Ivan Mercanti

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Ivan Mercanti is a postdoc at the Department of Mathematics and Computer Science at the University of Perugia. He received his PhD in Computer Science and Systems Engineering at IMT School for Advanced Studies, Lucca. His research activities mainly focus on Distributed Ledger Technology (DLT), a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions. In particular, he is studying cryptocurrencies like Bitcoin or Ethereum. He is a member of the CINI Cyber Security Research Lab UniPG, and the Italian Distributed Ledger Technology Working Group.

Employment

2022 – present **Post Doctoral position**, *Depertment of Mathematics and Computer Science, University of Perugia*, Italy
Project "GIUSTIZIA AGILE".

2018 – 2022 **Ph.D. Student in Computer Science**, *IMT School for Advanced Studies*, Lucca, Italy
Scholarship-funded Ph.D. course in Computer Science and Systems engineering.

Education

2018 – 2022 **Ph.D. in Computer Science and Systems Engineering**, *IMT School for Advanced Studies*, Lucca, Italy
Thesis title: *"Models and applications for the cryptocurrencies ecosystem"*. Advisors: Prof. Stefano Bistarelli (University of Perugia), Prof. Rocco De Nicola (IMT School for Advanced Studies, Lucca). Reviewers: Prof. Massimo Bartoletti (University of Cagliari), Prof. Damiano Di-Francesco-Maesa (University of Cambridge).

2015 – 2017 **M.Sc. in Computer Science**, *University of Perugia*, Italy, Final mark: 110/110
Thesis title: *"Analysis of non-standard bitcoin transactions"*. Advisor: Prof. Stefano Bistarelli (University of Perugia), Prof. Francesco Santini (University of Perugia).

2012 – 2015 **B.Sc. in Computer Science**, *University of Perugia*, Italy, Final mark: 98/110
Thesis title: *"Peculiarities in bitcoin markets"*. Advisor: Prof. Stefano Bistarelli (University of Perugia).

Teaching Activity

2020 – present   **Cultore della Materia, course of "Introduzione alla Sicurezza Informatica"**, Department of Mathematics and Computer Science, University of Perugia, Italy
SSD: INF/01

2018 – present   **Cultore della Materia, course of "System, Social and Mobile Security"**, Department of Political Science, University of Perugia, Italy
SSD: INF/01

2013 – present   **Member of *Applab***, *University of Perugia*, Italy
Intern group of the Department of Mathematics and Computer Science at the University of Perugia, whose purpose is to carry out laboratory work finalized in thesis work and internship.
applab.dmi.unipg.it

Research Activity

Participation in Research Groups

2018 – present   **Cyber Security Research Lab: Research Group on Cybersecurity of the University of Perugia**
SSD: INF/01 - The Lab is a member of the CINI National Cybersecurity Lab.
cybersecuritylab.unipg.it

2018 – present   **Italian Distributed Ledger Technology Working Group**
SSD: INF/01 - The Lab is a member of the the CINI working group on Blockchain.
dltgroup.dmi.unipg.it/

Visiting

2022   University of Stirling, Stirling, UK. Host: Prof. Andrea Bracciali. February – May 2022.

Publications

Journal Articles

[1] Stefano Bistarelli, Ivan Mercanti, and Francesco Santini. "An Analysis of Non-standard Transactions". In: *Frontiers Blockchain* 2 (2019), p. 7.

[2] Stefano Bistarelli, Ivan Mercanti, Paolo Santancini, and Francesco Santini. "End-to-End Voting with Non-Permissioned and Permissioned Ledgers". In: *J. Grid Comput.* 17.1 (2019), pp. 97–118.

[3] Stefano Bistarelli, Rocco De Nicola, Letterio Galletta, Cosimo Laneve, Ivan Mercanti, and Adele Veschetti. "Stochastic modeling and analysis of the bitcoin protocol in the presence of block communication delays". In: *Concurr. Comput. Pract. Exp.* 35.16 (2023).

[4] Letterio Galletta, Cosimo Laneve, Ivan Mercanti, and Adele Veschetti. "Resilience of Hybrid Casper Under Varying Values of Parameters". In: *Distributed Ledger Technol. Res. Pract.* 2.1 (2023), 5:1–5:25.

[5] Federico Costantini, Francesco Crisci, Silvia Venier, Stefano Bistarelli, and Ivan Mercanti. "TACKLING DISINFORMATION IN THE EU: THE CASE OF "TRUTHSTER"". In: *Jusletter IT* March (2023), 1 – 8.

