (CBDC). Since 2015, Brett has been assisting with implementation of Ripple blockchain technology solutions at commercial banks around the world, and is currently the technical lead for Ripple's central bank pilots.

“CBDC Sidechain Topologies”
When looking at a national digital currency, central banks have needs beyond the current performance of public blockchain solutions. Most scaling methods for these solutions involve sharding or sidechain technology. Key to scaling efficiently is designing a system that most often communicates within the shard/chain and infrequently cross chain. We will look at the problem and the pros and cons of the various choices when designing a CBDC network composed of multiple sidechains.

Danielle Nelson
Program Manager of the University Blockchain Research Initiative, Ripple

Danielle Nelson is a Program Manager at Ripple for their University Blockchain Research Initiative (UBRI), a partnerships program that funds financial technology curriculum development, research, technical projects, entrepreneurship and student activities at 47 universities globally. Coming from a career in fintech, before joining Ripple, Danielle was a Program Manager for Diversity, Equity and Inclusion at NFT marketplace, OpenSea.

Tim Roughgarden, PhD
Professor of Computer Science, Columbia University

Tim Roughgarden is a Professor in the Computer Science Department at Columbia University. Prior to joining Columbia, he spent 15 years on the computer science faculty at Stanford, following a PhD at Cornell and a postdoc at UC Berkeley. He works on the boundary of computer science and economics, and on the design, analysis, applications, and limitations of algorithms.

"Web3 and the Evolution of the Internet"
I will discuss the evolution of the Internet, and provide a perspective on Web3, including decentralization, blockchain technologies, and token-based economics.

Asani Sarkar, PhD
Financial Research Advisor, Research and Statistics Group, Federal Reserve Bank of New York

Asani Sarkar is a Financial Research Advisor in the Research and Statistics Group of the Federal Reserve Bank of New York. He is working on issues related to bitcoin, and credit intermediation by banks and fintechs. His paper "Stigma in Financial Markets: Evidence from Liquidity Auctions and Discount Window Borrowing During the Crisis" received the Western Finance Association Pearson Award for the best paper on Financial Institutions and Markets in 2011. Dr. Sarkar has also held positions at Princeton University, Columbia University and the University of Illinois at Urbana-Champaign. He received his Ph.D. in Economics from the University of Pennsylvania.

"Stopped Capital: Using Bitcoin to Avoid Capital Controls"
We provide evidence consistent with residents buying bitcoin in China and selling them for US dollars on non-Chinese bitcoin exchanges, thereby using bitcoin to evade capital controls. Specifically, during our sample period of 2014-2016, on Chinese bitcoin exchanges, the Bitcoin price premium and the buy imbalance increases with our measure of capital control. Conversely, on foreign exchanges, the Bitcoin price discount and the sell imbalance increases with our measure of capital control. Our paper highlights the prominent role of Bitcoin in evading capital controls during our sample, when Chinese capital controls were strict, and when most bitcoin trading also occurred in China.

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Jay Sethuraman, PhD
Professor of Industrial Engineering and Operations Research, Columbia University

Jay Sethuraman is a Professor of Industrial Engineering and Operations Research at Columbia University. He is currently the chair of the IEOR department. His research interests are in market design, discrete optimization and its applications, scheduling theory, and applied probability.

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Eric Vieira, PhD
Director of Strategic Collaborations and Administrative Lead of Columbia COVID Tech Innovation Group, Columbia University School of Engineering and Applied Science

Eric is currently the Director of Strategic Collaborations for the Columbia University School of Engineering and Applied Science. He is primarily responsible for developing and stewarding strategic research collaborations with industry, foundations, government, and other external partners. In that capacity, Eric supports the school's Leadership Team, Board of Visitors, faculty, and staff by directing all partnership activities for the school and providing advice to the University on strategic internal and external collaborations. He has over 20 years of experience in research administration and technology & business development working in various professional environments, from small tech startups to large university systems. Before joining Columbia, Eric served as the Director of Special Research Programs in the Office of the Vice Chancellor for Research at the City University of New York (CUNY). Eric represented CUNY as the liaison on city and state economic development projects between the NYC Economic Development Corporation and NYS Empire State Development Corporation, respectively. Eric also served for four years in the Office of Technology and Business Development at Mount Sinai School of Medicine after a few years as a sell-side analyst in the financial industry covering the biopharma industry.

