

# NICOLÒ DAL FABBRIO

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<https://ndf96.github.io>

Philadelphia, PA, USA

*Ph.D. in Information and Communication Technology.*

*Currently a postdoctoral researcher at the University of Pennsylvania, USA.*

*My research interest is mainly in the analysis and design of multi-agent and distributed machine learning algorithms, with a focus on wireless communications and sensing.*

## EDUCATION

### PHD, INFORMATION AND COMMUNICATION TECHNOLOGY:

Thesis: Pushing the Boundaries of Federated Learning: Super-Linear Convergence and Reinforcement Learning Over Wireless  
Department of Information Engineering, University of Padova, Italy | October 2020 - October 2023

### VISITING PHD STUDENT, GRASP (General Robotics, Automation, Sensing, and Perception)

Electrical and Systems Engineering, University of Pennsylvania, USA | September 2022 - April 2023

### M. S., TELECOMMUNICATIONS ENGINEERING

Thesis: WiFi-based human sensing

Department of Information Engineering, University of Padova, Italy | 2018 - 2020

### EXCHANGE STUDENT, Swiss European Mobility Program (SEMP) (Scholarship Recipient)

École Polytechnique Fédérale de Lausanne (EPFL), School of Computer and Communication Sciences, Switzerland | 2019 - 2020

### B. S. IN INFORMATION ENGINEERING

University of Padova, Italy | 2015 - 2018

## WORK EXPERIENCE

### POSTDOCTORAL RESEARCHER

Electrical and Systems Engineering, University of Pennsylvania, USA | November 2023 - **Current**

- Conducting research in Federated Learning and Multi-Agent Reinforcement Learning with applications in autonomous driving and underwater robotics.

### UNIVERSITY RESEARCH ASSISTANT

University of Padova, Padova, Italy | September 2020 - September 2023

- Research on algorithm design for Federated Learning in the context of wireless 5G/6G networks, theoretical analysis of distributed and multi-agent reinforcement learning algorithms.

### UNIVERSITY TEACHING ASSISTANT, Numerical Calculus

Department of Mathematics, University of Padova, Italy | February 2022 - July 2022

- Conducting practical sessions with exercises on numerical calculus in Matlab

### RESEARCH INTERN, SIGNET RESEARCH GROUP, DEI

University of Padova, Italy | February 2020 - August 2020

- Experimental research on WiFi-based human sensing

## SKILLS

### Programming Languages and Software

Python | MATLAB | C++ | LaTeX | Linux | Github | Slack

### Multilingual

Italian (native) | English (fluent) | French (basic)

## AWARDS AND FELLOWSHIPS

- Best PhD Thesis Award by the Italian Telecommunications and Information Technology Group (GTTI) for the year 2024: <http://www.gtti.it/awards>
- Winner of the Fall 2022 IEEE DataPort Dataset Upload Contest in the Machine Learning category based on unique dataset views as measured by Google Analytics and a review from a committee of the IEEE (<https://ieee-dataport.org/documents/csi-dataset-wireless-human-sensing-80-mhz-wi-fi-channels>)
- AI x Science fellow (2024-current), University of Pennsylvania data science postdoctoral fellowship (5K USD yearly research fund): <https://web.sas.upenn.edu/data-science/postdoctoral-fellows/>

## PUBLICATIONS

Luca Ballotta, Nicolò Dal Fabbro, Giovanni Perin, Luca Schenato, Michele Rossi, Giuseppe Piro. **VREM-FL: Mobility-Aware Computation-Scheduling Co-Design for Vehicular Federated Learning**, *IEEE Transactions on Vehicular Technology*, 2024

Nicolò Dal Fabbro, Arman Adibi, Aritra Mitra, George J. Pappas. **DASA: Delay-Adaptive Multi-Agent Stochastic Approximation**, Accepted for publication, *62nd IEEE Conference on Decision and Control (CDC)*, 2024

Arman Adibi, Nicolò Dal Fabbro, Luca Schenato, Sanjeev Kulkarni, H. Vincent Poor, George J. Pappas, Hamed Hassani and Aritra Mitra. **Stochastic Approximation with Delayed Updates: Finite-Time Rates under Markovian Sampling**, *The 27th International Conference on Artificial Intelligence and Statistics (AISTATS)*, Valencia, Spain, 2024

