2024 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)

27–31 May 2024 // Dublin, Ireland

# Final Program

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# PROGRAMME AT A GLANCE

**Venue**: Arts Building, Trinity College Dublin
**Time Zone**: Dublin, Ireland

| IEEE ICBC 2024 Programme at a Glance (27 – 31 May 2024) | | | | | |
|---|---|---|---|---|---|
| **Day** | **Start Time** | **End Time** | **Duration** | **Session** | **Location** |
| Sunday 26 May | 16:00 | 18:00 | 2:00 | PRE-CONFERENCE OC MEETING | Room 3071 @ Arts Building |
| Monday 27 May | 08:30 | 16:30 | 8:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 08:45 | 10:45 | 2:00 | TUTORIAL 1 & 2 | Room 3074 & 3071 |
| | 10:45 | 11:00 | 0:15 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 11:00 | 13:00 | 2:00 | TUTORIAL 3 & 4 | Room 3074 & 3071 |
| | 13:00 | 14:00 | 1:00 | LUNCH | Lower Concourse, outside Edmund Burke Theatre |
| | 14:00 | 16:00 | 2:00 | SHORT PAPER 1 & 2 | Room 3074 & 3071 |
| | 16:00 | 16:20 | 0:20 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 16:20 | 18:20 | 2:00 | SHORT PAPER 3 & 4 | Room 3074 & 3071 |
| | 18:45 | 21:00 | 2:15 | WELCOME RECEPTION (JOINT EVENT WITH BLOCKCHAIN IRELAND WEEK) | Trinity City Hotel, Pearse Street, Dublin 2 |
| Tuesday 28 May | 08:30 | 16:30 | 8:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 08:45 | 10:00 | 1:15 | FULL PAPER 1 | Edmund Burke Theatre |
| | 10:00 | 10:30 | 0:30 | POSTER 1 & COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:30 | 10:45 | 0:15 | CONFERENCE OPENING | Edmund Burke Theatre |
| | 10:45 | 11:45 | 1:00 | FIRESIDE CHAT WITH RIPPLE | Edmund Burke Theatre |
| | 11:45 | 13:00 | 1:15 | FULL PAPER 2 | Edmund Burke Theatre |
| | 13:00 | 14:00 | 1:00 | DEMO 1 & LUNCH | Lower Concourse, outside Edmund Burke Theatre |
| | 14:00 | 15:15 | 1:15 | FULL PAPER 3 | Edmund Burke Theatre |
| | 15:15 | 16:15 | 1:00 | KEYNOTE 1 | Edmund Burke Theatre |
| | 16:15 | 16:45 | 0:30 | POSTER 2 & COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 16:45 | 18:00 | 1:15 | FULL PAPER 4 | Edmund Burke Theatre |
| | 18:25 | 19:30 | 1:05 | VISIT TO THE OLD LIBRARY & BOOK OF KELLS EXPERIENCE | Trinity College Campus |
| Wednesday 29 May | 08:30 | 16:30 | 8:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 08:45 | 10:15 | 1:30 | SOK PAPER | Edmund Burke Theatre |
| | 10:15 | 10:45 | 0:30 | POSTER 3 & COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:45 | 11:45 | 1:00 | KEYNOTE 2 | Edmund Burke Theatre |
| | 11:45 | 13:00 | 1:15 | FULL PAPER 5 | Edmund Burke Theatre |

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|---|---|---|---|---|---|
| | 13:00 | 14:00 | 1:00 | DEMO 2 & LUNCH | Lower Concourse, outside Edmund Burke Theatre |
| | 14:00 | 15:15 | 1:15 | FULL PAPER 6 | Edmund Burke Theatre |
| | 15:15 | 15:45 | 0:30 | POSTER 4 & COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 15:45 | 17:00 | 1:15 | FULL PAPER 7 | Edmund Burke Theatre |
| | 19:00 | 19:30 | 0:30 | BOARD COACHES TO GUINNESS STOREHOUSE | Nassau Street, outside Arts Building |
| | 19:30 | 20:15 | 0:45 | SELF-GUIDED TOUR @ GUINNESS STOREHOUSE | Guinness Storehouse, St. James's Gate, Dublin 8 |
| | 20:15 | 22:15 | 2:00 | BANQUET | The Arrol Suite @ Guinness Storehouse, St. James's Gate, Dublin 8 |
| | 22:15 | 22:30 | 0:15 | BOARD COACHES RETURNING TO TRINITY COLLEGE CAMPUS | Guinness Storehouse, St. James's Gate, Dublin 8 |
| Thursday<br><br>30 May | 08:30 | 16:30 | 8:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 09:00 | 10:15 | 1:15 | FULL PAPER 8 | Edmund Burke Theatre |
| | 10:15 | 10:45 | 0:30 | POSTER 5 & COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:45 | 11:45 | 1:00 | KEYNOTE 3 | Edmund Burke Theatre |
| | 11:45 | 13:00 | 1:15 | FULL PAPER 9 | Edmund Burke Theatre |
| | 13:00 | 14:00 | 1:00 | LUNCH | Lower Concourse, outside Edmund Burke Theatre |
| | 14:00 | 15:15 | 1:15 | FULL PAPER 10 | Edmund Burke Theatre |
| | 15:15 | 15:45 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 15:45 | 17:00 | 1:15 | FULL PAPER 11 | Edmund Burke Theatre |
| | 17:00 | 17:15 | 2:00 | SHORT PAPER 5 | Edmund Burke Theatre |
| | 17:15 | 17:40 | 0:25 | BEST PAPER AWARD & CLOSING REMARKS | Edmund Burke Theatre |
| Friday<br>31 May<br><br>**CRYPTOEX**<br>Workshop | 08:00 | 09:00 | 1:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 09:00 | 10:00 | 1:00 | WELCOME ADDRESS & KEYNOTE | Room 3074 |
| | 10:00 | 10:30 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:30 | 12:00 | 1:30 | TECHNICAL SESSION 1 | Room 3074 |
| | 12:00 | 13:00 | 1:00 | LUNCH BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 13:00 | 14:30 | 1:30 | TECHNICAL SESSION 2 | Room 3074 |
| | 14:30 | 15:45 | 1:15 | SHORT PAPER SESSION | Room 3074 |
| | 15:45 | 16:15 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 16:15 | 17:45 | 1:30 | TECHNICAL SESSION 3 | Room 3074 |
| | 17:45 | 18:00 | 0:15 | CLOSING REMARKS | Room 3074 |
| Friday<br>31 May<br><br>**DAG-DLT**<br>Workshop | 08:00 | 09:00 | 1:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 09:00 | 10:15 | 1:15 | WELCOME ADDRESS & KEYNOTE | Room 3126 |
| | 10:15 | 10:30 | 0:15 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:30 | 11:30 | 1:00 | TECHNICAL SESSION 1 | Room 3126 |

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| | 11:30 | 11:45 | 0:15 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 11:45 | 12:45 | 1:00 | TECHNICAL SESSION 2 | Room 3126 |
| | 12:45 | 13:00 | 0:15 | CLOSING REMARKS | Room 3126 |
| | 13:00 | 14:00 | 1:00 | LUNCH | Lower Concourse, outside Edmund Burke Theatre |
| Friday 31 May<br><br>**DEPIN** Workshop | 08:00 | 09:00 | 1:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 09:00 | 10:00 | 1:00 | WELCOME ADDRESS & KEYNOTE | Room 3071 |
| | 10:00 | 10:30 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:30 | 12:00 | 1:30 | TECHNICAL SESSION 1 | Room 3071 |
| | 12:00 | 13:00 | 1:00 | LUNCH | Lower Concourse, outside Edmund Burke Theatre |
| | 13:00 | 15:00 | 2:00 | TECHNICAL SESSION 2 | Room 3071 |
| | 15:00 | 15:30 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 15:30 | 16:30 | 1:00 | **DEPIN** PANEL | Room 3071 |
| | 16:30 | 16:40 | 0:10 | CLOSING REMARKS | Room 3071 |
| Friday 31 May<br><br>**ZKDAPPS & CROSSCHAIN** Workshop | 08:00 | 09:00 | 1:00 | REGISTRATION | Registration Desk, Street Level (Level 2) @ Arts Building |
| | 09:00 | 10:00 | 1:00 | **ZKDAPPS** WORKSHOP | Room 3051 |
| | 10:00 | 10:30 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 10:30 | 11:30 | 1:00 | **CROSSCHAIN** WORKSHOP | Room 3051 |
| | 11:30 | 12:00 | 0:30 | COFFEE BREAK | Lower Concourse, outside Edmund Burke Theatre |
| | 12:00 | 13:00 | 1:30 | LUNCH | Lower Concourse, outside Edmund Burke Theatre |

## Message from the ICBC 2024 General and Technical Program Chairs

The General Chairs and Technical Program Chairs (TPC) are delighted to welcome you to the International Conference on Blockchain and Cryptocurrency (ICBC 2024) being held as an in-person event between May 27 and May 31, 2024, at the Trinity College Dublin, Ireland.

