

Bernardo CAMAJORI TEDESCHINI

Telecommunication Engineer | PhD student | Italian

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📍 Residence : 20133, Milan, Italy 📅 Date of Birth : 14.01.1997, Carrara, Italy

🎓 ACADEMICS

November 2024	PhD in Information Technology, TELECOMMUNICATIONS, Politecnico di Milano
November 2021	<ul style="list-style-type: none">➤ Thesis : Cooperative Machine Learning Methods in Distributed Systems.➤ Multi-agent Learning.➤ Online Learning and Monitoring.➤ TinyML and Efficient Deep Learning Computing.
October 2021	Master Degree in Telecommunication Engineering (Honors - 110L, GPA 29.85/30), COMMUNICATION NETWORKS AND INTERNET, Politecnico di Milano
October 2019	<ul style="list-style-type: none">➤ Thesis in collaboration with CERN, CNR, and medical school of Athens. Title : "Federated learning architectures and algorithms for diagnostic imaging in healthcare networks."
July 2019	Bachelor Degree in Computer Science Engineering (Honors - 110L, GPA 29.23/30), TELECOMMUNICATIONS, Politecnico di Milano
October 2016	<ul style="list-style-type: none">➤ Thesis : Final Examination in Communication Systems.

🎓 HONORS AND AWARDS

2022	Roberto Rocca Doctoral Fellowship : funding for 12 months of research at MIT.
2021	PhD grant from Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR), Italy.
2021	Master's degree with Honors.
2019	Bachelor's degree with Honors.
2017	Best freshmen of the academic year 2016/2017.

📁 WORK EXPERIENCE, STAGES, STUDIES ABROAD

August 2024	Visiting Researcher at MIT Laboratory for Information & Decision Systems (LIDS), MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge
August 2023	<ul style="list-style-type: none">➤ Contribution : Development of classical and deep machine learning algorithms for localization and sensing networks. Research carried out under Prof. Win's supervision. <div>Bayesian Neural Networks Ray-tracing 5G Autonomous Vehicles</div>
July 2021	Visiting Research Scientist, CERN, Geneva
June 2021	<ul style="list-style-type: none">➤ Contribution : Implementing and testing the network architecture for the Federated Learning in real and physically separated machines located at CERN, Milan, and Athens. <div>Federated Learning MQTT NVIDIA Docker</div>
July 2013	Summer english school, UNIVERSITY OF LIMERICK, Ireland
June 2013	<ul style="list-style-type: none">➤ Contribution : Attending daily lessons of english and culture of Ireland.

PHD PROJECTS

TRUSTROKE

2022 - 2025

 trustroke.eu

- > Partners : Fundacio Hospital Universitari Vall D'Hebron, Fondazione Policlinico Universitario Agostino Gemelli-IRCSS, KU Leuven, CERN, Eurecat Technology Centre, Nora Health, Politecnico di Milano, CNR, Stroke Alliance for Europe and others.
- > Objective : Trustworthy prediction of stroke outcome on a Federated Learning infrastructure.
- > Budget : 6M €. Call : HORIZON-HLTH-2022-STAYHLTH-01-two-stage.
- > Contribution : Analysis of the federated algorithms and their optimization.

Tensorflow Fully-distributed Federated Learning Asynchronous Federated Learning

HYPER-5G

2022 - 2024

 hyper5g-project.eu

- > Partners : Geomatics Research & Development srl, algoWatt SpA and Politecnico di Milano.
- > Budget : 500k € funded by ESA's Navigation Innovation and Support Program (NAVISP).
- > Objective : Studying, designing and developing the algorithms and software needed to implement a precise positioning engine to jointly use multi-constellation GNSS and 5G observations.
- > Contribution : Design and implement the 5G positioning system.

Matlab Rohde & Schwarz scanner

CAFEIN-FL

2019 - 2021

 kt.cern/kt-fund/projects/cafein-federated-network-platform-development-and-deployment-ai-based-analysis-and

- > Partners : CERN, CNR, Politecnico di Milano, National and Kapodistrian University of Athens.
- > Budget : 135k CHF funded by CERN Knowledge Transfer fund.
- > Objective : Federated network platform for the development and deployment of AI based analysis and prediction models.
- > Contribution : Creation of the whole network architecture and proof-of-work implementation of Federated Learning algorithms.

Tensorflow Personalized Federated Learning

MASTER'S DEGREE PROJECTS

WIRELESS COMMUNICATION GROUP PROJECT

OCT 2020 - DEC 2020

 github.com/BernardoCama/WirelessCommunicationProject Grade : 30L

Tracking, with adaptive Beamforming, two mobile terminals in presence of one or more interferers.

Matlab Beamforming

LOCALIZATION, NAVIGATION AND SMART MOBILITY GROUP PROJECT

JUN 2020

 github.com/BernardoCama/Localization-Navigation-and-Smart-Mobility-Project Grade : 30L

Handling a localization problem, by formulating the model, implementing a positioning method and assessing the related performance in Matlab environment.

