IVAN MALAKHOV

Postdoc in Computer Science

ABOUT ME

I am a postdoctoral researcher at Ca' Foscari University of Venice. I specialize on applied blockchain network analysis and its performance evaluation.

PERSONAL INFORMATION

CURRENT POSITION: Postdoctoral researcher
ADDRESS: Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, via Torino 155, 30170 Venice, Italy
E-MAIL: iy.malakhov@gmail.com
SOCIAL: linkedin.com/in/van-malakhov

EDUCATION

Ca' Foscari University of Venice, Venice, Italy
2019-2022
Ph.D. in Computer Science
Thesis title: Analysis of the transaction confirmation process and fairness in Proof-of-Work blockchains
Supervisor: Prof. Andrea Marin
Co-supervisor: Prof. Sabina Rossi

National Research University "Higher School of economics", Moscow, Russia
2017-2019
Master degree in Computer systems and networks
Thesis title: System for the Collection Heterogeneous Data on the Internet of Things
Supervisor: Prof. Leonid Voskov

National Research University "Higher School of economics", Moscow, Russia
2013-2017
Bachelor degree in Informatics and computer engineering
Thesis title: Development of a Video Stream Switcher Based on Snowmix
Supervisor: docent Denis Korolev

ACADEMIC POSITIONS

Postdoctoral researcher at **Ca' Foscari University of Venice,** Venice, Italy
2022-today
Research Fellow within the PRIN Project "Noninterference and Reversibility Analysis in Private Blockchains"
Research topic: Analysis of safety and evaluation of the performance of Blockchain networks

Visiting researcher at **Newcastle University,** Newcastle upon Tyne, United Kingdom
February 2022-June 2022
Research fellowship from Ca' Foscari University of Venice to carry out activities of training abroad
Research topic: Analysis of the transaction confirmation process and fairness in Proof-of-Work blockchains

Head of "Student Scientific Society" at **National Research University "Higher School of economics",** Moscow, Russia
2015-2016
Research and team coordination tasks, development tasks

Volunteer at **National Research University "Higher School of economics",** Moscow, Russia
2014-2017
Event management, research and team coordination tasks

TEACHING EXPERIENCE

TUTORING

Algebra Lineare (Italian)
Bachelor Degree Programme in Informatics, DAIS, Ca' Foscari University of Venice (30 hours), I semester 2021/2022

TEACHING ASSISTANCE

Matematica Discreta (Italian)
Bachelor Degree Programme in Informatics, DAIS, Ca' Foscari University of Venice (30 hours), I semester 2022/2023 & 2023/2024

PUBLICATIONS

1. Smuseva, D., **Malakhov I.**, Piazza, C., Marin, A., Rossi, S. *Under the space threat: Quantitative Analysis of Cosmos blockchain*. 20th European Performance Engineering Workshop (EPEW), 2024
2. Smuseva, D., **Malakhov I.**, Piazza, C., Marin, A., Rossi, S. *Cosmos discovery: Quantitative assessment of Cosmos blockchain*. *Submitted to* 32nd International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), 2024
3. **Malakhov, I.**, Marin, A., Sadoc Menaschè D., Rossi S., *Confirmed or Dropped? Reliability Analysis of Transactions in Blockchains*. IEEE Transactions on Network Science and Engineering (TNSE), 2024
4. Smuseva, D., **Malakhov, I.**, Marin, A., Rossi, S., *Crisis of Trust: Analyzing the Verifier's Dilemma in Ethereum's Proof-of-Stake Blockchain*. 6th IEEE International Conference on Blockchain, 2023
5. **Malakhov, I.**, *Analysis of the transaction confirmation process and fairness in Proof-of-Work blockchains*. PhD thesis, 2023
6. **Malakhov, I.**, Marin, A., Rossi S., *Analysis of the Confirmation Time in Proof-of-Work Blockchains*. Future Generation Computer Systems (FGCS), 2023 (pp. 275–291)
7. Smuseva, D., **Malakhov, I.**, Marin, A., van Moorsel A., Rossi, S., *Verifier's Dilemma in Ethereum Blockchain: A Quantitative Analysis*. 19th International Conference on Quantitative Evaluation of SysTems (QEST), 2022 (pp. 317–336)
8. Balsamo S., **Malakhov, I.**, Marin, A., Mitrani I. *Transaction confirmation in proof-of-work blockchains: auctions, delays and droppings*. 20th Mediterranean Communication and Computer Networking Conference (MedComNet), 2022 (pp. 140-149)
9. **Malakhov, I.**, Marin, A., Rossi, S., Smuseva, D. *On the Use of Proof-of-Work in Permissioned Blockchains: Security and Fairness*. IEEE Access, 10, 2022 (pp. 1305-1316)
10. **Malakhov, I.**, Gaetan C., Marin, A., Rossi, S., *Workload Prediction in BTC Blockchain and Application to the Confirmation Time Estimation*. Performance Engineering and Stochastic Modeling. (EPEW ASMTA), 2021 (pp. 3-21)
11. **Malakhov, I.**, Marin, A., Rossi, S., Smuseva, D. *Fair Work Distribution on Permissioned Blockchains: a Mobile Window Based Approach*. IEEE International Conference on Blockchain, 2020 (pp. 436-441)