The ICBC 2024 is the 6th edition of the IEEE Communications Society (ComSoc) sponsored conference on Blockchains and Cryptocurrency. It is the society's primary forum for reporting the latest research results and innovations, regulations, standards, industry practice innovations, and policies in the exciting, emerging, and challenging area of blockchains and cryptocurrencies. The TPC Chairs have compiled an outstanding technical program featuring world-class papers by internationally renowned researchers. Along with a cutting-edge single-track conference, IEEE ICBC provides opportunities to network with like-minded researchers and professionals from around the world.

This year, ICBC 2024 received 249 submissions, including full/short papers, posters, Systematization-of-Knowledge (SoK) papers and Demos, contributed by 728 authors from 47 countries. In addition, five workshops had been collocated with the main Conference track: CrossChain, CryptoEx, DAG-DLT, DePIN and ZKDAPPS. Out of these submissions, about 21.7% were from North America, 36.4% from Europe, 32.4% from Asia/Pacific, 5.0% from Australia, 5.2% from Middle East and Africa and 4.3% from Latin America.

The review process for ICBC 2024 consists of 2 phases, fulfilled by the technical program committee including 146 members and 52 reviewers. Each paper received 2 reviews in phase 1. The papers with 2 rejections were not advanced to the next phase. In phase 2, each paper received additional reviews to ensure a total of 3 reviews per paper.

Through this rigorous review process, we have been able to compile a very high-quality program for the conference. 33 full papers have been selected for the single-track program, corresponding to a competitive acceptance rate of 18.2%. We are pleased to share that the authors of selected ICBC 2024 best-papers finalists will be invited to submit an extended version of their paper to IEEE Transactions on Network and Service Management with a fast-track review process. Additionally, 6 SoK papers, 23 short papers, and 29 posters have been accepted to the conference program. Moreover, 8 demo papers were accepted. In total, 125 papers, posters and demos from the conference and workshops were retrained to appear in the proceedings.

IEEE ICBC 2024 will include a fireside chat with Eric van Miltenberg (Senior VP of Strategic Initiatives, Ripple) and David Ridgway (Head of Ripple Ireland), along with keynote addresses from three distinguished speakers: Dr. Jiahua Xu (Associate Professor, University College London; Head of Science, DLT Science Foundation, Sebastian Bode (Director of Engineering, Cardano Foundation), Dr. Jan Camenisch (CTO, DFINITY Foundation). Additionally, the first day of ICBC 2024 will host four excellent tutorials.

We like to express our deepest and most sincere gratitude to all our volunteers, OC members, TPC members, and Steering Committee members, especially for their kind efforts, dedication, support, and timely contributions. We would also like to thank IEEE ComSoc, Jimmy Le and Melissa Torres for their support in preparing the event. Finally, we highly appreciate our patrons and their commitment to ICBC 2024. Without the help and support of all these people, this event would not have been possible.

We wish all participants an exciting, informative, and pleasant ICBC 2024!

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## KEYNOTES & FIRESIDE CHAT

TUESDAY, 28/05/2024, 10:45 - 11:45

### FIRESIDE CHAT WITH RIPPLE: UNIVERSITY BLOCKCHAIN RESEARCH INITIATIVES AND PERSPECTIVES ON REGULATION

Location: Edmund Burke Theatre

**Eric van Miltenberg (Senior VP of Strategic Initiatives, Ripple)**

**David Ridgway (Head of Ripple Ireland)**

**Moderator: Will Knottenbelt (Director of the Centre for Cryptocurrency Research & Engineering, Imperial College London)**

**Vita: Eric van Miltenburg** is the SVP of Strategic Initiatives at Ripple. Over his 7+ year tenure at the company, Eric has led high-performing teams across a range of disciplines including corporate strategy, global business operations, strategic partnerships, business development and marketing. Eric has 25+ years of business leadership. Prior to joining Ripple, Eric held senior positions with high-growth start-ups and Fortune 500 companies including Adobe, Yahoo!, Hightail, RedSwoosh, Work.com and Excite@Home.com. He is known for his extensive experience in solving complex business problems and executing strategies that help technology companies systematically accelerate growth.

TUESDAY, 28/05/2024, 15:15 - 16:15

### KEYNOTE 1: PIERCING THE VEIL OF TVL: DEFI REAPPRAISED

Location: Edmund Burke Theatre

**Speaker: Jiahua Xu (UCL; Head of Science, DLT Science Foundation)**

**Abstract**

Total Value Locked (TVL) has been the standard metric for gauging the size and popularity of Decentralized Finance (DeFi) protocols and ecosystems. Despite its widespread usage, TVL suffers from significant "double counting" issues, leading to inflated and misleading representations of actual value. In this talk, we explore the fundamental mechanics of DeFi protocols to uncover the root causes of double counting, both across and within protocols. We lay out how double counting should be eliminated from the bookkeeping and financial reporting perspective.

We further propose a new framework, Total Value Redeemable (TVR), designed to provide a more accurate and truthful measure of the value contained within DeFi protocols. Our empirical findings demonstrate a stark discrepancy between reported TVL figures and the

newly proposed TVR, with differences peaking at $139.87 billion and a TVL-to-TVR ratio reaching approximately 2. Importantly, TVR proves to be a more stable and reliable metric, particularly during market downturns.

This talk will not only challenge existing valuation frameworks within DeFi but also set the stage for more robust and truthful financial metrics that better reflect the actual economic realities of the DeFi ecosystem.

**Vita: Dr. Jiahua Xu** is Associate Professor in Financial Computing at UCL, where she teaches Blockchain Technologies and Digital Finance. She serves as Programme Director of the MSc Emerging Digital Technologies under the UCL Computer Science Department, as well as Head of Science at the DLT Science Foundation. Dr. Xu teaches FinTech courses at various institutions, including EPFL, London Business School, and Center for Latin American Monetary Studies. She visited and has ongoing research collaboration with Harvard Business School, Imperial College London, and Vienna University of Economics and Business. Her research interests lie primarily in blockchain economics, behavioural finance, and risk management. She has published academic papers in top tier conferences in computer science as well as renowned journals in economics and finance.

WEDNESDAY, 29/05/2024, 10:45 - 11:45

## KEYNOTE 2: THE CHALLENGES OF APPROACH: ALIGNING THE GOALS OF RESEARCH AND DEVELOPMENT TEAMS TO ENSURE OPTIMAL IMPLEMENTATION AND ADOPTION

Location: Edmund Burke Theatre

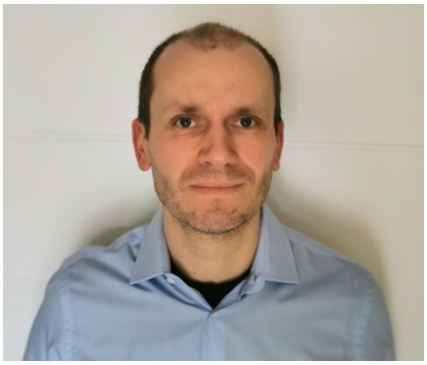
**Speaker: Sebastian Bode (Cardano Foundation)**

**Abstract**

The entities behind the Cardano blockchain claim it to be founded on peer-reviewed research and developed through evidence-based methods. What sounds like a bold statement and a dream scenario for systems engineering for mission critical applications prompts divergent and multiple challenges and results in many learnings which are to be presented in this talk.

Research and engineering often face different impediments and can even have conflicting interests depending on the definition of an optimal solution. This can result in gaps and ambiguities when the former is translated for the latter in order to enable implementation. Formal specification is applied to mitigate these sometimes intricate pitfalls. This approach is not without its own risks and challenges: It requires discipline when applied and might even result in a misconception that a perfect specification is in place when it is in fact far from that state.

The application of formal verification methods, reference implementations derived from those, and common and less common software quality assurance measures each affect differently how the code is actually written, which in turn determines the maintainability of the code base and with this the operational resilience of the entire system. Whereas resilience is not solely defined through the maintainability of the code base, the governance of the network itself, often referred to as mainnet and which is ultimately just a single instantiation of the respective blockchain protocol, affects its sustainability in terms of security, economics and user experience. All three are important pillars for adoption, which should ultimately be the driving force behind any technological development.



**Vita: Sebastian Bode** is the Director of Engineering at the Cardano Foundation where he leads the Engineering and Research Teams. Applying his previous experience across financial services, the automotive industry, and the research sector, he drives development both internally within the Cardano Foundation and with development companies in the wider Cardano space. Sebastian holds a PhD in Mechanical Engineering and Computer Sciences and has been part of several open source software development projects as both an engineer and educator.

THURSDAY, 30/05/2024, 10:45 - 11:45

**KEYNOTE 3: THE FUTURE OF COMPUTE IS BLOCKCHAIN**

Location: Edmund Burke Theatre

**Speaker: Jan Camenisch (DFINITY Foundation)**

**Abstract**

Cybersecurity is becoming our next big global challenge. The cost caused by cybercrime damages as well as the money spent on IT security is ever increasing. With AI as a new tool to cybercriminals, this trend will very likely accelerate. The root problem is that the current IT stack is inherently insecure as it has grown organically with security requirements initially not being considered and later addressed only by bolt-on solutions such as firewalls, virus scanners, and intrusion detectors. This makes it nearly impossible to build and operate secure applications on this stack.