Matlab Kalman filter Localization problem

IOT GROUP PROJECT

MAR 2020 - JUL 2020

 github.com/LucaFerraro/IoT-HomeChallenge Grade : 30L

Designing and implementing a software prototype for a social distancing application using TinyOS and Node-Red and test it with Cooja. The application is meant to understand and to alert you when two people (motest) are close to each other.

TinyOS TOSSIM Wireshark MQTT ThingSpeak Node-Red IFTTT

SWITCHING AND ROUTING GROUP PROJECT

FEB 2020

 github.com/BernardoCama/project-7 Grade : 30L

Building an application able to react to the failure of a switch (node), both in a reactive and in a proactive way, using OpenFlow switches and Ryu as network controller.

Mininet ryu-manager python Failure Detection in rings

CERTIFICATIONS

October 2022	Professional engineering licence
July 2022	MIT Certification of English Proficiency Assessment
November 2021	TOEFL
October 2021	RTF Certificate (VHF)
August 2021	First Aid Certificate
September 2018	ETS - TOEIC (Test of English for International Communication - Listening and Reading Test), Grade 835 (C1)
May 2015	Certificate in ESOL International (First), Grade C

TECHNICAL SKILLS

Programming Languages	Python (Advanced) Matlab (Advanced) C/C++ (Beginner)
Deep Learning Frameworks SDK's	PyTorch, TensorFlow, Keras Visual Studio Code, Eclipse, git
Operating Systems	Mac OS, Windows, Linux
Database Tools	MySQL
Text Processing	Word, PowerPoint

INTERESTS

- > Machine Learning
- > Localization
- > Vehicles
- > Data Mining
- > Wireless Communications

LANGUAGES

Italian	● ● ● ● ●
English	● ● ● ● ●
French	● ● ● ○ ○

SOFT SKILLS

- > Problem Solving
- > Team Working
- > Leadership
- > Curiosity and innovation
- > Organization and planning