Eric earned his B.A. in molecular biology and biochemistry, with a minor in art history, from Rutgers College at Rutgers University. He is a member of the Rutgers Cap & Skull Senior Honor Society (Skull of '95). He went on to earn a Ph.D. in developmental genetics from NYU School of Medicine's Vilcek Institute of Graduate Biomedical Sciences.

Lauren Weymouth
Head of University Blockchain Research Initiative, Ripple

Lauren Weymouth is a Director at Ripple, where she leads its University Blockchain Research Initiative (UBRI), a partnerships program that funds financial technology curriculum development, research, technical projects, entrepreneurship and student activities. Since the program's inception, she has activated more than 47 global university partnerships such that 1028+ research projects have been engaged to tackle real-world issues in blockchain, cryptocurrency, cryptography and digital assets. Before joining Ripple, Lauren held leadership roles in education, private equity and at technology startups, pioneering ventures that grew record-setting profits.

“Accelerating Blockchain to Fuel the Future of Work”
Brief overview of Ripple with deep dive into how we foster research, talent and innovation through UBRI to build a scalable, global blockchain ecosystem and the FinTech workforce of the future.

Shihao Yu, PhD
Postdoctoral Research Scientist, Columbia University

I am a Postdoctoral Research Scientist at the IEOR Department of Columbia University since October 2022. I have a PhD in Finance from Vrije Universiteit Amsterdam. I study the impact of technology on the trading and clearing of financial securities, with a recent research focus on the economic implications of decentralized finance (DeFi) applications such as decentralized exchanges (DEXs).

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Agenda

BREAKFAST
9:30AM

OPENING REMARKS
10:00 AM - *Agostino Capponi & Garud Iyengar, Columbia Engineering*

SESSION 1 - Ethereum and DeFi
10:15 AM - Introduction
Agostino Capponi, Columbia Engineering

10:15 AM - Speaker 1A
Tyler Holmes, Ethereum Foundation
"Post Merge Ethereum"

10:30 AM - Speaker 1B
Ciamac Moallemi, Columbia Business School
"The Economics of Liquidity Provision"

10:45 AM - BREAK

SESSION 2 - Web3
11:00 AM - Introduction
Agostino Capponi, Columbia Engineering

11:00 AM - Speaker 2A
Frank Fan, Arcane Group
"Bridging East and West in Web3"

11:15 AM - Speaker 2B
J. Austin Campbell, Paxos National Trust
"Current Developments in Crypto"

11:30 AM - Speaker 2C
Tim Roughgarden, Columbia University
"Web3 and the Evolution of the Internet"

11:45 AM - GROUP PHOTO + LUNCH

SESSION 3 - Blockchain Security
1:00 PM - Introduction
Agostino Capponi, Columbia Engineering

1:00 PM - Speaker 3A
Ronghui Gu, Columbia Engineering
"Securing the Web3 World"

1:15 PM - Speaker 3B
Shai Halevi, Algorand Foundation
"Private Computing on Public Blockchains"

SESSION 4 - Digital Assets and Regulatory Frameworks
1:30 PM - Introduction
Agostino Capponi, Columbia Engineering

1:30 PM - Speaker 4A
Antoine Martin, Federal Reserve Bank of New York - "Distinguishing money and exchange mechanism"

1:45 PM - Speaker 4B
Asani Sarkar, Federal Reserve Bank of New York - "Stopped Capital: Using Bitcoin to Avoid Capital Controls"

2:00 PM - BREAK

(continued on next page)

Agenda *(continued)*

SESSION 5 - Blockchain, Efficiency & Digital Financial Innovations
2:15 PM - Introduction
Agostino Capponi, Columbia Engineering

2:15 PM - Speaker 5A
Bruce Choy, Global Risk Institute
“Navigating the risks of financial innovation”

2:30 PM - Speaker 5B
Lauren Weymouth, Ripple - “Accelerating Blockchain to Fuel the Future of Work”

2:45 PM - Speaker 5C
Brett Mollin, Ripple
“CBDC Sidechain Topologies”

CLOSING REMARKS
3:00 PM
Agostino Capponi, Columbia Engineering

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