Nevertheless, there is a very prominent application that runs on the current IT stack and that has never been hacked despite being probably the largest honey-pot ever and despite the insecurity of the current stack: the bitcoin network. It obtains security by taking a radically different architectural approach: it is a distributed state machine realized by a cryptographic protocol, or as we say today, a blockchain.

It may seem that although successful generalizing bitcoin makes no sense: the bitcoin network has a slow transaction speed and limited throughput, its computational capacity is barely enough to maintain a ledger, nor is it Turing complete, and, despite these

limitations, it consumes huge amounts of energy. In this talk we discuss how the principle of blockchain can be scaled to replace the current IT stack as a platform to build secure applications. In particular, we will look at the Internet Computer Protocol (ICP), a blockchain that has been designed from scratch with the explicit goal to provide all compute capacity that the world needs and to fundamentally address cybersecurity. We will discuss the protocol's architecture and the different design challenges and decisions that were made. We conclude with an assessment to what ICP already achieves today and what is still required to be done towards the vision of all of humanity's software running on blockchain.

**Vita: Jan Camenisch** is CTO at the DFINITY Foundation and Director of the DFINITY Zurich Research Lab, building the Internet Computer. He also serves on Sovrin's Technical Governance Board. Before joining DFINITY, Jan was a Principal Research Staff Member at IBM Research – Zurich, where he was leading the Privacy & Cryptography research team and was a member of the IBM Academy of Technology.

He is a leading scientist in the area of privacy and cryptography and a Fellow of the IACR, IEEE, and ACM. Jan has published over 140 widely cited papers, was granted about 140 patents worldwide, and has received a number of awards for his work, including the 2010 ACM SIGSAC outstanding innovation award, the 2013 IEEE computer society technical achievement award, and the 2018 IFIP Kristian Beckman award.

# TUTORIALS

MONDAY, 27/05/2024, 08:45 - 10:45

## TUTORIAL 1: COMPUTE OFFCHAIN, VERIFY ONCHAIN: HOW TO BUILD ZK-DAPPS WITH CIRCOM AND ZOKRATES

Location: Room 3074

**Speakers**

Alvaro Alonso Domenech (Technische Universität Berlin, Germany); Jonathan Heiss (TU Berlin, Germany); Johannes Sedlmeir (University of Luxembourg, Luxembourg)

**Abstract**

The tutorial starts with an overview of the fundamental concepts required to gain a better understanding of zk-SNARKs. After acquiring this foundation, the audience will be introduced to various use cases where zk-SNARKs are applied to solve real-world problems. In the next step, they will be introduced to the concept of domain specific languages for the efficient generation of zk-SNARK proving and verification programs as the example of two common frameworks, Circom and ZoKrates. Finally, the tutorial concludes with a one-hour hands-on exercise that guides the audience through the whole development process of zk-SNARKs. This includes the definition of an arithmetic circuit for a certain claim, how to perform a secure setup phase, the generation of an Ethereum verification smart contract, and the execution of proof programs. By following this tutorial, you will be able to take your DApp development to the next level.

MONDAY: 27/05/2024, 08:45 - 10:45

## TUTORIAL 2: BEYOND – CRYPTO: PREPARING FOR THE NEXT WAVE OF CHALLENGES IN DISTRIBUTED LEDGER TECHNOLOGY

Location: Room 3071

**Speakers**

Vishal Sharma (Queen's University Belfast, United Kingdom (Great Britain)); Trung Q. Duong (Memorial University of Newfoundland, Canada); Oluwafemi Olukoya (Queen's University Belfast, United Kingdom (Great Britain)); Teik Guan Tan (pQCee, Singapore); Zengpeng Li (Shandong University, United Kingdom (Great Britain))

**Abstract**

Blockchain is not just a cryptocurrency – it is one of the examples of chain-based Distributed Ledger Technology (DLT) where another graph-based mechanism is equally important depending on the use case and application. With this ideology in view, this tutorial is planned to cover the introduction of DLTs and then move into the practical space of blockchain, followed by quantum and post-quantum security, malware analysis with smart contracts and practical applications such as supply chain management, digital asset management, multi-layer security in future networks, convergence of quantum with DLTs and other broader challenges and research problems. The tutorial has content that would suit the audience with a prior interest in DLT, even without any workable experience. Two interactive demos will be shared with the audience to allow them to understand how blockchains can facilitate several real-world applications.

MONDAY, 27/05/2024, 11:00 - 13:00

## TUTORIAL 3: SCALABILITY AND THROUGHPUT OF BLOCKCHAINS AND DECENTRALIZED APPLICATIONS

Location: Room 3074

**Speakers**

Martin Perešíni and Ivan Homoliak (Brno University of Technology, Czech Republic)

**Abstract**

The tutorial aims to address the fundamental limitations of current blockchain technology concern- ing scalability and throughput. It introduces various approaches to improve scalability, including naive improvements, Bitcoin-NG, sharding methods (Elastico, OmniLedger, RapidChain), DAG- based protocols, off-chain payments, and centralized blockchains. The motivation behind this is the increasing demand for higher transaction throughput and lower latency to support real-world applications, which current blockchain technologies struggle to meet due to the inherent trade-offs between scalability, security, and decentralization (blockchain trilemma).

MONDAY, 27/05/2024, 11:00 - 13:00

## TUTORIAL 4: BLOCKCHAIN AND EMERGING STANDARDS

Location: Room 3071

**Speakers**

Fiona Delaney (Origin Chain Networks, European Union); Irina Tal (Dublin City University, Ireland)

**Abstract**

Blockchain standardisation is a critical aspect of the evolving blockchain landscape, aiming to establish uniformity, interoperability, and security across diverse blockchain networks. This tutorial explores the fundamental concepts and key objectives of blockchain standardisation, providing a comprehensive overview of the standards that underpin this revolutionary technology. Participants will gain insights into the significance of standardisation for fostering trust, promoting innovation, and facilitating widespread adoption in various industries. Moreover, the participants will benefit from an insider's perspective on the very recently published ***ISO/TR 6277:2024 Data flow models for DLT use cases***, co-edited by the instructor Fiona Delaney. Fiona will provide a step-by-step tutorial on how to submit a new use case to the ***ISO 24878 new and emerging blockchain use cases***. Other opportunities and ways to get involved in the realm of Blockchain standardisation will be discussed as well. The tutorial contents draws from the results and experiences gained within the SEEBLOCKS project (https://seeblocks.eu/), a Digital Europe Programme project that aims at delivering a targeted, democratic, industry-driven initiative to support European interests in standardisation within the Blockchain/DLT domain, bringing together EU researchers and open standards specialists, along with industry and policy experts.

# TECHNICAL PROGRAMME

## MONDAY, 27/05/2024

### MONDAY, 27/05/2024, 08:45 - 10:45
TUTORIAL 1: COMPUTE OFFCHAIN, VERIFY ONCHAIN: HOW TO BUILD ZK-DAPPS WITH CIRCOM AND ZOKRATES
Location: Room 3074

**Speakers**
Alvaro Alonso Domenech (Technische Universität Berlin, Germany); Jonathan Heiss (TU Berlin, Germany); Johannes Sedlmeir (University of Luxembourg, Luxembourg)

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Fiona Delaney (Origin Chain Networks, European Union); Irina Tal (Dublin City University, Ireland)

### MONDAY, 27/05/2024, 14:00 - 16:00
SHORT PAPER 1: CRYPTO, IDENTITY, ZERO-KNOWLEDGE PROOF
Location: Room 3074

**14:00 - 14:20, Completely FROST-ed: IoT issued FROST signature for Hyperledger Fabric blockchain**
Mostafa Khattat and Roland Kromes (Delft University of Technology, The Netherlands)

**14:20 - 14:40, SRNG: An Efficient Decentralized Approach for Secret Random Number Generation**
Togzhan Barakbayeva (Hong Kong University of Science and Technology (HKUST), Hong Kong); Zhuo Cai and Amir Kafshdar Goharshady (Hong Kong University of Science and Technology, Hong Kong)

**14:40 - 15:00, zkGen: Policy-to-Circuit Transpiler**
Jan Philipp Lauinger, Jens Ernstberger and Sebastian Steinhorst (Technical University of Munich, Germany)

**15:00 - 15:20, Gas-Efficient Decentralized Random Beacons**
Vp Abidha (Hong Kong University of Science and Technology, Hong Kong); Togzhan Barakbayeva (Hong Kong University of Science and Technology (HKUST), Hong Kong); Zhuo Cai and Amir Kafshdar Goharshady (Hong Kong University of Science and Technology, Hong Kong)