REFERENCES

Monica Barbara Nicoli
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Luigi Serio
High-ranking official at CERN
GENEVA, SWITZERLAND
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Moe Z. Win
Core faculty Professor at MIT
CAMBRIDGE, MA, USA
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- * 2024 **B. Camajori Tedeschini**, S. Savazzi, M. Nicoli, “Weighted Consensus Algorithms in Distributed and Federated Learning”, submitted to IEEE Transactions on Network Science and Engineering (TNSE).
- Nov 2024 M. Brambilla, M. Alghisi, **B. Camajori Tedeschini**, A. Fumagalli, F. Grec, L. Italiano, C. Pileggi, L. Biagi, S. Bianchi, A. Gatti, A. Goia, M. Nicoli, and E. Realini, “Integration of 5G and GNSS Technologies for Enhanced Positioning : an Experimental Study”, IEEE Open Journal of the Communications Society (OJ-COMS), doi : 10.1109/OJCOMS.2024.3487270.
- Nov 2024 J. C. Morrison, N. Schatz, S. Kim, G. Kwon, **B. Camajori Tedeschini**, V. Weerackody, A. Conti, and M. Z. Win, “Sidelink-Enabled Cooperative Localization for xG Non-Terrestrial Networks”, IEEE Military Communications Conference (MILCOM), pp. 1-6, doi : 10.1109/MILCOM61039.2024.10773683.
- Nov 2024 N. Schatz, S. Kim, G. Kwon, **B. Camajori Tedeschini**, M. Ricard, T. Klein, V. Weerackody, A. Conti, and M. Z. Win, “Location Verification in Next-Generation Non-Terrestrial Networks”, IEEE Military Communications Conference (MILCOM), pp. 1-6, doi : 10.1109/MILCOM61039.2024.10774026.
- Oct 2024 **B. Camajori Tedeschini**, M. Brambilla, M. Nicoli, and M. Z. Win, “Multi-agent Reinforcement Learning for Distributed Cooperative Positioning”, IEEE Transactions on Intelligent Vehicles (TIV), doi : 10.1109/TIV.2024.3471909.
- Sep 2024 L. Italiano, **B. Camajori Tedeschini**, M. Brambilla, H. Huang, M. Nicoli and H. Wymeersch, “A Tutorial on 5G Positioning”, IEEE Communications Surveys & Tutorials (COMST), doi : 10.1109/COMST.2024.3449031.
- Sep 2024 **B. Camajori Tedeschini**, G. Kwon, M. Nicoli, and M. Z. Win, “Real-time Bayesian Neural Networks for 6G Cooperative Positioning and Tracking”, IEEE Journal on Selected Areas in Communications (JSAC), special issue “Positioning and Sensing Over Wireless Networks”, doi : 10.1109/JSAC.2024.3413950.
- Aug 2024 **B. Camajori Tedeschini**, M. Brambilla and M. Nicoli, “Split Consensus Federated Learning : an Approach for Distributed Training and Inference”, IEEE Access, doi : 10.1109/ACCESS.2024.3446577.
- Jul 2024 **B. Camajori Tedeschini**, M. Brambilla, M. Nicoli, and M. Z. Win, “Cooperative Positioning with Multi-Agent Reinforcement Learning”, 27th IEEE International Conference on Information Fusion (FUSION), doi : 10.23919/FUSION59988.2024.10706524.
- Jun 2024 L. Italiano, **B. Camajori Tedeschini**, M. Brambilla and M. Nicoli, “Pedestrian Positioning in Urban Environments with 5G Technology”, IEEE 22th Mediterranean Communication and Computer Networking Conference (MedComNet), doi : 10.1109/MedComNet62012.2024.10578126.
- Jun 2024 U. Milasheuski, L. Barbieri, **B. Camajori Tedeschini**, M. Nicoli, and S. Savazzi, “On the Impact of Data Heterogeneity in Federated Learning Environments with Application to Healthcare Networks”, IEEE Conference on Artificial Intelligence, pp. 1-6, doi : 10.1109/CAI59869.2024.00185.
- Jun 2024 **B. Camajori Tedeschini**, G. Kwon, M. Nicoli, and M. Z. Win, “Empowering 6G Positioning and Tracking with Bayesian Neural Networks”, IEEE International Conference on Communications (ICC), pp. 1-7, doi : 10.1109/ICC51166.2024.10622691.
- Mar 2024 L. Barbieri, **B. Camajori Tedeschini**, M. Brambilla and M. Nicoli, “Deep Learning-based Cooperative LiDAR Sensing for Improved Vehicle Positioning”, IEEE Transactions on Signal Processing (TSP), doi : 10.1109/TSP.2024.3377375.
- Nov 2023 S. Roger, M. Brambilla, **B. Camajori Tedeschini**, C. Botella-Mascarell, M. Cobos and M. Nicoli, “Deep-Learning-Based Radio Map Reconstruction for V2X Communications”, IEEE Transactions on Vehicular Technology (TVT), doi : 10.1109/TVT.2023.3326935.
- Sep 2023 **B. Camajori Tedeschini**, M. Brambilla, L. Italiano, S. Reggiani, D. Vaccarone, M. Alghisi, L. Benvenuto, A. Goia, E. Realini, F. Grec and M. Nicoli, “5G positioning : a feasibility analysis with current network deployment”, Scientific Reports (Nature), doi : 10.1038/s41598-023-42426-1.
- Sep 2023 **B. Camajori Tedeschini** and M. Nicoli, “Cooperative Deep-Learning Positioning in mmWave 5G-Advanced Networks”, IEEE Journal on Selected Areas in Communications (JSAC), special issue “5G/6G Precise Positioning on Cooperative Intelligent Transportation Systems (C-ITS) and Connected Automated Vehicles (CAV)”, doi : 10.1109/JSAC.2023.3322795.
- Aug 2023 **B. Camajori Tedeschini**, M. Brambilla and M. Nicoli, “Message Passing Neural Network Versus Message Passing Algorithm for Cooperative Positioning”, IEEE Transactions on Cognitive Communications and Networking (TCCN), doi : 10.1109/TCCN.2023.3307953.
- Aug 2023 **B. Camajori Tedeschini**, M. Brambilla, L. Barbieri, G. Balducci and M. Nicoli, “Cooperative lidar sensing for pedestrian detection : data association based on message passing neural networks”, IEEE Transactions on Signal Processing (TSP), doi : 10.1109/TSP.2023.3304002.
- Jun 2023 L. Barbieri, **B. Camajori Tedeschini**, M. Brambilla and M. Nicoli, “Implicit vehicle positioning with cooperative lidar sensing”, 48th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 1-5, doi : 10.1109/ICASSP49357.2023.10094864.

PUBLICATIONS

- May 2023 **B. Camajori Tedeschini**, M. Nicoli and M. Z. Win, "On the Latent Space of mmWave MIMO Channels for NLOS Identification in 5G-Advanced Systems", IEEE Journal on Selected Areas in Communications (JSAC), special issue "3GPP Technologies : 5G-Advanced and Beyond", doi : 10.1109/JSAC.2023.3273769.
- May 2023 **B. Camajori Tedeschini**, S. Savazzi, M. Nicoli, "A Traffic Model based Approach to Parameter Server Design in Federated Learning Processes", IEEE Communications Letters (COMML), doi : 10.1109/LCOMM.2023.3272844.
- Jul 2022 **B. Camajori Tedeschini**, M. Brambilla, L. Barbieri and M. Nicoli, "Addressing data association by message passing over graph neural networks", 25th IEEE International Conference on Information Fusion (FUSION), pp. 01-07, doi : 10.23919/FUSION49751.2022.9841233.
- Jan 2022 **B. Camajori Tedeschini**, S. Savazzi, R. Stoklasa, L. Barbieri, I. Stathopoulos, M. Nicoli, L. Serio, "Decentralized Federated Learning for Healthcare Networks : A Case Study on Tumor Segmentation", IEEE Access, doi : 10.1109/ACCESS.2022.3141913.