Samuele Marro

Student, Research Fellow

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Education

Sep '22 – Today **MSc in Artificial Intelligence**, *University of Bologna*.
- Current GPA: **29.70/30**, top of the class (170 students).

Oct '19 – Today **Excellency Degree**, *Institute of Superior Studies*, Bologna.
- 7 STEM students are admitted each year and are provided with a personal tutor, exemption from tuition fees, free accommodation and an annual scholarship throughout their Bachelor's and Master's degrees.
- Yearly requirements: 28/30 GPA, no grade lower than 24/30, must take 5 additional excellency courses.
- Current GPA: **30/30**.

Oct '19 – Jul '22 **BSc in Computer Science**, *University of Bologna*.
- GPA: **29.77/30**, top of the class (150 students). Graduation grade: **110 *cum laude***.

Publications

Jul '23 **Samuele Marro**, Michele Lombardi. Computational Asymmetries in Robust Classification, *40th International Conference on Machine Learning (ICML 2023)*.

Dec '22 Andrea Asperti, Davide Evangelista, **Samuele Marro**, Fabio Merizzi. Image Embedding for Denoising Generative Models, *Springer Artificial Intelligence Review*.

Jul '22 **Samuele Marro**, Luca Donno. ERC-5375, *Ethereum Foundation*.

May '21 **Samuele Marro**, Luca Donno. Green NFTs: A Study on the Environmental Impact of Cryptoart Technologies, *https://arxiv.org/abs/2202.00003*.

Research and Teaching Experience

Nov '23 – Now **Predoctoral Research Fellow**, *University of Bologna*, Bologna, Italy.
- Department fellowship on adversarial robustness under prof. Michele Lombardi.

Dec '19 – Oct '23 **Student Researcher**, *University of Bologna*, Bologna, Italy.
- Developed, under profs. Michele Lombardi and Michela Milano, an **adversarial defense** (implemented in **Python** + **PyTorch**) with certified robustness.
- Proved that training a robust ReLU model is Σ_2^P-hard, with implications for adversarial defense design.
- Wrote a **Julia** interface to formally verify the effectiveness of the defense using **MIPVerify.jl** + **Gurobi**.

Sep '22 – Jan '23 **Teaching Assistant**, *University of Bologna*, Bologna, Italy.
- Taught the Applied ML module of "Introduction to Machine Learning" for the Fall '22 semester.

Nov '21 – Mar '22 **Machine Learning Intern**, *MindIt Srl + Kantar*, Bologna, Italy.
- Developed a **Tensorflow** LSTM implementation compatible with **IBM CPLEX** optimization algorithms.
- Rewrote Meta's FBProphet time series model in **Tensorflow**.

Mar '21 – May '21 **Blockchain Environmental Impact Project**, *University of Bologna*, Bologna, Italy.
- Created a model to estimate the environmental impact of individual transactions on Ethereum.
- Developed Green NFT Helper, a **JavaScript** + **Svelte.js** website to help users reduce their emissions.

Nov '18 – Jul '19 **PAX Project**, *L.S. "Leonardo Cocito"*, Alba, Italy.
- Trained in **Python** + **Tensorflow** a **CNN** to identify illegal dumping locations from aerial data.
- Deployed the model as part of an Android app (written in **Java**) to capture aerial data and relay landfill locations in real time to a quadcopter.

Research Awards

Nov '23 **AIxIA "Leonardo Lesmo" Award**.
- Award for the best Italian AI thesis, granted by the Italian Association for Artificial Intelligence.

May '21 **GreenNFT Award**, 3k USD.
- Award for research contributions on understanding the environmental impact of blockchains.

Jan '21 **CINECA HPC Grant**, 170k core-hours.
- Grant for the Galileo100 HPC cluster for research on the computational complexity of adversarial attacks.

Jul '19 **Ancalau Award**, 3k EUR.
- Award and incubator for innovative R&D projects, obtained for building PAX.

Other Experience

Jan '22 – Today **Solidity Developer and Auditor**, *Freelance*.
- Performed Smart Contract audits, Web3 integrations and secure Smart Contract development.
- Specialized in EVM and EVM-like (e.g. Vite) security standards.

Feb '19 – Jun '19 **Tutor**, *L.S. "Leonardo Cocito"*, Alba, Italy.
- Provided one-on-one and one-on-two tutorship for students struggling with Mathematics and Physics.

May '18 **Software Development Intern**, *Sistemi Tre*, Alba, Italy.
- Translated a website from Italian to English and French, adapting its HTML layout.
- Automated Excel analyses of HR data, saving ~3 man-hours per week.

Jun '17 – Jul '17 **Software Development Intern**, *Sistemi Tre*, Alba, Italy.
- Automated database queries through the in-house software interface using **AHK**, leading to a 3-4x increase in data retrieval speed.
- Assisted IT staff during on-site technical support.

Other Awards

Mar '22 **Gitcoin Round 13 Hackathon Bounty**, 6k USD.
- Wrote four smart contracts in **Solidityp** for the Vite blockchain and developed unit tests with **Vuilder** and **Javascript**.

Mar '21 **Gitcoin Round 9 Hackathon Bounty**, 1k USD.
- Developed a Chrome extension in **JavaScript** to search on IPFS directly from the omnibox.

Apr '19 **FAST "I Giovani e le Scienze" Award**.
- Italian award for promising young scientists, obtained for building PAX.

Certifications

Nov '21 **Graduate Records Examination (GRE)**, *Verbal: 164/170, Quantitative: 170/170*.

Nov '21 **Test of English as a Foreign Language (TOEFL)**, *109/120*.

Mar '18 **Cambridge Certificate in Advanced English (CAE)**, *205/210 (C2)*.

Affiliations

Mar '23 – Today **Head of Computer Science Student Commission**, *Superior College of Bologna (ISS)*.
- Supervising CS student projects and advising students on CS and ML-related research directions.

Jul '22 – Today **CS Department Student Representative**, *University of Bologna*.
- Managing student-department relations and representing student interests in department meetings.

Research Interests

Adversarial Machine Learning.
- Computational complexity of adversarial attacks and defenses;
- Provable robustness techniques;
- Use of inference-time optimizations as robustness tools;
- Solver-assisted certification of neural network robustness.

Generative Modelling.
- Theoretical properties of generative models;
- Effects of architecture on model performance;
- Reliable detection of LLM output.

Inference-Time Capabilities.
- Integration of model inference with optimization techniques;
- Fundamental properties of autoregressivity in inference.

Languages

- **Italian**: Native
- **English**: C2
- **French**: A2