**15:20 - 15:40, An Untraceable Credential Revocation Approach Based on a Novel Merkle tree Accumulator**
Nacereddine Sitouah (Polytechnic University of Milan, Italy); Francesco Bruschi, Francesco Lorenzo Pallotta, Riccardo Mencucci and Donatella Sciuto (Politecnico di Milano, Italy)

**15:40 - 16:00, Decentralised Redactable Blockchain: A Privacy-Preserving Approach to Addressing Identity Tracing Challenges**
Jun Wook Heo (Queensland University of Technology (QUT), Australia); Gowri Ramachandran (Queensland University of Technology, Australia); Raja Jurdak (Queensland University of Technology & CSIRO, Australia)

MONDAY, 27/05/2024, 14:00 - 16:00
SHORT PAPER 2: MEV, TRANSACTION, ADDRESS ANALYSIS
Location: Room 3071

**14:00 - 14:20, Short Paper: Unpredictable Transaction Arrangement for MEV Mitigation in Ethereum**
Jan Droll, Oliver Stengele and Hannes Hartenstein (Karlsruhe Institute of Technology, Germany)

**14:20 - 14:40, Analysis of Earned Rewards In A Blockchain with Two Selfish Miners**
Sheng-Wei Wang (National United University, Taiwan)

**14:40 - 15:00, The Spatiotemporal Scaling Laws of Bitcoin Transactions**

Lajos Kelemen and István Andras Seres (Eötvös Loránd University, Hungary); Ágnes Backhausz (Rényi Institute of Mathematics, Hungary)

**15:00 - 15:20, Playing the MEV Game on a First-Come-First-Served Blockchain**
Burak Öz, Jonas Gebele, Parshant Singh, Filip Rezabek and Florian Matthes (Technical University of Munich, Germany)

**15:20 - 15:40, Shared Send Mixers Untangling in Bitcoin Clustering Heuristics Adjustment**
Nickolay Larionov (Moscow Institute of Physics and Technology, Russia); Yury Yanovich (Skolkovo Institute of Science and Technology, Russia)

**15:40 - 16:00, Quick Order Fairness: Implementation and Evaluation**
Jovana Micic and Christian Cachin (University of Bern, Switzerland)

MONDAY, 27/05/2024, 16:20 - 18:20
SHORT PAPER 3: NFT, DEFI, APPLICATION
Location: Room 3074

**16:20 - 16:40, Decentralized commit-reveal scheme to defend against front-running attacks on Decentralized EXchanges**
Nakhoon Choi and Heeyoul Kim (Kyonggi University, Korea (South))

**16:40 - 17:00, ML2SC: Deploying Machine Learning Models as Smart Contracts on the Blockchain**
Zhikai Li, Steve Vott and Bhaskar Krishnamachari (University of Southern California, USA)

**17:00 - 17:20, BAKUP: Automated, Flexible, and Capital-Efficient Insurance Protocol for Decentralized Finance**
Srisht Fateh Singh, Panagiotis Michalopoulos and Andreas Veneris (University of Toronto, Canada)

**17:20 - 17:40, Machine Learning in DeFi: Credit Risk Assessment and Liquidation Prediction**
Georgios Palaiokrassas (Yale University & Yale Institute for Network Science, USA); Sandro Scherrers, Eftychia Makri and Leandros Tassiulas (Yale University, USA)

**17:40 - 18:00, A Blockchain-Based Decentralized and Incentive Compatible Distributed Computing Protocol**
Conor McMenamin (Pompeu Fabra University & Nethermind Research, Spain); Vanesa Daza Fernández (Universitat Pompeu Fabra, Spain)

**18:00 - 18:20, ROAR: A Benchmark for NFT Rarity Meters**
Dmitry Belousov (Moscow Institute of Physics and Technology, Russia); Maksim Shuklin and Alexander Stepin (HSE University, Russia); Yury Yanovich (Skolkovo Institute of Science and Technology, Russia)

MONDAY, 27/05/2024, 16:20 - 18:20
SHORT PAPER 4: CONSENSUS, CROSS-CHAIN, SECURITY
Location: Room 3071

**16:20 - 16:40, Enhancing Ethereum PoA Clique Network with DAG-based BFT Consensus**
Yongrae Jo (Pohang University of Science and Technology (POSTECH), Korea (South)); Chanik Park (Pohang University of Science and Technology, Korea (South))

**16:40 - 17:00, Verifiable Querying Framework for Multi-Blockchain Applications**
Stanly Wilson (Newcastle University, United Kingdom (Great Britain) & St. Vincent Pallotti College of Engineering & Technology, Nagpur, India); Kwabena Adu-Duodu (Newcastle University, United Kingdom (Great Britain)); Yinhao Li (Newcastle university, United Kingdom (Great Britain)); Ringo Sham and Ellis Solaiman (Newcastle University, United Kingdom (Great Britain)); Omer Rana (Cardiff University, United Kingdom (Great Britain)); Rajiv Ranjan (Newcastle University, United Kingdom (Great Britain))

**17:00 - 17:20, VELLET: Verifiable Embedded Wallet for Securing Authenticity and Integrity**
Hiroki Watanabe (The Japan Research Institute, Limited, Japan); Kohei Ichihara (The Japan Research Institute, Limited & Sumitomo Mitsui Banking Corporation, Japan); Takumi Aita (The Japan Research Institute, Limited, Japan)

**17:20 - 17:40, Multi-Party Cross-Chain Asset Transfers**
André Augusto (INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal); Rafael Belchior (Instituto Superior Técnico & INESC-ID & Blockdaemon Ltd., Portugal); André Vasconcelos (INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal); Miguel Correia (INESC-ID & Instituto Superior Técnico, Portugal); Thomas Hardjono (MIT, USA)

TUESDAY, 28/05/2024

TUESDAY, 28/05/2024, 08:45 - 10:00
FULL PAPER 1: STATE CHANNEL, CROSS CHAIN, SHARDING, SIMULATION
Location: Edmund Burke Theatre

**08:45 - 09:10, Bridging BRC-20 to Ethereum**
Qin Wang (CSIRO Data61, Australia); Guangsheng Yu (CSIRO, Australia); Shiping Chen (CSIRO Data61 & UNSW, Australia)

**09:10 - 09:35, ShardingSim: A Modular Committee-Based Sharding Blockchain Simulator**
Yuehua Wu, Yunxiao Wang, Feihu Yan and Wenzhi Chen (Zhejiang University, China)

**09:35 - 10:00, Fast, Favorable, and Fair Blockchain-based Exchange of Digital Goods using State Channels**
Matthias Lohr (University of Koblenz-Landau, Germany); Sven Peldszus (Ruhr University Bochum, Germany); Jan Jürjens (Univ Koblenz & Fraunhofer ISST, Germany); Steffen Staab (University of Stuttgart, Germany)

TUESDAY, 28/05/2024, 10:00 - 10:30
PS1: POSTER SESSION 1
Location: Concourse outside Edmund Burke Theatre

**10:00 - 10:30, Towards a harmonized global regulation: An analysis of the MiCA regulation and its implications for the European crypto-asset market**
Cristina Carata (Imperial College London, United Kingdom (Great Britain)); William J Knottenbelt (Imperial College, United Kingdom (Great Britain))

**10:00 - 10:30, Blockchain Smart Contract Vulnerability Detection and Segmentation Using ML and XAI**
Sabbir Ahmed (Jahangirnagar University, Bangladesh); Luay Abdeljaber (University of Texas at Dallas, USA); Sharif Noor Zisad (Lulea University of Technology, USA); Mohammad Shahadat Hossain (University of Chittagong, Bangladesh); Latifur Khan (University of Texas, USA)

**10:00 - 10:30, Incident Analysis of Decentralized Finance**
Cheng-Chieh Lin (National Cheng Kung University, Taiwan); Chia Cheng Tsai and Shih-wei Liao (National Taiwan University, Taiwan)

**10:00 - 10:30, A Universal System for OpenID Connect Sign-ins with Verifiable Credentials and Cross-Device Flow**
Felix Hoops and Florian Matthes (Technical University of Munich, Germany)

**10:00 - 10:30, Stability Analysis of Market-Making Mechanisms for Decentralized Cryptocurrency Exchanges**
Yean-Fu Wen and Chien-Ming Huang (National Taipei University, Taiwan)

**10:00 - 10:30, Hierarchical Execution of Cross-Shard Transactions with Multiple Smart Contract Functions**
Hiroshi Matsuura and Takayuki Fujii (NTT Network Service Systems Laboratories, Japan)

**10:00 - 10:30, Global, robust and comparable digital carbon assets**
Sadiq Jaffer, Michael W Dales, Patrick Ferris, Derek H Sorensen and Thomas Swinfield (University of Cambridge, United Kingdom (Great Britain)); Robin Message (Lambda Cambridge, United Kingdom (Great Britain)); Srinivasan Keshav and Anil Madhavapeddy (University of Cambridge, United Kingdom (Great Britain))

