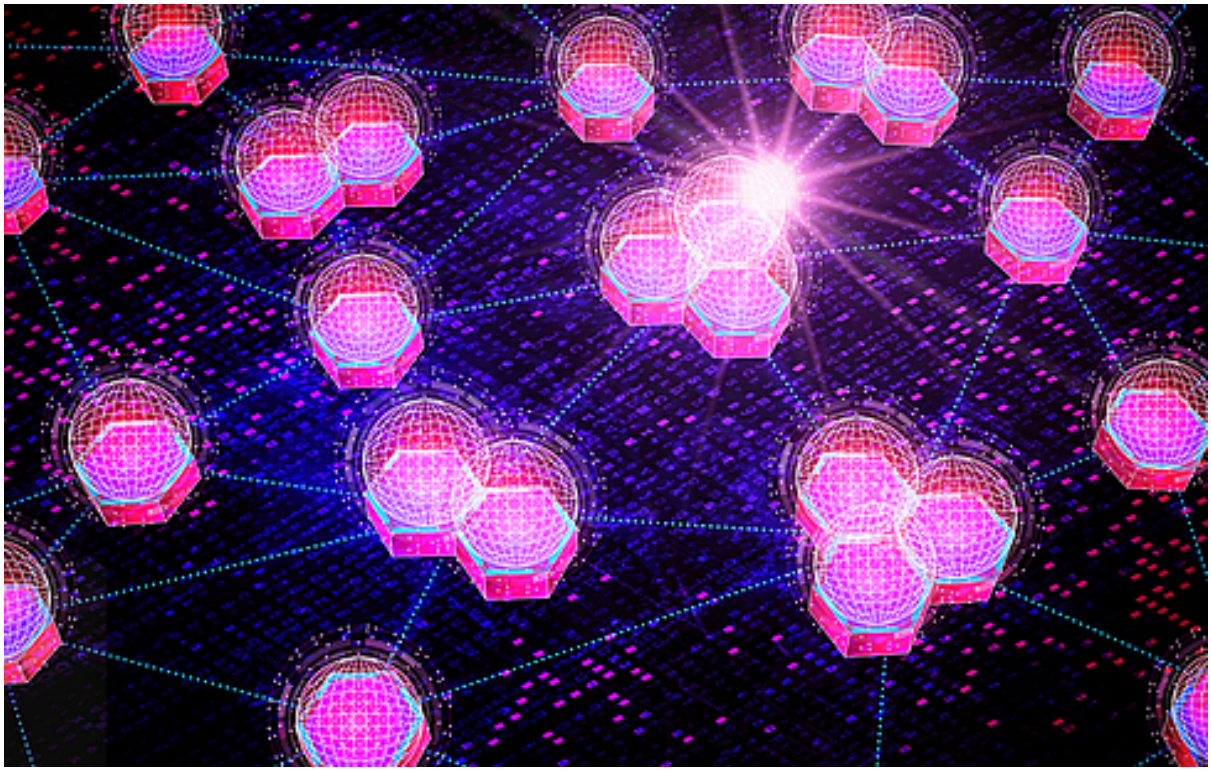
Frontiers in Decentralized Finance 2025

Program & Speakers



HTW Berlin, Wilhelminenhofstraße 75A, 12459 Berlin

Google Maps

Building G, Room G002

Thursday, 18 September 2025

Program (Thursday, 18.09.2025)

