Niccolò Marastoni

Date of birth	25/03/1983
Citizenship	Italian
Office	Università di Verona - Dipartimento di Informatica Str. le Grazie, 15 - 37134 Verona
Email	niccolo.marastoni@univr.it
Web page	https://niccolomarastoni.github.io/

Position and Education

Record of Employment

April 2025 – present

Assistant Professor at the University of Verona, Scientific Area: "Computer Science" Research Area: "Data Science" under the European Project DataGEMS.

January 2023 – December 2024

Postdoctoral Researcher at the University of Verona, Scientific Area: "Computer Science" Research Area: "Software Security" under the European Project NEUROPULS.

June 2021 – December 2022

Postdoctoral Researcher at the University of Verona, Scientific Area: "Computer Science" Research Area: "Data Analytics".

December 2016 – September 2017

Research Assistant at the University of Verona, Scientific Area: "Computer Science", Research Area: "Software Security".

Education

- Ph.D. in Computer Science at the University of Verona. September 2021.
  Title: *Program Similarity Analysis for Malware Classification and its Pitfalls*
  Advisor: *Mila Dalla Preda*.
- Laurea in Ingegneria e Scienze Informatiche at the University of Verona. October 2016.
  Grade: 110/110 Cum Laude.
  Thesis title: *'R.E.H.A. - Reverse Engineering Helper for Android*
  Advisor: *Mila Dalla Preda*.

Teaching Activities

2021-2026

Programming and database (*Teacher*) - Computer Science - Master's Degree in Data Science at University of Verona.

2020-2021

Compilers (*Teacher Assistant*) - Computer Science - Undergraduate level.

2017-2020

Foundations of Informatics (*Teacher Assistant*) - Computer Science - Undergraduate level.

2014-2016

Programming I (*Teacher Assistant*) - Computer Engineering - Computer Science - Undergraduate level.

Computer Programming with Laboratory (*Teacher Assistant*) - Applied Mathematics - Undergraduate level.

STUDENTS' SUPERVISION

Graduate Students Supervision

- *Elisa Ottoboni* 2024-2025 "From Tweets to Trends: Sentiment Analysis and Topic Modelling of Donald Trump's Online Communication" (Advisor)
- *Gulden Zeynolla* 2024-2025 "Labeling Tourism Anomalies with Large Language Models: A Comparative Evaluation of GPT-4 and Open-Source Alternatives" (Advisor)
- *Mattia Ceron* 2024-2025 "Traceable Web Automation with Large Language Models and Playwright" (Advisor)
- *Matteo Foroni* 2024-2025 "ADAD: Anomaly Detection on Active Directory Logs" (Advisor)
- *Pierpaolo Hyvoz* 2023-2024 "Automating investment decisions with machine learning: design and implementation of a Robo Advisor" (Advisor)
- *Mohamad El Khatib* 2023-2024 "Enhancing Recommender Systems through Reinforcement Learning: A Q-Learning Approach" (Advisor)
- *Federico Scognamiglio* 2023-2024 "Statistical and machine learning approaches in small data applications for healthcare" (Advisor)
- *Nicole Olivetto* 2023-2024 "Autoencoder-based anomaly detection for COVID-19 data" (Advisor)
- *Mahsa Sedaghatinia* 2022-2023 "Anomaly Detection Models for Wearable Sensor Data" (Advisor)
- *Anna Dalla Vecchia* 2022-2023, "The Synergies of Context and Data Aging in Recommendations: Issues and Solutions" (Co-Advisor, Advisor: Elisa Quintarelli).
- *Caterina Gobbetti* 2021-2022, "Predicting pharma sales: an approach combining sales datasets and user-generated online information" (Co-Advisor, Advisor: Elisa Quintarelli).

Undergraduate Students Supervision/Co-Advisor

- From 2014, I have supervised students for their graduation thesis projects, either as an advisor or co-advisor, on research related to malware analysis, machine learning and dynamic analysis.