Nicolò Dal Fabbro, Arman Adibi, Aritra Mitra, George J. Pappas. **Finite-Time Analysis of Asynchronous Multi-Agent TD Learning**, *The 2024 American Control Conference (ACC)*, 2024

N. Dal Fabbro, S. Dey, M. Rossi, and L. Schenato. **SHED: A Newton-Type Algorithm for Federated Learning based on Incremental Hessian Eigenvector Sharing**. *Automatica*, 2024

Andrea Agiollo, Enkeleda Bardhi, Mauro Conti, Nicolò Dal Fabbro, Riccardo Lazzeretti. **Anonymous Federated Learning via Named-Data Networking**, *Future Generation Computer Systems*, 2024

Nicolò Dal Fabbro, Aritra Mitra, George J. Pappas. **Communication-Efficient Federated Reinforcement Learning: Recent Advances and Open Challenges**, *Elsevier Encyclopedia of Systems and Control Engineering*, 2024

Sima Noorani, Orlando Romero, Nicolò Dal Fabbro, Hamed Hassani, and George J. Pappas. **Conformal Risk Minimization with Variance Reduction**, under revision, preprint available: arXiv preprint arXiv:2411.01696, 2024

N. Dal Fabbro, A. Mitra, and G. J. Pappas. **Federated TD Learning over Finite-Rate Erasure Channels: Linear Speedup under Markovian Sampling**. *IEEE Control Systems Letters*, 2023 doi: 10.1109/LCSYS.2023.3287499 (also accepted and presented at the *62nd IEEE Conference on Decision and Control (CDC 2023)*)

F. Meneghello, N. Dal Fabbro, D. Garlisi, I. Tinnirello, and M. Rossi. **A CSI Dataset for Wireless Human Sensing on 80 MHz Wi-Fi Channels**. *IEEE Communications Magazine*, 2023

N. Dal Fabbro, M. Rossi, L. Schenato, and S. Dey. **Q-SHED: Distributed Optimization at the Edge via Hessian Eigenvectors Quantization**. *IEEE International Conference on Communications (ICC)*, Rome, Italy, 2023

N. Dal Fabbro, A. Mitra, R. W. Heath, L. Schenato, and G. J. Pappas. **Over-the-Air Federated TD Learning**. *Sixth Conference on Machine Learning and Systems (MLSys23)*, Workshop on Resource-Constrained Learning in Wireless Networks, Miami, Florida, 2023

F. Meneghello, D. Garlisi, N. Dal Fabbro, I. Tinnirello, and M. Rossi. **SHARP: Environment and Person Independent Activity Recognition with Commodity IEEE 802.11 Access Points**. *IEEE Transactions on Mobile Computing*, 2022

N. Dal Fabbro, M. Rossi, G. Pillonetto, L. Schenato, and G. Piro. **Model-Free Radio Map Estimation in Massive MIMO Systems via Semi-Parametric Gaussian Regression**. *IEEE Wireless Communications Letters*, 2022

## ADDITIONAL EXPERIENCE AND VOLUNTEERING

- Organizing weekly meetings between group members of Prof. George Pappas research group at the University of Pennsylvania. I have been organizing the meetings with the main objective of spurring collaboration, stimulating knowledge exchange and networking
- Attended and actively contributed to prestigious international PhD schools, including the IEEE/DEI Summer PhD School of Information Engineering "Silvano Pupolin" – SSIE 2022 (<https://ssie.dei.unipd.it/>), and the 5G International PhD School, December 2020 (<https://www.5gitaly.eu/2020/>)
- Reviewer for esteemed international journals, such as Signal Processing (Elsevier), Automatica (Elsevier), Transactions on Mobile Computing (IEEE), Transactions on Vehicular Technology (IEEE) since 2021
- Co-founded and actively participated in Venice Calls (<https://www.venicecalls.com/>), a non-profit organization of social promotion in Venice, which played a major role in helping coordinate volunteers during the 2019 flooding crisis, providing assistance to affected citizens, institutions, and businesses (<https://www.festivalitaca.net/2020/02/venice-calls-gli-angeli-veneziani-dellacqua-alta/>). Organized public events, including conferences and clean-up initiatives in the Venice Lagoon. Contributed to promoting public participation and cultural events.