Time	Event
08:30 – 09:10	Arrival & Registration
09:00 – 09:10	Welcome remarks
09:10 – 10:40	**Morning Session 1, Chair Bernhard Haslhofer, CSH** **Massimo Bartoletti** | University of Cagliari *Theory of Lending Protocols in DeFi* **Yichen Luo** | University College London *Piercing the Veil of TVL: DeFi Reappraised* **Benjamin Kraner** | University of Zurich *Money in Motion: Micro-Velocity and Usage of Ethereum's Liquid Staking Tokens*
10:40 – 11:00	Coffee Break
11:00 – 12:30	**Morning Session 2, Chair Christina Erlwein-Sayer, HTW Berlin** **Natalie Packham** | HWR Berlin *Jump risk premia in the presence of clustered jumps* **Massimiliano Caporin** | University of Padova *Sector Structure in Digital Asset Returns* **Daniel Traian Pele** | ASE Bucharest *Do Investors Buy Innovation: Market Responses to ETH Development Milestones*
12:30 – 13:30	Lunch Break
13:30 – 15:00	**Afternoon Session 1, Chair Pietro Saggese, IMT Lucca** **Valerie Laturnus** | Durham University *How Do Shareholder Defaults Influence Corporate Governance in DeFi Lending?* **Stefan Schmid** | Technical University Berlin *Democracy for DAOs: Decentralized Governance in Theory and Practice* **Stefan Kitzler** | Complexity Science Hub *The Impact of DeFi Crime Events on DAOs*
15:00 – 15:30	Coffee Break
15:30 – 17:00	**Afternoon Session 2, Chair Marcus Wunsch, ZHAW** **Martin Herdegen** | University of Stuttgart *Optimal Dynamic Fees in Automated Market Makers* **Daniele Marazzina** | Politecnico di Milano *The Adoption of Central Bank Digital Currency* **Paul P. Momtaz** | Syracuse University *Venture Tokenization and Growth: The Going-Public Decision of Decentralized Digital Platforms*
17:20	Networking Apéro

IMT School for Advanced Studies Lucca · htw · zhaw · Poznań University of Economics and Business · Complexity Science Hub

Meet our speakers

Massimiliano Caporin
University of Padova

Martin Herdegen
University of Stuttgart

Stefan Kitzler
Complexity Science Hub

Benjamin Kraner
University of Zurich

Valerie Laturnus
Durham University

Yichen Luo
University College London

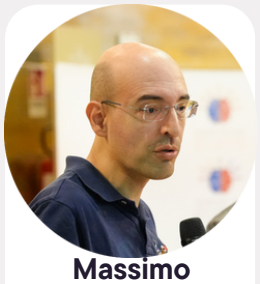
Daniele Marazzina
Politecnico di Milano

Paul P. Momtaz
Syracuse University

Natalie Packham
HWR Berlin

Daniel Traian Pele
ASE Bucharest

Stefan Schmid
Technical University Berlin



Massimo Bartoletti
University of Cagliari

Massimo Bartoletti| University of Cagliari

Theory of Lending Protocols in DeFi

Abstract: Lending protocols are one of the main applications of Decentralized Finance (DeFi), enabling crypto-assets loan markets with a total value estimated in the tens of billions of dollars. Unlike traditional lending systems, these protocols operate without relying on trusted authorities or off-chain enforcement mechanisms. To achieve key economic goals such as stability of the loan market, they devise instead trustless on-chain mechanisms, such as rewarding liquidators who repay the loans of under-collateralized borrowers by awarding them part of the borrower's collateral. The complexity of these incentive mechanisms, combined with their entanglement in low-level implementation details, makes it challenging to precisely assess the structural and economic properties of lending protocols, as well as to analyze user strategies and attacks. Crucially, since participation is open to anyone, any weaknesses in the incentive mechanism may give rise to unintended emergent behaviours, or even enable adversarial strategies aimed at making profits to the detriment of legit users, or at undermining the stability of the protocol. In this talk, we present a formal model of lending protocols that captures the essential features of mainstream platforms, enabling us to identify and prove key properties related to their economic and strategic dynamics.

Bio: Massimo Bartoletti is Associate Professor at the Department of Mathematics and Computer Science of the University of Cagliari. His research activity concerns the development of tools and techniques for the specification, analysis and verification of software, with a special emphasis on security and formal methods. Massimo Bartoletti is founder of the laboratory Blockchain@Unica, one of the first academic research group on blockchain technologies in Italy, director of the node of the Cyber Security National Lab for the University of Cagliari, and core member of the CINI working group on Blockchain. The laboratory is currently investigating several aspects of blockchain technologies, among which custom Domain-Specific Languages for smart contracts. He is principal investigator of R&D projects on blockchain technologies, and program committee member of top-tier conferences on blockchain technologies, including ACM CCS - blockchain track and Financial Cryptography. He is the organizer of the DLT Workshop series, of the Scientific School on Blockchain & DLT series, and of the Workshop on Distributed Ledger Technologies and Formal Methods series. Massimo Bartoletti has published over 50 scientific papers on blockchain technologies since 2016, and it has presented his research in top-tier conferences like ACM CCS, Financial Cryptography, Computer Security Foundations, IEEE Security and Privacy Europe, and ESEC/SIGSOFT FSE.