Professional Activities

Academic

- *Cyberchallenge 2021 (University of Verona) - Teacher*
- *Cyberchallenge 2020 (University of Verona) - Organizer and Teacher*
  Our team obtained the 3rd place in the national competition.
- *PhD students representative 2017-2018*

Conferences

- *DAWAK 2026 - Program Committee*
- *FAIEMA 2026 - Program Committee*
- *IEE COINS 2026 - Program Committee*
- *FAIEMA 2025 - Program Committee*
- *HeDAI 2024 - Program Committee*
- *TACAS 2024 - Reviewer*
- *ESORICS 2024 - Reviewer*
- *DSAA 2023 - Reviewer*
- *IoT&Security 2022 - Program Committee*
- *DAWAK 2022 - Session Chair*
- *ITASEC 2020 - Program Committee*

Referee services

I have been a reviewer for the following journals:

- Data Science and Engineering, *Springer*
- Journal of Computer Virology and Hacking Techniques, *Springer*
- International Journal of Information Security, *Springer*
- Journal of Systems and Software, *Elsevier*
- Journal of Information Security and Applications, *Elsevier*

Paper Presentations and Talks

- "Remote Attestation of IoT Devices using Physically Unclonable Functions: Recent Advancements and Open Research Challenges", at *The 5th Joint Workshop on CPS & IoT Security and Privacy*, Copenhagen, 2023
- "Explainable Recommendations for Wearable Sensor Data", at *International Conference on Big Data Analytics and Knowledge Discovery*, Vienna, 2022.

- "Revealing similarities in android malware by dissecting their methods", at *2020 IEEE European Symposium on Security and Privacy Workshops (EuroS&PW)*, Online, 2020.
- "Learning Semantic Properties of Programs", at *ITASEC*, Ancona, 2020.
- "A deep learning approach to program similarity", at *International Workshop on Machine Learning and Software Engineering in Symbiosis*, Montpellier, 2018.
- "Groupdroid: Automatically grouping mobile malware by extracting code similarities", at *Software Security, Protection, and Reverse Engi- neering/Software Security and Protection Workshop*, Orlando, 2017.

Research

Research Interests

My research refines Machine Learning and Data Analysis techniques in multiple settings.

software security. I have studied different methods to represent programs as graphs and designed a system that condenses the structural information of programs into a simple coordinate system. This system can then be used to find the similarity between different programs by calculating custom-built distance measures (NC.5). It also allows for programs to be indexed and quickly searched through their new spatial data representation.

recommender systems. I have adapted the Apriori algorithm to work with sequence data and implemented a recommender system that uses wearable sensor data to suggest physical activities to its users (IC.3). I have investigated new methods to improve the performance of the recommender system by leveraging data aging techniques (IC.2) and contextual information. I am currently researching a methodology that leverages anomaly detection techniques to detect context changes in temporal data (IC.1).

Research Projects

- Participant of European project DataGEMS, P.I.: Georgia Koutrika
- Participant of European project NEUROPULS, P.I.: Fabio Pavanello
- Participant of project FACE (Formal Avenue for Chasing malwarE), P.I.: Mila Dalla Preda

  In collaboration with the Security group at the Politecnico di Milano, I developed GroupDroid, a tool that statically classifies Android Malware by leveraging a structural abstraction of their control flow graph. I then co-authored and presented a paper outlining the contributions of this work.

Research Groups

- 2025-present - DataGEMS

  DataGEMS is a next-generation dataset discovery and management ecosystem that provides algorithms to make datasets discoverable, combinable and explorable. It is a Research and Innovation Action funded by European Union under Horizon Europe Research and Innovation Programme via Grant Agreement No 101188416.

- 2023-2025 - NEUROPULS

  The NEUROPULS project aims at delivering the first photonics-based neuromorphic accelerator. My task is enhancing the security of the device on the softwer side. For this, I have designed and implemented a novel remote software attestation approach that leverages the strong photonic-based PUF that resides in the neuromorphic accelerator.

- 2021-2023 - Data Analysis Group

  The group focuses on developing novel Data Analysis techniques for sensor data. I developed new Data Mining techniques that leverage the Apriori algorithm to extract recommendations from sensor data.

- 2016-2021 - Software Security Group

  While working with this group, I have developed novel approaches for malware classification leveraging refined code abstractions (NC.3, NC.5) and machine learning techniques (NC.4, JR.2). In particular, I have devised the first data augmentation method for the semantic classification of programs by iteratively applying code obfuscations (JR.2).