TUESDAY, 28/05/2024, 10:45 - 11:45

## FIRESIDE CHAT WITH RIPPLE: UNIVERSITY BLOCKCHAIN RESEARCH INITIATIVES AND PERSPECTIVES ON REGULATION

Location: Edmund Burke Theatre

**Eric van Miltenberg (Senior VP of Strategic Initiatives, Ripple)**

**David Ridgway (Head of Ripple Ireland)**

**Moderator: Will Knottenbelt (Director of the Centre for Cryptocurrency Research & Engineering, Imperial College London)**

TUESDAY, 28/05/2024, 11:45 - 13:00

## FULL PAPER 2: CBDC AND STABLE COIN

Location: Edmund Burke Theatre

**11:45 - 12:10, Compliance Design Options for Offline CBDCs: Balancing Privacy and AML/CFT**
Panagiotis Michalopoulos (University of Toronto, Canada); Odunayo Olowookere (York University, Canada); Nadia Pocher and Johannes Sedlmeir (University of Luxembourg, Luxembourg); Andreas Veneris (University of Toronto, Canada); Poonam Puri (York University, Canada)

**12:10 - 12:35, What Drives the (In)stability of a Stablecoin?**
Yujin Potter (UC Berkeley, USA); Kornrapat Pongmala (University of California, USA); Kaihua Qin (Imperial College London, United Kingdom (Great Britain)); Ariah Klages-Mundt (Cornell, USA); Philipp Jovanovic (University College London, United Kingdom (Great Britain)); Christine Parlour (UC Berkeley, USA); Arthur Gervais (Imperial College London, United Kingdom (Great Britain)); Dawn Song (UC Berkeley, USA)

**12:35 - 13:00, LimboCoin: On the Denial-of-Service of Token based Retail CBDCs**
Aditya Ahuja (TCS Research, India); Siddhasagar Pani (TCS Research, India); Srujana Kanchanapalli (TCS Research, India), Vigneswaran R and Rajan M A (TCS Research, India); Sachin Lodha (TCS Research, India)

TUESDAY, 28/05/2024, 13:00 - 14:00

## DS1: DEMO SESSION 1

Location: Concourse outside Edmund Burke Theatre

**13:00 - 14:00, Machine Learning for Data Trust Evaluations in Blockchain-Enabled IoT Systems**
Rashmi Ratnayake, Madhusanka Liyanage and Liam Murphy (University College Dublin, Ireland)

**13:00 - 14:00, Smart Donations for Software Development via Blockchain**

Yury Yanovich and Yash Madhwal (Skolkovo Institute of Science and Technology, Russia); Igor Maximov (Moscow Institute of Physics and Technology, Russia)

**13:00 - 14:00, Biometric Authentication Service on Smart Contract**
Takayuki Suzuki (Hitachi America, Ltd., USA); Ken Naganuma (Hitachi America Ltd., USA); Kaiho Fukuchi (Hitachi America, Ltd., USA); Takatoshi Ohara (Hitachi America, USA)

**13:00 - 14:00, Blockchain-IoT Demo for Supply Chain Management**
Yash Madhwal and Yury Yanovich (Skolkovo Institute of Science and Technology, Russia)

TUESDAY, 28/05/2024, 14:00 - 15:15
FULL PAPER 3: POS AND DEFI
Location: Edmund Burke Theatre

**14:00 - 14:25, Exploring the Market Dynamics of Liquid Staking Derivatives (LSDs)**
Xihan Xiong and Zhipeng Wang (Imperial College London, United Kingdom (Great Britain)); Qin Wang (CSIRO Data61, Australia)

**14:25 - 14:50, How does Stake distribution influence Consensus? Analyzing Blockchain Decentralization**
Shashank Motepalli and Hans-Arno Jacobsen (University of Toronto, Canada)

**14:50 - 15:15, Financially-Stable Automated Market Making for Decentralized Fixed-Rate Lending and Trading**
Tuan Tran (IDG Blockchain Lab, Vietnam); Duc A. Tran (University of Massachusetts Boston, USA); Khanh Truong (IDG Blockchain Lab, Vietnam)

TUESDAY, 28/05/2024, 15:15 - 16:15
**KEYNOTE 1: PIERCING THE VEIL OF TVL: DEFI REAPPRAISED**
Location: Edmund Burke Theatre

**Speaker: Jiahua Xu (UCL; Head of Science, DLT Science Foundation)**

TUESDAY, 28/05/2024, 16:15 - 16:45
PS2: POSTER SESSION 2
Location: Concourse outside Edmund Burke Theatre

**16:15 - 16:45, Integrating Behavioral Finance Factors with Temporal Convolutional Networks for Enhanced Cryptocurrency Return Predictions**
Jiacheng Fu, Marco Mandolfo and Giuliano Noci (Politecnico di Milano, Italy)

**16:15 - 16:45, CypherChain: A Privacy-Preserving Data Aggregation Framework for Blockchain-Based DR Programs**

Samuel Karumba (UNSW Sydney, Australia); Volkan Dedeoglu (CSIRO, Australia); Raja Jurdak (Queensland University of Technology & CSIRO, Australia); Salil S Kanhere (UNSW Sydney, Australia)

**16:15 - 16:45, Towards the Optimization of Gas Usage of Solidity Smart Contracts with Code Mining**
Avik Banerjee (Hamburg University of Technology); Carl Egge and Stefan Schulte (Hamburg University of Technology, Germany)

**16:15 - 16:45, Enhancing Coin Selection in UTXO-based Blockchains through Modified Greedy Algorithms**
Manvir Schneider (Cardano Foundation, Switzerland)

**16:15 - 16:45, Dynamically available consensus on a DAG with fast confirmation for UTXO transactions**
Nikita Polyanskii (IOTA Foundation, Germany)

**16:15 - 16:45, An Incentivization Scheme for a Fixed-Supply DLT with no Base Token Fees**
Olivia Saa (IOTA Foundation, Germany); Andrew Cullen (IOTA Foundation, United Kingdom (Great Britain)); Luigi Vigneri (IOTA Foundation, Germany)

TUESDAY, 28/05/2024, 16:45 - 18:00
FULL PAPER 4: BLOCKCHAIN PROTOCOL AND PERFORMANCE
Location: Edmund Burke Theatre

**16:45 - 17:10, Better Clients, Less Conflicts: Hyperledger Fabric Conflict Avoidance**
Bing-Jie Ji and Tung-Wei Kuo (National Chengchi University, Taiwan)

**17:10 - 17:35, From Slow Propagation to Partition: Analyzing Bitcoin Over Anonymous Routing**
Nazmus Sakib and Simeon Wuthier (University of Colorado Colorado Springs, USA); Kelei Zhang (University of Colorado Colorado Springs & Fort Hays State University, USA); Xiaobo Zhou (University of Colorado, Colorado Springs, USA); Sang-Yoon Chang (University of Colorado Colorado Springs, USA)

**17:35 - 18:00, Optimizing Block Propagation in Bitcoin Network with Region-based Neighbor Selection Using Reinforcement Learning**
Wonseok Choi, Eui-Dong Jeong, Jongsoo Woo and James Won-Ki Hong (POSTECH, Korea (South))

WEDNESDAY, 29/05/2024

WEDNESDAY, 29/05/2024, 08:45 - 10:15
SOK: SOK PAPER SESSION

Location: Edmund Burke Theatre

**08:45 - 09:00, SoK: Crosschain Token Bridges and Risk**
Uri Lee (Imperial College London, United Kingdom (Great Britain))

**09:00 - 09:15, SoK: Compression in Rollups**
Roshan Palakkal (Quantstamp, USA); Jan Gorzny and Martin Derka (Zircuit, Canada)

**09:15 - 09:30, Cryptoeconomics and Tokenomics as Economics: A Survey with Opinions**
Kensuke Ito (The University of Tokyo, Japan)

**09:30 - 09:45, Pragmatic Analysis of Key Management for Cryptocurrency Custodians**
Yuto Takei (Mercari, Inc. & Tokyo Institute of Technology, Japan); Kazuyuki Shudo (Kyoto University, Japan)

**09:45 - 10:00, SoK: Public Blockchain Sharding**
Md Mohaimin Al Barat, Shaoyu Li, Changlai Du, Thomas Hou and Wenjing Lou (Virginia Tech, USA)

**10:00 - 10:15, FATF Travel Rule's Technical Challenges and Solution Taxonomy**
Yuto Takei (Mercari, Inc. & Tokyo Institute of Technology, Japan); Kazuyuki Shudo (Kyoto University, Japan)

WEDNESDAY, 29/05/2024, 10:15 - 10:45
PS3: POSTER SESSION 3
Location: Concourse outside Edmund Burke Theatre

**10:15 - 10:45, Congesting Ethereum after EIP-1559**
Kianoush Arshi and Amir Kafshdar Goharshady (Hong Kong University of Science and Technology, Hong Kong)

**10:15 - 10:45, Servicifying zk-SNARKs Execution for Verifiable Off-chain Computations**
Alvaro Alonso Domenech (Technische Universität Berlin, Germany); Jonathan Heiss and Stefan Tai (TU Berlin, Germany)