Yichen Luo| University College London

Piercing the Veil of TVL: DeFi Reappraised

Abstract: Total value locked (TVL) is widely used to measure the size and popularity of decentralized finance (DeFi). However, TVL can be manipulated and inflated through "double counting" activities such as wrapping and leveraging. As existing methodologies addressing double counting are inconsistent and flawed, we propose a new framework, termed "total value redeemable (TVR)", to assess the true underlying value of DeFi. Our formal analysis reveals how DeFi's complex network spreads financial contagion via derivative tokens, increasing TVL's sensitivity to external shocks. To quantify double

counting, we construct the DeFi multiplier, which mirrors the money multiplier in traditional finance (TradFi). This measurement reveals substantial double counting in DeFi, finding that the gap between TVL and TVR reached $139.87 billion during the peak of DeFi activity on December 2, 2021, with a TVL-to-TVR ratio of approximately 2. We conduct sensitivity tests to evaluate the stability of TVL compared to TVR, demonstrating the former's significantly higher level of instability than the latter, especially during market downturns: a 25% decline in the price of Ether (ETH) leads to a $1 billion greater decrease in TVL compared to TVR via the liquidations triggered by derivative tokens. We also document that the DeFi money multiplier is positively correlated with crypto market indicators and negatively correlated with macroeconomic indicators. Overall, our study suggests that TVR is more reliable and stable than TVL.

Bio: Yichen Luo is a PhD candidate UCL. His research interests include decentralized finance, market manipulation detection, and multi-agent systems.

Benjamin Kraner | University of Zurich

Money in Motion: Micro-Velocity and Usage of Ethereum's Liquid Staking Tokens

Bio: Benjamin Kraner is a PhD student in the Blockchain and Distributed Ledger Technologies group. Before starting his PhD, Benjamin obtained a master's degree in economics from the University of Zürich. His background in economics provides him with a unique perspective on the design and implementation of DLTs, particularly with respect to the economic incentives that underlie these systems. Benjamin's research interests include the study of consensus mechanisms, which are fundamental to the functioning of blockchain and DLTs. He is particularly interested in the economic incentives that are built into these systems and how they affect the behaviour of network participants. His work aims to explore the impact of these incentives on the security, scalability, and efficiency of DLTs.

Abstract: We introduce a micro-velocity framework for analysing the on-chain circulation of Lido's liquid-staking tokens, stETH and its wrapped ERC-20 form wstETH, after Ethereum's transition to proof-of-stake. By reconstructing full transfer and share-accounting histories, we compute address-level velocities and decompose them into behavioural components. Despite their growing importance, the micro-level monetary dynamics of LSTs remain largely unexplored. Our data reveal persistently high velocity for both tokens, reflecting intensive reuse within DeFi. Yet activity is highly concentrated: a small cohort of large addresses, likely institutional accounts for most turnover, while the rest of users remains largely passive. We also observe a gradual transition in user behavior, characterized by increasing adoption of wstETH over rebasing stETH. This shift appears to align with DeFi composability trends, as wstETH is more frequently deployed across protocols such as AAVE, Spark, Balancer, and SkyMoney. To make the study fully reproducible we release (i) an open-source pipeline that indexes event logs and historical contract state, and (ii) two public datasets containing every Transfer and TransferShares record for stETH and wstETH through 2024-11-08. This is the first large-scale empirical characterisation of liquid-staking token circulation. Our methodology offers a blueprint for monitoring proof-of-stake assets, while the datasets lower the barrier to future research on the financial complexity and user asymmetry emerging in liquid-staking markets.