Skills

Language Skills

- Italian - Native speaker
- English - Proficient

Technical Skills

- Python - Sklearn, Keras, TensorFlow, Numpy, Pandas, Flask, Streamlit
- Databases - Postgres, SQL, MongoDB
- C, C++, Java

Complete Publication List

Refereed international journals

JR.1. A. Dalla Vecchia, N. Marastoni, B. Oliboni, E. Quintarelli:: ACTER: Activity Customization through Timely and Explainable Recommendations - *Information Systems, 2026*

[pre-print: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5081559]

JR.2. N. Marastoni, R. Giacobazzi, M. Dalla Preda: Data augmentation and transfer learning to classify malware images in a deep learning context - *Journal of Computer Virology and Hacking Techniques, 2021* 17(4): 279-297

[doi: https://doi.org/10.1007/s11416-021-00381-3]

Refereed chapters in international books

IB.1. B. Oliboni, A. Dalla Vecchia, N. Marastoni, E. Quintarelli: ICARE: An Intuitive Context-Aware Recommender with Explanations *Advances in Smart Healthcare Paradigms and Applications*, pp. 65-86, 2023 (ISSN: 1868-4394)

[doi: http://https://doi.org/10.1007/978-3-031-37306-0_4]

REFEREED INTERNATIONAL CONFERENCES

IC.1. A. Dalla Vecchia, N. MARASTONI, E. Quintarelli: Anomaly detection to infer context changes in temporal data
In *IEEE 18th International Conference on Application of Information and Communication Technologies (AICT), 2024*

IC.2. A. Dalla Vecchia, N. MARASTONI, B. Oliboni, E. Quintarelli: The Synergies of Context and Data Aging in Recommendations
In *International Conference on Big Data Analytics and Knowledge Discovery, 2023*
[doi: https://doi.org/10.1007/978-3-031-39831-5_7]

IC.3. A. Dalla Vecchia, N. MARASTONI, S. Migliorini, B. Oliboni, E. Quintarelli: Mining totally ordered sequential rules to provide timely recommendations
In *European Conference on Advances in Databases and Information Systems, 2023*
[doi: https://doi.org/10.1007/978-3-031-42941-5_18]

IC.4. N. MARASTONI, B. Oliboni, E. Quintarelli: Explainable Recommendations for Wearable Sensor Data
In *International Conference on Big Data Analytics and Knowledge Discovery, 2022*: 241-246
[doi: https://doi.org/10.1007/978-3-031-12670-3_21]

IC.5. M. Dalla Preda, R. Giacobazzi, N. MARASTONI: Formal framework for reasoning about the precision of dynamic analysis
In *International Static Analysis Symposium, 2020*: 178-199
[doi: https://doi.org/10.1007/978-3-030-65474-0_9]

WORKSHOPS

NC.1. A. Dalla Vecchia, N. MARASTONI, B. Oliboni, E. Quintarelli: "In Time Recommendations through an Associative Classifier and LookBackApriori: a Case Study.", in *EDBT/ICDT Workshops* (EDBT-2024), 2024.

NC.2. N. MARASTONI, M. Ceccato: "Remote Attestation of IoT Devices using Physically Unclonable Functions: Recent Advancements and Open Research Challenges", in *5th Workshop on CPS&IoT Security and Privacy* (CPSIoTSec), 2023.
[doi: https://doi.org/10.1145/3605758.3623502]

NC.3. M. Pasetto, N. MARASTONI, M Dalla Preda, "Revealing similarities in android malware by dissecting their methods", in *2020 IEEE European Symposium on Security and Privacy Workshops* (EuroS&PWS-2020), 2020.
[doi: https://doi.org/10.1109/EuroSPW51379.2020.00090]

NC.4. N. MARASTONI, R. Giacobazzi, M. Dalla Preda, "A deep learning approach to program similarity", in *International Workshop on Machine Learning and Software Engineering in Symbiosis* (MASES 2018): 26-35, 2018.
[doi: https://doi.org/10.1145/3243127.3243131]

NC.5. N. MARASTONI, A. Continella, D. Quarta, S. Zanero, M. Dalla Preda, "Groupdroid: Automatically grouping mobile malware by extracting code similarities", in *Proceedings of the 7th Software Security, Protection, and Reverse Engineering/Software Security and Protection Workshop* (SSPREW17), pp. 1-12, 2017.
[doi: https://doi.org/10.1145/3151137.3151138]

METRICS

	Scholar	**Scopus**	**Web of Science**
Papers	17	15	13
Citations	186	121	78
h-index	6	4	4

Il sottoscritto dichiara sotto la propria responsabilità che le informazioni contenute in questo curriculum corrispondono a verità, e sono rilasciate ai sensi degli articoli 46-47 del DPR 445/2000.

Verona, 7/1/2025 Firma