Conference Papers

[1] Stefano Bistarelli, Michele Ceccarelli, Chiara Luchini, Ivan Mercanti, and Francesco Santini. "A Survey of Steganography Tools at Layers 2-4 and HTTP". In: *Proceedings of the 18th International Conference on Availability, Reliability and Security, ARES 2023, Benevento, Italy, 29 August 2023- 1 September 2023.* ACM, 2023, 81:1–81:9.

[2] Stefano Bistarelli, Andrea Bracciali, Rick Klomp, and Ivan Mercanti. "Towards automated verification of Bitcoin-based decentralised applications". In: *Proceedings of the 38th ACM/SIGAPP Symposium on Applied Computing, SAC 2023, Tallinn, Estonia, March 27-31, 2023.* Ed. by Jiman Hong, Maart Lanperne, Juw Won Park, Tomás Cerný, and Hossain Shahriar. ACM, 2023, pp. 262–269. ISBN: 978-1-4503-9517-5.

[3] Stefano Bistarelli, Bruno Lazo La Torre Montalvo, Ivan Mercanti, and Francesco Santini. "An E-Voting System Based on Tornado Cash". In: *Emerging Technologies for Authorization and Authentication - 5th International Workshop, ETAA 2022, Copenhagen, Denmark, September 30, 2022, Revised Selected Papers.* Ed. by Andrea Saracino and Paolo Mori. Vol. 13782. Lecture Notes in Computer Science. Springer, 2022, pp. 120–135. ISBN: 978-3-031-25466-6.

[4] Stefano Bistarelli, Ivan Mercanti, Francesco Faloci, and Francesco Santini. "Highlighting poor anonymity and security practice in the blockchain of Bitcoin". In: *SAC '21: The 36th ACM/SIGAPP Symposium on Applied Computing, Virtual Event, Republic of Korea, March 22-26, 2021.* Ed. by Chih-Cheng Hung, Jiman Hong, Alessio Bechini, and Eunjee Song. ACM, 2021, pp. 265–272.

[5] Stefano Bistarelli, Gianna Figà-Talamanca, Francesco Lucarini, and Ivan Mercanti. "Studying forward looking bubbles in Bitcoin/USD exchange rates". In: *Proceedings of the 23rd International Database Applications & Engineering Symposium, IDEAS 2019, Athens, Greece, June 10-12, 2019*. Ed. by Bipin C. Desai, Dimosthenis Anagnostopoulos, Yannis Manolopoulos, and Mara Nikolaidou. ACM, 2019, 15:1–15:9.

[6] Ivan Mercanti, Stefano Bistarelli, and Francesco Santini. "An Analysis of Non-standard Bitcoin Transactions". In: *Crypto Valley Conference on Blockchain Technology, CVCBT 2018, Zug, Switzerland, June 20-22, 2018*. IEEE, 2018, pp. 93–96.

[7] Stefano Bistarelli, Ivan Mercanti, and Francesco Santini. "A Suite of Tools for the Forensic Analysis of Bitcoin Transactions: Preliminary Report". In: *Euro-Par 2018: Parallel Processing Workshops - Euro-Par 2018 International Workshops, Turin, Italy, August 27-28, 2018, Revised Selected Papers*. Ed. by Gabriele Mencagli, Dora B. Heras, Valeria Cardellini, Emiliano Casalicchio, Emmanuel Jeannot, Felix Wolf, Antonio Salis, Claudio Schifanella, Ravi Reddy Manumachu, Laura Ricci, Marco Beccuti, Laura Antonelli, José Daniel García Sánchez, and Stephen L. Scott. Vol. 11339. Lecture Notes in Computer Science. Springer, 2018, pp. 329–341.

[8] Stefano Bistarelli, Alessandra Cretarola, Gianna Figà-Talamanca, Ivan Mercanti, and Marco Patacca. "Is Arbitrage Possible in the Bitcoin Market? (Work-In-Progress Paper)". In: *Economics of Grids, Clouds, Systems, and Services - 15th International Conference, GECON 2018, Pisa, Italy, September 18-20, 2018, Proceedings*. Ed. by Massimo Coppola, Emanuele Carlini, Daniele D'Agostino, Jörn Altmann, and José Ángel Bañares. Vol. 11113. Lecture Notes in Computer Science. Springer, 2018, pp. 243–251.

Conference Presentations

2023
- Towards automated verification of Bitcoin-based decentralised applications. SAC 23: The 38th ACM/SIGAPP Symposium On Applied Computing, Tallin (Estonia), March 30 2023.
- Enforcing Confidentiality in Tornado Cash-based E-Voting Systems. DLT Workshop 2023 - The 5th Distributed Ledger Technology Workshop, Bologna (Italy), May 25 2023.

2022
- An E-voting System Based on Tornado Cash. 5th International Workshop on Emerging Technologies for Authorization and Authentication (Co-Located with ESORICS 2022), Copenhagen, 30 September 22.