Natalie Packham| HWR Berlin

Jump risk premia in the presence of clustered jumps

Abstract: This paper presents an option pricing model that incorporates clusters of jumps using a bivariate Hawkes process with exponential decay memory kernels. The Hawkes process captures self- and cross-excitement of positive and negative jumps, allowing the model to effectively capture the volatile price dynamics observed in cryptocurrencies such as Bitcoin (BTC), while also fitting the implied volatility surface. The model can fit the dynamics of implied volatilites with changing preferences for the skewness risk. As an example, we use BTC dynamics where the skewness can change from negative (stronger demand for puts) to positive (stronger demand for calls). We derive positive and negative jump risk premia, defined as the discrepancies in jump measures between the objective measure and the risk-neutral measure. Our findings reveal that these jump risk premia: (i) provide insights on how the BTC options market reacts to major events, such as the COVID-19 outbreak and the FTX scandal; (ii) possess significant predictive power for delta-hedged option returns; and (iii) are indicators in explaining the volatile cost-of-carry implied from BTC futures prices.

Massimiliano Caporin| University of Padova

Sector Structure in Digital Asset Returns

Bio: Massimiliano Caporin is Full Professor and Deputy Head at the Department of Statistical Sciences of the University of Padova. He obtained a PhD in Quantitative Economics from the University Ca' Foscari Venice. His research interests include dynamic modeling of financial time series for applications in risk management, asset allocation and empirical finance, the dynamic modeling of energy-related variables, the measurement of systemic risk and, more recently, the analysis of realized variables measured from high frequency data and the analysis of digital assets and variables related to sustainability and emissions. His works appeared in leading journals including the Journal of Econometrics, the Journal of Financial Economics, Review of Finance, the Journal of Financial Econometrics and Energy Economics.

Abstract: We identify a sector structure within the digital asset market, where different types of digital assets (the "digital asset sectors") exhibit different risk and return characteristics. To the best of our knowledge, this study provides the first comprehensive analysis of the sector structure within the digital asset market. We examine the observed sectoral variation through two channels: the systematic risk channel and the idiosyncratic risk channel. Our findings indicate that although sectoral differences exist, they do not translate into variations in sector-level beta exposures. Instead, sector-specific information emerges through the idiosyncratic risk channel. The sector risk factor, which captures this sector-specific information, exhibits significant variability. Further analysis reveals that such sectoral differences are driven by sector-specific events, sector momentum, and inter-sector spillovers.

Daniel Traian Pele| ASE Bucharest

Do Investors Buy Innovation: Market Responses to ETH Development Milestones

Abstract: Ethereum has undergone a series of protocol upgrades that are publicly announced yet technically complex, raising a key question: Do markets fully incorporate these innovations into prices? This paper explores investor responses to Ethereum Improvement Proposals (EIPs), emphasizing the role of informational asymmetries and herding behavior in cryptocurrency (crypto) asset pricing. Our findings provide evidence supporting both the "innovation-growth" and the "innovation-fragility" hypotheses. Specifically, security- and validator-related upgrades are associated with positive returns and increased volatility, while monetary upgrades tend to dampen volatility. When upgrades are considered significant for the entire crypto ecosystem, their effects would spill over into other crypto markets. These findings offer new insights into how innovation is priced in decentralized markets and provide implications in asset decision for the broader crypto-asset ecosystem.

Bio: Daniel Traian Pele is Professor of Statistics and Data Science at the Bucharest University of Economic Studies (ASE), Romania, and researcher in the Institute for Digital Assets (IDA) and AI4EFin. He serves as the local project manager for the MSCA Industrial Doctoral Network on Digital Finance (DIGITAL), part of the European Union's Horizon Europe research and innovation program. He is Work Package 4 Co-Lead for digital innovation with blockchain applications within the MSCA DIGITAL project. Professor Pele's research covers time series analysis, financial risk management, and the integration of artificial intelligence—including large language models and blockchain technology—into digital finance. He holds a senior researcher position at the Romanian Academy's Institute for Economic Forecasting, he is a member of the Romanian National Statistical Council and has held visiting research appointments at Humboldt University Berlin, Germany, and University of Reading, UK. Professor Pele has contributed as an expert consultant to the World Bank, the European Investment Bank, and the European Commission on numerous projects relating to public finance, risk assessment, and data-driven policy. An active educator and mentor, Professor Pele is a PhD coordinator in the Doctoral School of Cybernetics and Economic Statistics at ASE Bucharest, teaches courses on the statistics of financial markets and time series, and is a board member of the European Courses in Advanced Statistics (ECAS). His work is published internationally and he frequently speaks at leading conferences on digital finance, risk, and AI in financial markets.