**10:15 - 10:45, DecentPeeR: A Self-Incentivised & Inclusive Decentralized Peer Review System**
Johannes Gruendler, Darya Melnyk, Arash Pourdamghani and Stefan Schmid (TU Berlin, Germany)

**10:15 - 10:45, Delay Towers to Bootstrap Blockchains**
Shashank Motepalli and Hans-Arno Jacobsen (University of Toronto, Canada)

**10:15 - 10:45, SolMover: Feasibility of using LLMs for Translating Smart Contracts**

Rabimba Karanjai (University of Houston, USA); Lei Xu (Kent State University, USA); Weidong (Larry) Shi (University of Houston, USA)

**10:15 - 10:45, Is Wireless Bad for Consensus in Blockchain?**
Seungmo Kim (Georgia Southern University, USA)

**10:15 - 10:45, ContractSafeguard: Practical Bug Bounty Platform for Smart Contracts with Intel SGX**
Kaiho Fukuchi (Hitachi America, Ltd., USA); Ken Naganuma (Hitachi America Ltd., USA); Takayuki Suzuki (Hitachi America, Ltd., USA); Takatoshi Ohara (Hitachi America, USA)

WEDNESDAY, 29/05/2024, 10:45 - 11:45
**KEYNOTE 2: THE CHALLENGES OF APPROACH: ALIGNING THE GOALS OF RESEARCH AND DEVELOPMENT TEAMS TO ENSURE OPTIMAL IMPLEMENTATION AND ADOPTION**
Location: Edmund Burke Theatre

**Speaker: Sebastian Bode (Cardano Foundation)**

WEDNESDAY, 29/05/2024, 11:45 - 13:00
FULL PAPER 5: DATA SHARING, STORAGE, DAO
Location: Edmund Burke Theatre

**11:45 - 12:10, Altruism, reciprocity, and tokens to reward forwarding data: Is that fair?**
Vahid Heidaripour Lakhani (University of Stavanger, Norway); Arman Babaei (EPFL, Switzerland); Leander Jehl (University of Stavanger, Norway); Georgy Ishmaev (Delft University of Technology, The Netherlands); Vero Estrada-Galiñanes (EPFL, Switzerland)

**12:10 - 12:35, Unpacking How Decentralized Autonomous Organizations (DAOs) Work in Practice**
Tanusree Sharma (University of Illinois at Urbana Champaign, USA); Yujin Potter (UC Berkeley, USA); Kornrapat Pongmala (University of California, USA); Henry Wang (University of Illinois Laboratory High School, USA); Andrew Miller (University of Illinois, USA); Dawn Song (UC Berkeley, USA); Yang Wang (University of Illinois at Urbana Champaign, USA)

**12:35 - 13:00, CredAct: Privacy-Preserving Activity Verification for Benefits Schemes in Self-Sovereign Identity**
Rahma Mukta (UNSW Sydney, Australia); Hye-young Paik (University of New South Wales, Australia); Qinghua Lu (CSIRO, Australia); Salil S Kanhere (UNSW Sydney, Australia)

WEDNESDAY, 29/05/2024, 13:00 - 14:00
DS2: DEMO SESSION 2
Location: Concourse outside Edmund Burke Theatre

**13:00 - 14:00, Enabling Web2-Based User Authentication for Account Abstraction**
Xinxin Fan and Xueping Yang (IoTeX, USA)

**13:00 - 14:00, PROOF: Decentralized Platform for Verifiable Outsourced Computation**
Spiros Grigoratos, Katerina Doka and Nectarios Koziris (National Technical University of Athens, Greece)

**13:00 - 14:00, Demo: Radio Spectrum Data Collection with Distributed-Proof-of-Sense Blockchain Network**
Pramitha Fernando and Madhusanka Liyanage (University College Dublin, Ireland)

**13:00 - 14:00, Demonstrating a Hyperledger Fabric-based Blockchain with Knowledge Graphs for a Supply Chain Ecosystem**
Gyan Wickremasinghe (Queen's University Belfast, United Kingdom (Great Britain)); Siofra Frost (Queens University Belfast, United Kingdom (Great Britain)); Karen Rafferty and Vishal Sharma (Queen's University Belfast, United Kingdom (Great Britain))

WEDNESDAY, 29/05/2024, 14:00 - 15:15
FULL PAPER 6: FEDERATED LEARNING, IOT, METAVERSE
Location: Edmund Burke Theatre

**14:00 - 14:25, End-to-End Verifiable Decentralized Federated Learning**
Chaehyeon Lee (POSTECH, Korea (South)); Jonathan Heiss and Stefan Tai (TU Berlin, Germany); James Won-Ki Hong (POSTECH, Korea (South))

**14:25 - 14:50, Protecting Non Fungible Mutable Tokens: an Application in the Metaverse**
Damiano Di Francesco Maesa (University of Pisa & University of Cambridge, United Kingdom (Great Britain)); Francesco Donini (University of Camerino, Italy & University of Pisa, National Research Council of Italy, Italy); Paolo Mori (IIT, CNR, Italy); Laura Emilia Maria Ricci (University of Pisa, Italy)

**14:50 - 15:15, Energy-Efficient Data Anchoring for IoT Devices**
Seyed Amid Moeinzadeh Mirhosseini and Stefan Craß (ABC Research GmbH, Austria); Bernhard Uhl, Leander B. Hörmann and Christian Kastl (Linz Center of Mechatronics GmbH, Austria)

WEDNESDAY, 29/05/2024, 15:15 - 15:45
PS4: POSTER SESSION 4
Location: Concourse outside Edmund Burke Theatre

**15:15 - 15:45, An Evaluation of Lightweight CNNs for Smart Contract Vulnerability Detection**
Iqra Mustafa (Cork Institute of Technology (CIT), Ireland)

**15:15 - 15:45, An Ensemble Method of Deep Reinforcement Learning for Automated Cryptocurrency Trading**
Shuyang Wang and Diego Klabjan (Northwestern University, USA)

**15:15 - 15:45, Leveraging Machine Learning For Multichain DeFi Fraud Detection**
Georgios Palaiokrassas (Yale University & Yale Institute for Network Science, USA); Sandro Scherrers, Iason Ofeidis and Leandros Tassiulas (Yale University, USA)

**15:15 - 15:45, Second Layer Network Impact on Bitcoin Mining Fees and Network Value**
Saulo dos Santos (University of Manitoba, Canada); Japjeet Singh (Sats Capital LTDA, Brazil); Bakhshish Singh Dhillon (University of Winnipeg, Canada); Ruppa K. Thulasiram (University of Manitoba, Canada); Shahin Kamali (York University, Canada)

**15:15 - 15:45, PrivHChain: Monitoring the Supply Chain of Controlled Substances with Privacy-Preserving Hierarchical Blockchain**
Hyeonbum Lee and Kyuhwan Lee (Hanyang University, Korea (South)); Wenyi Tang and Shankha Shubhra Mukherjee (University of Notre Dame, USA); Jae Hong Seo (Hanyang University, Korea (South)); Taeho Jung (University of Notre Dame, USA)

**15:15 - 15:45, POSTER: Towards an Identity Authentication Layer in CBDC Networks using Self-Sovereign Identities**
Joao Pedro Alonso Almeida (University of Sao Paulo, Brazil); Rodrigo Dutra Garcia (University of São Paulo, Brazil); Gowri Ramachandran (Queensland University of Technology, Australia); Jo Ueyama (University of São Paulo (USP) & Institute of Mathematics and Computer Science, Brazil)

**15:15 - 15:45, Bitcoin, Gold, Oil Implied Volatility Spillover to Stock Market: Evidence from an Asymmetric Quantile Regression Model**
Toshiko Matsui (Imperial College London, United Kingdom (Great Britain)); William J Knottenbelt (Imperial College, United Kingdom (Great Britain))

WEDNESDAY, 29/05/2024, 15:45 - 17:00
FULL PAPER 7: GDPR, PRIVACY, ANALYSIS
Location: Edmund Burke Theatre

**15:45 - 16:10, Privacy-Preserving Account-Abstraction for Teams on EVM chains**
Thierry Sans (University of Toronto Scarborough, Canada & PriFi Labs Inc, Canada); David Liu (PriFi Labs Inc., Canada)

**16:10 - 16:35, How to Redact the Bitcoin Backbone Protocol**
Enrique Larraia (nChain, Spain); Mehmet Sabir Kiraz (De Montfort University, United Kingdom (Great Britain)); Owen J Vaughan (nChain, United Kingdom (Great Britain))

**16:35 - 17:00, A Tip for IOTA Privacy: IOTA Light Node Deanonymization via Tip Selection**

Hojung Yang (Korea University, Korea (South)); Suhyeon Lee (Tokamak Network, Korea (South)); Seungjoo Kim (Korea University, Korea (South))

## THURSDAY, 30/05/2024

### THURSDAY, 30/05/2024, 09:00 - 10:15
### FULL PAPER 8: MEV, DEFI, ANTI ILLICIT ACTIVITIES
Location: Edmund Burke Theatre