WORKING EXPERIENCE

Stock and bid market specialist at **Central Bank,** Moscow, Russia
May 2019-August 2019
Supervision of financial institutions

Robotics teacher at **School "Malta Crown",** Moscow, Russia
2017-2018
Lesson preparation, teaching activities, evaluation of pupils' work

Robotics teacher at **Summer school "Malta Crown",** Marsascala, Malta
August 2017
Lesson preparation, teaching activities, evaluation of pupils' work

Information risks management specialist at **KPMG,** Moscow, Russia
November 2017-February 2018
Execution of general IT controls and data analysis to support financial audit

RESEARCH ACTIVITIES

RESEARCH INTERESTS

Ivan Malakhov is primarily focused on researching in the field of the analysis and the evaluation of blockchain networks through the use of formal methods and data analysis. More precisely, his main research directions are:

- Modeling and evaluation of the blockchain networks driven under various consensus mechanisms (such as Proof-of-Stake and Proof-of-Work) with the attention on security, reliability and fairness of underlying systems
- Analysis of existing and development of new blockchain protocols through the use of formal methods and modeling techniques
- Detection of possible flaws and potentially harmful mechanisms in blockchain protocols. Introduction of model- and data-based mitigation approaches.

RESEARCH PROJECTS

PRIN Project, Progetti di Ricerca di rilevante Interesse Nazionale Prot. 20202FCJMH Call 2020: "Noninterference and Reversibility Analysis in Private Blockchains (NiRvAna)". Ivan Malakhov is a member of the UniVe research unit led by Prof. Sabina Rossi.

SPECIALIZATION SCHOOLS

International Winter School on Blockchain Technology and Applications – Hyperledger, Camerino, Italy
December 2020
Place: University of Camerino - Computer Science Division (online)
Topic: Hyperledger Fabric technology for blockchain network research

Date: from December 14 to December 18, 2020

ORAL PRESENTATIONS AND TALKS

PAPER AND ORAL PRESENTATIONS

1. Analysing Algorand: Possible directions for quantitative analysis. PRIN 2020 NiRvAna. (June 2024)
2. Quantitative assessment of Cosmos blockchain. DLT 2024 (May 2024)
3. *Proof of Work vs. Proof of Stake consensus mechanisms: a comparison*. PRIN 2020 NiRvAna. Riunione fine primo anno (June 2023)
4. *Analysis of the Confirmation Time in Proof-of-Work Blockchains*. 2nd Conference on System and Service Quality (QualITA) (June 2023)
5. *Analysis of the Confirmation Time in Proof-of-Work Blockchains*. 5th Distributed Ledger Technology Workshop (May 2023)
6. *Reliability Analysis of Transactions in Blockchains.* PRIN 2020 NiRvAna. Coordination meeting (December 2023)
7. *Confirmation time in Ethereum.* PhD Seminar at Ca' Foscari University of Venice (June 2023)
8. *Bitcoin Workload prediction and application to the confirmation time estimation.* AMBER group seminar at Newcastle University. (June 2022)
9. *Bitcoin Workload prediction and application to the confirmation time estimation.* Seminar at Newcastle University (March 2022)
10. *Workload Prediction in BTC Blockchain and Application to the Confirmation Time Estimation*. ASMTA 2021 (December 2021)
11. *Transaction fee analysis in Bitcoin.* PhD Seminar at Ca' Foscari University of Venice (April 2021)
12. *Fair Work Distribution on Permissioned Blockchains: a Mobile Window Based Approach,* IEEE International Conference on Blockchain (November 2020)
13. FruitChains: Fair blockchain. Discussion. PhD Seminar at Ca' Foscari University of Venice (February 2020)

THESIS DEFENSE

1. *Analysis of the transaction confirmation process and fairness in Proof-of-Work blockchains.* PhD thesis defense at Ca' Foscari University of Venice (May 2023)