

# Ulysse Pavloff, PhD

*Distributed Computing and Game Theory*

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## Education

- 2021–2024     **PhD in Computer Science, CEA and Paris-Saclay University, France.**  
- Research area: Distributed Computing and Game Theory, focusing on blockchain robustness and incentive mechanisms.  
- Thesis: "[A Game-Theoretic Approach to the Study of Blockchain's Robustness.](#)" Focused on Ethereum's Proof-of-Stake (PoS) protocol to derive general insights into robust protocol design.  
- Key contributions: Formalized the Ethereum PoS protocol through pseudo-code based on its specifications and implementation. Identified how inactivity leaks and incentive mechanisms can both strengthen and compromise protocol robustness. Demonstrated that rational validators converge to compliant behavior under equilibrium conditions, providing critical insights into the interplay between incentives and security.  
- Teaching: Delivered courses on Ethereum PoS and robust protocol design at prestigious institutions, including École Polytechnique, HEC Paris, and ENSIIE.  
- Advisors: Sara Tucci-Piergiovanni, Yackolley Amoussou-Guenou.
- 2019–2021     **Master's Degree in Computer Science, Sorbonne University, France.**  
Specialization in Game Theory and Artificial Intelligence.
- 2016–2019     **Two Bachelor's Degrees in Mathematics and Computer Science, Sorbonne University, France.**  
Selective Curriculum (Double Intensive Computer Science and Mathematics).

## Experience

- 2025–present     **Game Theory & Strategic Optimisation Lead, Kolm Shield, Remote.**  
Designing game-theoretic mechanisms to detect and prevent fraudulent transactions in cross-chain bridges. Collaborating with machine learning and post-quantum cryptography teams to integrate incentive-aware decision layers. Developing adversarial models and mechanism design approaches for robust fraud detection in blockchain systems.
- 2022–2023     **Blockchain and ZK Content Author, Node Guardians.**  
Authored comprehensive, in-depth technical content on zk-SNARKs and blockchain technologies. Simplified complex concepts, such as pseudo-randomness and zero-knowledge proofs, into explanatory post followed by a quiz to evaluate comprehension. [804 reads / 653 quiz completed; reference: Hector Roussille.]
- Jan–Jun 2021     **Research Internship, Paris Dauphine University, France.**  
Developed and applied Monte Carlo Tree Search algorithms and Game Theory to analyze voting systems. This work resulted in a scientific paper titled Sequential Elimination Voting Games, which provides tight bounds on worst-case ratios, measuring the loss of social welfare due to strategic behavior, and presents experimental analyses demonstrating that the average impact of manipulation is significantly lower than in the worst-case scenarios.  
Supervised by Prof. Jérôme Lang and Prof. Tristan Cazenave.

Summer 2019     **Data Scientist**, Wister, France.  
Leveraged deep learning models to optimize ad selection, improving user engagement and automating model updates. Improved CTR by 155%.

## Technical Skills

C, C++, C#, CSS, Git, HTML, Java, JavaScript,  $\LaTeX$ , Matlab, Python, Solidity, SQL.

## Publications

- Pavloff, Ulysse, Yackolley Amoussou-Guenou, and Sara Tucci-Piergiovanni. "Ethereum Proof-of-Stake and the Probabilistic Bouncing Attack." *ACM Distributed Ledger Technologies Journal*.
- Pavloff, Ulysse, Yackolley Amoussou-Guenou, and Sara Tucci-Piergiovanni. "Incentive Compatibility of Ethereum's PoS Consensus Protocol." *28th International Conference on Principles of Distributed Systems (OPODIS 2024)*, 2024.
- Pavloff, Ulysse, Yackolley Amoussou-Guenou, and Sara Tucci-Piergiovanni. "Byzantine Attacks Exploiting Penalties in Ethereum PoS." *54th IEEE/IFIP DSN 2024, Brisbane, Australia*, 2024.
- Pavloff, Ulysse, Yackolley Amoussou-Guenou, and Sara Tucci-Piergiovanni. "Ethereum Proof-of-Stake under Scrutiny." *38th ACM/SIGAPP Symposium on Applied Computing*, 2023.
- Attiya, Hagit, Alessia Del Pozzo, Alessia Milani, Ulysse Pavloff, and Alexandre Rapetti. "The Synchronization Power of Auditable Registers." *27th OPODIS 2023*, 2023.
- Pavloff, Ulysse, Yackolley Amoussou-Guenou, and Sara Tucci-Piergiovanni. "Exploitation des amendes dans Ethereum PoS." *AlgoTel 2024 – Rencontres sur les Aspects Algorithmiques des Télécommunications*, 2024.
- Pavloff, Ulysse, Tristan Cazenave, and Jérôme Lang. "Sequential Elimination Voting Games." *arXiv preprint*, 2022.

## Teaching

Spring 2023     **Guest Lecturer**, *École Polytechnique*, with Prof. Julien Prat.  
Delivered specialized lectures on Ethereum consensus mechanisms and their role in blockchain scalability and security.

2022–2023     **Teaching Assistant**, *HEC*, with Prof. Bruno Biais.  
Delivered lectures and guided discussions on Ethereum consensus mechanisms, emphasizing their application in decentralized finance.

2022–2023     **Teaching Assistant**, *ENSIIE*.  
Conducted hands-on courses on Solidity programming and smart contracts, preparing students for practical blockchain development.

2021–2022     **Teaching Assistant**, *Paris-Saclay University*.  
Designed and taught an introductory course on coding fundamentals, covering Git, Agile methodologies, and best practices for development organization.

## Conference and Seminar Talks

Jan. 2025	Byzantine Attacks Exploiting Penalties in Ethereum PoS, Scientific DILS day, Palaiseau, France.
Nov. 2024	A Game-Theoretic Analysis of Blockchain Robustness, PhD Defense, Palaiseau, France.
Aug. 2024	Byzantine Attacks Exploiting Penalties in Ethereum PoS, DSN, Brisbane, Australia.
Jun. 2024	Invited to Attend, Summer School on real-world crypto and privacy 2024, Vodice, Croatia.
May 2024	Exploitation des amendes dans Ethereum PoS, Algotel, St-Briac, France.
Feb. 2024	Ethereum Proof-of-Stake and the Probabilistic Bouncing Attack, Apéro Défi, Paris, France.
Mar. 2023	Ethereum Proof-of-Stake under Scrutiny, SAC, Talinn, Estonia.
Jun. 2023	Introduction to zk-SNARKs, Invited Speaker, Blockchain Bytes, Palaiseau, France
Feb. 2023	Ethereum Proof-of-Stake Under Scrutiny, Invited Speaker, Blockchain@X, Paris, France
Mar. 2022	Ethereum Consensus Protocol, Invited Speaker, Blockchain Bytes, Palaiseau, France

## Languages

<b>French</b>	Native Speaker
<b>English</b>	Fluent
<b>German</b>	Student Level

## Interests

**Cinema.** Avid attendee with a yearly subscription.  
**Chess.** Rated 1900 Elo on Lichess.  
**DIY Furniture Design.** Created furniture from reclaimed materials, ranging from tables and plant stands to storage solutions.