**09:00 - 09:25, Strategic Bidding Wars in On-chain Auctions**
Fei Wu (King's College London, United Kingdom (Great Britain)); Thomas Thiery (Ethereum Foundation, United Kingdom (Great Britain)); Stefanos Leonardos and Carmine Ventre (Kings College London, United Kingdom (Great Britain))

**09:25 - 09:50, Efficient and Reliable Service Detection on Bitcoin**
Vincent Jacquot (University of Liège: Montefiore Institute, Belgium); Nada Hammad (TRM Labs, USA); Benoit Donnet (Université de Liège (ULiège), Belgium)

**09:50 - 10:15, Private, Anonymous, Collateralizable Commitments vs. MEV**
Conor McMenamin (Pompeu Fabra University & Nethermind Research, Spain); Vanesa Daza Fernández (Universitat Pompeu Fabra, Spain)

### THURSDAY, 30/05/2024, 10:15 - 10:45
### PS5: POSTER SESSION 5
Location: Concourse outside Edmund Burke Theatre

**10:15 - 10:45, Abstracting Bitcoin Lightning Network Complexity with Ultraviolet**
Davide Patti (University of Catania, Italy); Salvatore Monteleone (Niccolò Cusano University, Italy); Enrico Russo, Maurizio Palesi and Vincenzo Catania (University of Catania, Italy)

**10:15 - 10:45, Support Remote Attestation for Decentralized Robot Operating System (ROS) using Trusted Execution Environment**
Qian Wang, Brian Lee and Yuansong Qiao (Technological University of the Shannon, Ireland)

### THURSDAY, 30/05/2024, 10:45 - 11:45
### KEYNOTE 3: THE FUTURE OF COMPUTE IS BLOCKCHAIN
Location: Edmund Burke Theatre

**Speaker: Jan Camenisch (DFINITY Foundation)**

### THURSDAY, 30/05/2024, 11:45 - 13:00

FULL PAPER 9: SMART CONTRACT OPTIMISATION, BLOCKCHAIN ANALYSIS
Location: Edmund Burke Theatre

**11:45 - 12:10, Bytecode Skeletons for Sample Selection in the Analysis of Blockchain Programs**
Monika di Angelo (TU Wien, Austria); Gernot Salzer (Technische Universität Wien, Austria)

**12:10 - 12:35, Monero Traceability Heuristics: Wallet Application Bugs and the Mordinal-P2Pool Perspective**
Nada Hammad (TRM Labs, USA); Friedhelm Victor (TRM Labs, USA)

**12:35 - 13:00, Lock-Free Concurrent Smart Contracts**
Zachary M Painter and Damian Dechev (University of Central Florida, USA)

THURSDAY, 30/05/2024, 14:00 - 15:15
FULL PAPER 10: SMART CONTRACT VERIFICATION
Location: Edmund Burke Theatre

**14:00 - 14:25, Enhanced mutation testing of smart contracts in support of code inspection**
Sebastian Banescu (Quantstamp, Germany); Morena Barboni and Andrea Morichetta (University of Camerino, Italy); Andrea Polini (Camerino University, Italy); Edward Zulkoski (Quantstamp, Canada)

**14:25 - 14:50, (In)Correct Smart Contract Specifications**
Derek H Sorensen (University of Cambridge, United Kingdom (Great Britain))

**14:50 - 15:15, iCon: Automated Verification of Inter-Transaction Properties in Tezos Smart Contracts with Unknowns**
Yuki Nishida, Kohei Suenaga and Atsushi Igarashi (Kyoto University, Japan)

THURSDAY, 30/05/2024, 15:45 - 17:00
FULL PAPER 11: BLOCKCHAIN ANALYSIS
Location: Edmund Burke Theatre

**15:45 - 16:10, Towards a deeper understanding of the Cardano macro-economics**
Mostafa Chegenizadeh (University of Zurich, Switzerland); Shengnan Li (University of Zürich, Switzerland); Claudio J. Tessone (University of Zurich, Switzerland)

**16:10 - 16:35, Rational Economic Behaviours in the Bitcoin Lightning Network**
Andrea Carotti (University of Illinois at Chicago, USA); Cosimo Sguanci (Politecnico di Milano, Italy); Anastasios Sidiropoulos (University of Illinois at Chicago, USA)

**16:35 - 17:00, A Two-Stage Encrypted Cryptomining Traffic Detection Mechanism in Campus Network**

Haoran Sun (Beijing University of Posts And Telecommunications, China); Ruisheng Shi, Lina Lan, Zhiyuan Peng and Chenfeng Wang (Beijing University of Posts and Telecommunications, China)

THURSDAY, 30/05/2024, 17:00 - 17:15
SHORT PAPER 5: SECURITY ANALYSIS
Location: Edmund Burke Theatre

**17:00 - 17:15, Gasless On-Chain Password Manager: A Comparative Analysis Across EVM-Based Platforms**
Tahlil Tahlil (Road no. 6, Arunapolli, Savar, Dhaka & Tero Labs LLC, Bangladesh); Tanvir Islam (Brac University, Bangladesh); Sania Azhmee Bhuiyan (BRAC University, Bangladesh); Mahabub Alahi (Universal Machine Inc. & University of Asia Pacific, Bangladesh)

FRIDAY, 31/05/2024 (CRYPTOEX WORKSHOP)

FRIDAY, 31/05/2024, 10:30 - 12:00 (CRYPTOEX WORKSHOP)
WORKSHOP TECHNICAL SESSION 1
Location: Room 3074

**10:30 - 11:00, An Improved Algorithm to Identify More Arbitrage Opportunities on Decentralized Exchanges**
Yu Zhang, Tao Yan, Jianhong Lin, Benjamin Kraner and Claudio J. Tessone (Blockchain and Distributed Ledger Technology, Blockchain Center, University of Zurich, Switzerland)

**11:00 - 11:30, Option Contracts in the DeFi Ecosystem: Motivation, Solutions, & Technical Challenges**
Srisht Fateh Singh, Panagiotis Michalopoulos and Andreas Veneris (University of Toronto, Canada)

**11:30 - 12:00, The AMMazing Frontrunner: Practical Frontrunning on the XRP Ledger Automated Market Maker**
Vytautas Tumas (Ripple, United Kingdom (Great Britain)); Aanchal Malhotra (Ripple, USA)

FRIDAY, 31/05/2024, 13:00 - 14:30 (CRYPTOEX WORKSHOP)
WORKSHOP TECHNICAL SESSION 2
Location: Room 3074

**13:00 - 13:30, A2C Reinforcement Learning for Cryptocurrency Trading and Asset Management**
Changhoon Kang, Jongsoo Woo and James Won-Ki Hong (POSTECH, Korea (South))

**13:30 - 14:00, Using Machine Learning for Predicting Arbitrage Occurrences in Cryptocurrency Exchanges**
Kristián Košťál (Slovak University of Technology, Slovakia)

**14:00 - 14:30, Buy Crypto, Sell Privacy: Investigating the Cryptocurrency Exchange Evonax**
Alexander Brechlin, Jochen Schäfer and Frederik Armknecht (University of Mannheim, Germany)

FRIDAY, 31/05/2024, 14:30 - 15:45 (CRYPTOEX WORKSHOP)
WORKSHOP SHORT PAPER SESSION
Location: Room 3074

**14:30 - 14:48, A Low-Volatility Strategy based on Hedging a Quanto Perpetual Swap on BitMEX**
Daniel Atzberger (Hasso Plattner Institute, Digital Engineering Faculty, University of Potsdam, Germany); Toshiko Matsui (Imperial College London, United Kingdom (Great Britain)); Robert Henker (XU Exponential University, Germany); Willy Scheibel and Jürgen Döllner (Hasso Plattner Institute - Digital Engineering Faculty - University of Potsdam, Germany); William J Knottenbelt (Imperial College, United Kingdom (Great Britain))

**14:48 - 15:06, Unlocking DeFi Literacy: Understanding NFT Market Microstructure in the Decentralized Finance Landscape**
Sampad Sikder and Mashiat Amin Farin (University of Dhaka, Bangladesh); Md. Ariful Islam (Brain Station-23 PLC, Bangladesh); Tahlil Tahlil (Road no. 6, Arunapolli, Savar, Dhaka & Tero Labs LLC, Bangladesh); Meah Tahmeed Ahmed (University of Texas at Dallas, USA)

**15:06 - 15:24, Bitcoin Inscriptions: Foundations and Beyond**
Ningran Li and Minfeng Qi (Swinburne University of Technology, Australia); Qin Wang (CSIRO Data61, Australia); Shiping Chen (Commonwealth Scientific and Industrial Research Organisation, Australia)

**15:24 - 15:42, Central Bank Digital Currency (CBDC) Requirements & Challenges**
Babu Pillai (Southern Cross University, Australia)