Valerie Laturnus| Durham University

How Do Shareholder Defaults Influence Corporate Governance in DeFi Lending?

Bio: Valerie Laturnus joined Durham University as an Assistant Professor of Finance in January 2024. She received her PhD in Financial Economics from Goethe University Frankfurt. Her research focuses on FinTech and blockchain economics, including two projects analyzing the credibility of investment information in Initial Coin Offerings (ICOs) on the blockchain and a third project exploring corporate governance mechanisms in Decentralized Autonomous Organizations (DAOs). Valerie has extensive experience

working with blockchain data and has shared her expertise on the Blockchain Scholars Podcast.

Stefan Schmid| Technical University Berlin

Democracy for DAOs: Decentralized Governance in Theory and Practice

Abstract: Decentralized autonomous organizations (DAOs) rely on governance mechanism without centralized leadership. In this talk, we discuss decentralized governance approaches both from an empirical and from an analytical perspective. We first shed light on user behavior in governance for a variety of DAOs on the Internet Computer, considering over 3,000 proposals. The Internet Computer is a particularly interesting example also because of its liquid democracy model which allows to delegate votes. In the second part of the talk, we then step back and try to understand from a more fundamental perspective, when such liquid democracy approaches can outperform alternative forms of governance.

Bio: Stefan Schmid is a Professor at the Technical University of Berlin, Germany. MSc and PhD at ETH Zurich, Postdoc at TU Munich and University of Paderborn, Senior Research Scientist at T-Labs in Berlin, Associate Professor at Aalborg University, Denmark, Full Professor at the University of Vienna, Austria, and Sabbathical as a Fellow at the Israel Institute for Advanced Studies (IIAS), Israel. Stefan Schmid received the IEEE Communications Society ITC Early Career Award 2016 and an ERC Consolidator Grant 2019.

Stefan Kitzler| Complexity Science Hub

The Impact of DeFi Crime Events on DAOs

Abstract: The Decentralized Finance (DeFi) ecosystem has experienced over $10 billion in direct losses due to crime events. Beyond immediate losses, such events often trigger broader market reactions, including price declines, shifts in trading volume, and drops in market capitalization. Decentralized Autonomous Organizations (DAOs), which govern DeFi applications, issue governance assets similar to corporate shares. They are tradable on exchanges and used for decision-making through voting. Given DeFi's transparency, the indirect economic impact of crime events on DAOs can be measured at a granular level. We conduct an event study on 22 crime events between 2020 and 2022 to analyze their effects on governance asset prices, trading volumes, and market capitalization. Using a dynamic difference-in-differences (DiD) framework with counterfactual governance assets, we aim for causal inference of intraday temporal effects. Our results show that 55% of crime events lead to significant negative price impacts, with an average decline of about 14%. Additionally, 68% of crime events lead to increased governance asset trading volume. Given substantial price declines, we estimate an indirect economic loss of over $1.3 billion in market capitalization for DAOs. These indirect losses far exceed direct victim costs, accounting for 74% of total losses. Our study provides valuable insights into how crime events shape market dynamics and affect DAOs. Moreover, our methodological approach is reproducible and applicable beyond DAOs, offering a framework for assessing the indirect economic impact of crime on other publicly traded cryptoassets.