2021 ○ Highlighting Poor Anonymity and Security Practice in the Blockchain of Bitcoin. SAC 21: the 36th Annual ACM Symposium on Applied Computing, Online, 22 March 2021.

○ Stochastic Modelling and Analysis of the Bitcoin Protocol. ITASEC 2021, Trends in Distributed Ledger Technologies (Trends in DLT 2021), Online, 7 April 2021.

2019 ○ Studying forward looking bubbles in Bitcoin/USD exchange rates. IDEAS 2019, 23rd International Database Applications & Engineering Symposium , Athens (Greece). 11 June 2019.

2018 ○ An Analysis of Non-standard Bitcoin Transactions. CVCBT 2018, Crypto Valley Conference on Blockchain Technology, Zug (Switzerland). 20-22 June 2018.

○ A Suite of Tools for the Forensic Analysis of Bitcoin Transactions: Preliminary Repor. Euro-Par 2018: Parallel Processing Workshops - Euro-Par 2018 International Workshops, Turin (Italy), 27-28 August 2018.

○ Is Arbitrage Possible in the Bitcoin Market? (Work-In-Progress Paper). GECON 2018, Economics of Grids, Clouds, Systems, and Services - 15th International Conference, Pisa (Italy). 18-20 September 2018.

Conference Participations

2023 ○ SAC 23: The 38th ACM/SIGAPP Symposium On Applied Computing, Tallin (Estonia), March 27-31, 2023.

○ DLT Workshop 2023 - The 5th Distributed Ledger Technology Workshop, Bologna (Italy), May 25-26, 2023.

2022 ○ ESORICS 2022 - 27th European Symposium on Research in Computer Security. Copenhagen, 26-30 September 2022.

○ 4th DLT working group meeting on multidisciplinary aspects, Florence (Italy), November 7-8, 2023.

2021 ○ SAC 21: the 36th Annual ACM Symposium on Applied Computing, Online, 22 March 2021.

○ ITASEC 2021, Trends in Distributed Ledger Technologies (Trends in DLT 2021), Online, 7 April 2021.

2020 ○ ITASEC 2020 - The Italian Conference on CyberSecurity, Ancona (Italy). 4-7 February 2020.

2019 ○ DLT 2019 - 2nd Distributed Ledger Technology Workshop, Pisa (Italy). 12 February 2019.
○ ITASEC 2019 - The Italian Conference on CyberSecurity, Pisa (Italy). 13-15 February 2019.
○ IDEAS 2019, 23rd International Database Applications & Engineering Symposium , Athens (Greece). 10-12 June 2019.

2018 ○ Pula 2018, The Scientific School on Blockchain - Pula (Italy), 12-15 June 2018.
○ CVCBT 2018, Crypto Valley Conference on Blockchain Technology, Zug (Switzerland). 20-22 June 2018.
○ Euro-Par 2018: Parallel Processing Workshops - Euro-Par 2018 International Workshops, Turin (Italy), 27-28 August 2018.
○ GECON 2018, Economics of Grids, Clouds, Systems, and Services - 15th International Conference, Pisa (Italy). 18-20 September 2018.

2014 ○ Todi Appy Days - Todi, September 28 2014.

2013 ○ CSS3 & HTML5, Developing cross device applications - Pisa, 31 May 2013.

Organisation Committees

2023 ○ **Web chair**, DLT Workshop 2023 - The 5th Distributed Ledger Technology Workshop.

2019 ○ **Organiser**, DLT Workshop 2019 - The 2nd Distributed Ledger Technology Workshop.

2018 ○ **Organiser**, DLT Workshop 2018 - The first Distributed Ledger Technology Workshop.

Reviewer Activity

- ITASEC 2023
- ICTAI 2023
- IWBOSE 2023
- KR 2023
- WTSC 2023
- PLOS ONE 2022
- PRIMA 2022
- WTSC 2022
- Frontiers (Review Editor)
- M-pref 2022
- WTSC 2022
- ITASEC 2022
- ECAI 2022
- KR 2022
- WTSC 2021
- SEMF 2021
- ICTCS 2021
- ITASEC 2021
- GECON 2021
- ITASEC 2020
- ICTAI 2020
- Euro-Par 2020
- GECON 2020
- GraMSec 2020
- CP 2020
- BES 2020
- AI3 2019
- PRIMA 2019
- AI4I 2019
- Euro-Par 2019
- IJCAI 2019
- AIxIA 2018
- Euro-Par 2018

Research Tools

- BlockchainVis Suite (`http://blockchainvis.dmi.unipg.it/`), a suite of tool mainly dedicated to the visual analysis of flows of Bitcoin transactions and other connected activities; ref. publications [7, 1]