FRIDAY, 31/05/2024, 16:15 - 17:45 (CRYPTOEX WORKSHOP)
WORKSHOP TECHNICAL SESSION 3
Location: Room 3074

**16:15 - 16:45, Detection of NFT Duplications with Image Hash Functions**
Arad Kotzer, Mostafa Naamneh and Ori Rottenstreich (Technion, Israel); Pedro Reviriego (University Carlos III of Madrid, Spain)

**16:45 - 17:15, Towards Proxy Staking Accounts Based on NFTs in Ethereum**

Viktor Valaštín, Roman Bitarovský, Kristián Košťál and Ivan Kotuliak (Slovak University of Technology, Slovakia)

**17:15 - 17:45, SoK: Cryptocurrency Wallets -- A Security Review and Classification based on Authentication Factors**
Ivan Homoliak and Martin Perešíni (Brno University of Technology, Czech Republic)

## FRIDAY, 31/05/2024 (DAG-DLT WORKSHOP)

### FRIDAY, 31/05/2024, 09:15 - 10:15 (DAG-DLT WORKSHOP)

**WORKSHOP KEYNOTE : FROM CHAINS TO DAGS: A TOUR OF POW PROTOCOLS**
Location: Room 3126

**Speaker: Shai Wyborski (KASPA)**

### FRIDAY, 31/05/2024, 10:30 - 11:00 (DAG-DLT WORKSHOP)

WORKSHOP TECHNICAL SESSION 1
Location: Room 3126

**10:30 - 11:00, Secure Transmission of Immutable Data for Low-Power, Long-Range Wireless IoT Services**
Andreas Baumgartner (Chemnitz University of Technology, Germany); Nada Akkari (Chemnitz University of Technology, Germany); Sudip Barua (Chemnitz University of Technology, Germany); Thomas Bauschert (Chemnitz University of Technology, Germany)

**11:00 - 11:30, A Study on Shared Objects in Sui Smart Contracts**
Roman Overko (IOTA Foundation, Germany)

### FRIDAY, 31/05/2024, 11:45 - 12:45 (DAG-DLT WORKSHOP)

WORKSHOP TECHNICAL SESSION 2
Location: Room 3126

11:45 - 12:15, **Name Management Using IOTA in ICN**
Teppei Okada (Ritsumeikan University, Japan); Noriaki Kamiyama (Ritsumeikan University, Japan)

12:15 - 12:45, **SoK: DAG-based Consensus Protocols**
Mayank Raikwar (University of Oslo, Norway); Sebastian Müller (Aix-Marseille University, France); Nikita Polianskii (IOTA Foundation, Germany)

## FRIDAY, 31/05/2024 (DEPIN WORKSHOP)

### FRIDAY, 31/05/2024, 09:10 - 10:00 (DEPIN WORKSHOP)

**WORKSHOP KEYNOTE: CAN AI HELP FINANCE AND BUILD GLOBAL AI INFRASTRUCTURE AND EQUALITY OF OPPORTUNITY?**
Location: Room 3071

**Speaker: David Palmer (Vodafone, UK)**

FRIDAY, 31/05/2024, 10:30 - 11:50 (DEPIN WORKSHOP)
WORKSHOP TECHNICAL SESSION 1: ARCHITECTURE & INFRASTRUCTURE
Location: Room 3071

**10:30 - 11:20, Industry Perspective: DePIN - A Modular Infrastructure Thesis**
Xinxin Fan (IoTeX, USA)

**11:20 - 11:50, SoK: DePIN Data Layer for Modular Blockchain**
Babu Pillai (Southern Cross University, Australia)

FRIDAY, 31/05/2024, 13:00 - 15:00 (DEPIN WORKSHOP)
WORKSHOP TECHNICAL SESSION 2: AI, NETWORK & PERFORMANCE
Location: Room 3071

**13:00 - 13:30, Trusted LLM Inference on the Edge with Smart Contracts**
Rabimba Karanjai (University of Houston, USA), Weidong (Larry) Shi (University of Houston, USA)

**13:30 - 14:00, Towards a Trusted and Cryptocurrency-Enabled Decentralized Wireless Community Network**
Sungmin Choi (Tsinghua University, China), Zhuochen Xie (Tsinghua University, China), Yifan Liu (Tsinghua University, China), Woo Tan Tat (Tsinghua University, China), Yongqi Wu (Tsinghua University, China), Xingjun Wang (Tsinghua University, China)

**14:00 - 14:30, Performance Analysis of Decentralized Physical Infrastructure Networks and Centralized Clouds**
Jan von der Assen (University of Zurich, Switzerland), Christian Killer (University of Zurich & Acurast Association, Switzerland), Alessandro De Carli (Acurast Association, Switzerland), Burkhard Stiller (University of Zurich, Switzerland)

**14:30 - 15:00, Proliferation of the Service-centric Distributed Consensus Model and its Impact on Ethereum**
David Guzman (Technical University of Munich, Germany), Dirk Trossen (Huawei Technologies Dusseldorf GmbH, Ger- many), Trinh Viet Doan (Technical University of Munich, Germany), Jorg Ott (Technical University of Munich, Germany)

FRIDAY, 31/05/2024, 15:30 - 16:30 (DEPIN WORKSHOP)

**DEPIN PANEL: TOWARDS MASS ADOPTION OF DEPIN: CHALLENGES AND OPPORTUNITIES**

Location: Room 3071

**Moderator: Xinxin Fan (IoTeX, USA)**

**Panellist: Robert Koschig (1kx, Portugal), David Palmer (Vodafone, UK), Jonathan Heiss (TU Berlin, Germany)**

**KEYNOTE SPEAKER & PANELLISTS**

David Palmer (Keynote Speaker/Panellist) is a digital visionary and global platform innovator. He is the Chief Product Officer of Vodafone's Digital Asset Broker (DAB) Web3 platform, Pair- Point. He also works as a Blockchain Leader at Vodafone Business. David is a recognized thought leader in blockchain, Web3, and the use case of these technologies to telecoms and wider enter- prise business. He is actively involved in knowing the convergence of digital technologies and new business models. He participates in many speaking pannels. David is currently exploring opportu- nities within Blockchain, Web3, DeFi, Digital Identity, and the Metaverse.

Robert Koschig (Panelist) is an economist and data scientist at 1kx. Robert studied financial mathematics in Leipzig and at Rice University. He supports our portfolio companies with bonding curve & pricing mechanism designs and agent-based simulations. Previous to that, Robert built and led data science teams for pricing, supply chains and natural language processing at Wayfair for 5 years. He also worked on BCG's risk team for financial institutions for 2 years and founded a math education platform for students. His affinity for math translates into musical abilities that he expresses through either techno or trumpets.

Dr.-Ing. Jonathan Heiß (Panelist) is a computer scientist (PhD) at TU Berlin with a strong inter- 2est and expertise in distributed systems. A special focus lies on novel decentralized applications of blockchains, zero-knowledge proofs, and trusted execution environments and their integration into real-world systems in domains like carbon emission management, federated learning, and decen- tralized identity. Jonathan is the project lead of ZoKratesPlus, a publicly funded validation initia- tive on ZoKrates, an open-source technology for zero-knowledge proofs (zkSNARKs). Jonathan serves as a reviewer in various international scientific conferences and journals. This year he co- organizes the ZKDAPPS workshop at ICBC and the BRAINS conference in Berlin. Jonathan is a member of the academic advisory board of the International Association for Trusted Blockchain Applications (INATBA).

## FRIDAY, 31/05/2024 (ZKDAPPS & CROSSCHAIN WORKSHOP)

FRIDAY, 31/05/2024, 09:00 - 10:00 (ZKDAPPS WORKSHOP)

WORKSHOP TECHNICAL SESSION

Location: Room 3051

**09:00 - 09:30, zk-IoT: Securing the Internet of Things with Zero-Knowledge Proofs on Blockchain Platforms**
Gholamreza Ramezan (FidesInnova, Canada); Ehsan Memari (FidesInnova, USA))

**09:30 - 10:00, Portal: Time-Bound and Replay-Resistant Zero-Knowledge Proofs for Single Sign-On**
Jan Philipp Lauinger, Serhat Bezmez, Jens Ernstberger, and Sebastian Steinhorst (Technical University of Munich, Germany))

FRIDAY, 31/05/2024, 10:30 - 11:30 (CROSSCHAIN WORKSHOP)
WORKSHOP TECHNICAL SESSION
Location: Room 3051

**10:30 - 11:00, Towards a Standard Framework for Blockchain Interoperability**
Rafael Belchior (Instituto Superior Técnico & INESC-ID & Blockdaemon Ltd., Portugal); Sabrina Scuri (Politecnico di Milano, Italy & Interactive Technologies Institute/LARsys, Portugal); Nuno Nunes (ITI/LARSYS, Técnico - ULisbon, Portugal); Thomas Hardjono (MIT, USA); André Vasconcelos (INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal)

**11:00 - 11:30, Formalising a Gateway-based Blockchain Interoperability Solution with Event-B**
Guzman Llambias (Universidad de la República & Pyxis, Uruguay); Laura González and Raúl Ruggia (Universidad de la República, Uruguay)


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