Bio: Stefan Kitzler joined the Complexity Science Hub as a PhD candidate in May 2021. His research interests center around data analysis on cryptoassets, especially in

Decentralized Finance. In 2023, he did a research stay at University of Montreal at the EconCrime Lab. Since March 2024, he serves as a University lecturer at TU Wien and worked as a Technical Advisor at the BIS Innovation Hub on the Data Atlas project in early 2025. Currently, he works in the Digital Currency Ecosystems research group, is doing his PhD thesis in computer science at TU Wien, and is a Scientist at AIT Austrian Institute of Technology. Stefan received a bachelor's and a master's degree in technical physics from TU Wien. During his studies, he did an internship in the Center for Energy at the AIT and continued the cooperation with the AIT for his master's thesis. After his graduation in 2018, Stefan worked in the Austrian energy market on computational projects for the power and gas clearing before transitioning to blockchain research.

Martin Herdegen| University of Stuttgart

Optimal Dynamic Fees in Automated Market Makers

Abstract: Automated Market Makers (AMMs) are emerging as a popular decentralised trading platform. In this talk, we determine the optimal dynamic fees in a constant function market maker. We find approximate closed-form solutions to the control problem and study the optimal fee structure. We find that there are two distinct fee regimes: one in which the AMM imposes higher fees to deter arbitrageurs, and another where fees are lowered to increase volatility and attract noise traders. Our results also show that dynamic fees that are linear in inventory are an excellent approximation of the optimal fee structure and thus constitute a suitable candidate when designing fees for AMMs. The talk is based on joint work with Leonardo Baggiani and Leandro Sanchéz-Betancourt.

Bio: Martin Herdegen did his PhD in Mathematical Finance at ETH Zürich. After holding a faculty position at the University of Warwick for several years, he recently joined the University of Stuttgart as a Professor of Stochastics and Applications. His research focuses on portfolio optimisation, equilibrium theory, risk measures and more recently DeFi.

Daniele Marazzina| Politecnico di Milano

The Adoption of Central Bank Digital Currency

Abstract: We investigate the adoption of Central Bank Digital Currency (CBDC) in a partial equilibrium setting, focusing on four key features: remuneration, monetary incentives, interoperability, and architecture. Agents are interested in adopting CBDC because they have a preference for digital payments, and the Central Bank may incentivize adoption through subsidies and platform development, potentially in collaboration with the private sector. Our results demonstrate that both the remuneration scheme and monetary incentives significantly influence the adoption rate and transaction volume. Calibrating the model for the Digital Euro case study, we show that the target of 60% of the population using CBDC can be achieved, provided that platform productivity is substantially enhanced. While this target is feasible within a one layer architecture, it becomes significantly more challenging in a two layers setting. CBDC is likely to win the adoption battle against stablecoins but is likely to lose it against debit cards. Joint work with Emilio Barucci and Matteo Brachetta.

Bio: Daniele Marazzina, PhD, is Professor of Mathematical Finance at the Department of Mathematics of Politecnico di Milano. His research mainly focuses on Quantita-

tive and Digital Finance.

Paul P. Momtaz| Syracuse University

Venture Tokenization and Growth: The Going-Public Decision of Decentralized Digital Platforms

Abstract: After initial coin offerings (ICOs), decentralized digital platforms (DDPs) decide whether to go public or remain private. We explore the implications of the public-versus-private decision for the growth and decentralization of DDPs. Employing a difference-in-differences framework, we find that public DDPs scale faster post-listing relative to matched private DDPs. An important driver behind public DDPs' superior growth is a spillover effect of financial speculation on fundamental platform activity, especially when DDPs are undervalued, hastening network effects. The going-public decision also facilitates DDP decentralization, although this stems mostly from the left tail of the token ownership distribution, while blockholders largely remain in control. Exploring the trade-off between going public through token exchange listings and remaining private with the help of institutional investors, we find that crypto fund-endorsed token listings yield more platform growth than unendorsed listings, while crypto fund backings without listings create the least value. Overall, our study suggests that early-stage startups may economically benefit from tokenization and creating liquid markets for venture tokens.

Bio: Paul P. Momtaz, Ph.D., is an associate professor of entrepreneurial finance at the Martin J. Whitman School of Management at Syracuse University, New York, USA. He has published in top journals in entrepreneurship, management, and finance. He is an editor of *Small Business Economics* and serves on the editorial boards of several other leading journals. His work has been discussed by *The Economist* and the European Parliament, among others.