

# Bruno Casella

POSTDOCTORAL RESEARCHER AT THE COMPUTER SCIENCE DEPARTMENT OF THE UNIVERSITY OF TORINO

via Gallinaro 7B, Aci Castello, Italy · via Antonio Pigafetta 9, Turin, Italy

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## Current position

### Postdoctoral researcher

UNIVERSITY OF TURIN

Turin, Italy

Nov. 2024 - current

- Associate fellow position for the research project: Federated Learning (PNRR)

## Research topics overview

In my career as a researcher, I have worked on several topics related to Machine and Deep Learning, such as Federated Learning, Transfer Learning, Continual Learning, High-Performance Computing, and Confidential Computing.

During my Ph.D., I have been focusing my efforts on **Federated Learning** with several recent publications. I am also active in the organization of Workshops, as well as journal special issues (see Section *Organization*).

Currently, I am also interested in topics related to deep learning, like Reinforcement Learning and Transfer Learning (see Section *Education*).

## Previous positions

### Bar Pizzeria Via Caracciolo

WEB PROGRAMMER

Turin, Italy

Feb. 2022 - May. 2022

- I collaborated with the Bar Pizzeria Via Caracciolo, leading the task of developing their website (<https://barpizzeriaviacaracciolo.github.io/>)

### Professional accounting studio "Giuseppe Casella"

SOFTWARE MANAGER

Catania, Italy

Oct. 2017 - July 2021

- In charge of processing accounting data via a remote connection system. Continuously improved the infrastructure architecture of the studio since launching the service.

## Period abroad

### Lamarr Institute for Machine Learning and Artificial Intelligence - TU Dortmund

VISITING PH.D STUDENT

Dortmund, Germany

Sep. 2024 - Oct. 2024

- This period was a continuation of the previous one with the addition of decentralized aspects related to the federated version of the Rocket algorithm.

### Lamarr Institute for Machine Learning and Artificial Intelligence - TU Dortmund

VISITING PH.D STUDENT

Dortmund, Germany

Sep. 2023 - Dec. 2023

- During my period at TU Dortmund, I actively collaborated with Dr. Sebastian Buschjäger and Dr. Matthias Jakobs on developing a federated version of the Rocket algorithm.

## Education

### Ph.D. in Modeling and Data Science

UNIVERSITY OF TURIN

Turin, Italy

Nov. 2021 - Jun. 2025

- Thesis title: Advancing Federated Learning - Towards Decentralization and Personalized Models.
- Advisor: Prof. Marco Aldinucci.
- Final mark: PhD degree with honors.
- Website <https://dottorato-mds.campusnet.unito.it/do/home.pl>
- Topics:
  - Federated Learning, Deep learning, Confidential Computing, High Performance Computing

### Master Degree in Data Science for Management

UNIVERSITY OF CATANIA

Catania, Italy

Oct. 2019 - Sep. 2021

- Thesis title: Federated Transfer Learning using Network Composition
- Advisor: Prof. Sebastiano Battiato
- Co-Advisor: Prof. Mario Valerio Giuffrida
- Final mark: 110/110 with honors.

## Bachelor Degree in Computer Engineering

UNIVERSITY OF CATANIA

Catania, Italy

Oct. 2016 - Mar. 2020

- Thesis title: Evaluation of an Artificial Intelligence Method based on Reinforcement Learning Method for Self-Playing Chess.
- Advisor: Prof. Concetto Spampinato
- Final mark 100/110.

## Diploma di Scuola Superiore

LICEO SCIENTIFICO GALILEO GALILEI

Catania, Italy

2011 - 2016

- Final mark 96/100.

## Publications

### CONFERENCE

- 2022 **Transfer Learning via Test-Time Neural Networks Aggregation**, B. Casella, A. B. Chisari, S. Battiato, M. V. Giuffrida, *International Conference on Computer Vision Theory and Applications (VISAPP)* Online
- 2022 **Benchmarking FedAvg and FedCurv for Image Classification Tasks**, B. Casella, R. Esposito, C. Cavazzoni, M. Aldinucci, *Italian Conference on Big Data and Data Science (ITADATA)* Milan, Italy
- 2022 **Federated Learning meets HPC and Cloud**, I. Colonnelli, B. Casella, G. Mittone, Y. Arfat, B. Cantalupo, R. Esposito, A. R. Martinelli, D. Medic, M. Aldinucci, *ML4Astro International Conference* Catania, Italy
- 2023 **Predicting Cryptocurrencies Market Phases Through On-Chain Data Long-Term Forecasting**, B. Casella, L. Paletto, *IEEE International Conference on Blockchain and Cryptocurrency (ICBC)* Dubai, United Arab Emirates
- 2024 **Federated Time Series Classification with ROCKET features**, B. Casella, M. Jakobs, M. Aldinucci, S. Buschjäger, *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)* Bruges, Belgium
- 2024 **Federated Learning in a Semi-Supervised Environment for Earth Observation Data**, B. Casella, A. B. Chisari, M. Aldinucci, S. Battiato, M. V. Giuffrida, *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)* Bruges, Belgium
- 2025 **A performance analysis of VM-based Trusted Execution Environments for Confidential Federated Learning**, B. Casella, *Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP)* Turin, Italy
- 2025 **Decentralized Time Series Classification with ROCKET features**, B. Casella, M. Jakobs, M. Aldinucci, S. Buschjäger, submitted to WAFL, in conjunction with ECML-PKDD Toronto, Canada
- 2025 **Fed2RC: Federated Rocket Kernels and Ridge Classifier for Time Series Classification**, B. Casella, S. Fonio, L. Sciandra, C. Gallicchio, M. Aldinucci, M. Polato, R. Esposito, *European Conference on Artificial Intelligence (ECAI)* Bologna, Italy

### JOURNAL

- 2023 **Predictors of target lesion failure after treatment of left main, bifurcation, or chronic total occlusion lesions with ultrathin-strut drug-eluting coronary stents in the ULTRA registry**, O. de Filippo et al., *Catheterization and Cardiovascular Interventions (CCI)* CCI
- 2023 **MERGE: a model for multi-input biomedical Federated Learning**, B. Casella, W. Riviera, M. Aldinucci, G. Menegaz, *Cell Patterns* Cell Patterns
- 2023 **FedER: Federated Learning through Experience Replay and Privacy-Preserving Data Synthesis**, M. Pennisi, F. Proietto Salanitri, G. Bellitto, B. Casella, M. Aldinucci, S. Palazzo, C. Spampinato, *Computer Vision and Image Understanding* CVIU
- 2024 **Protocol for training MERGE: A federated multi-input neural network for COVID-19 prognosis**, B. Casella, W. Riviera, M. Aldinucci, G. Menegaz STAR Protocols STAR Protocols
- 2024 **Experimenting with Normalization Layers in Federated Learning on non-IID scenarios**, B. Casella, R. Esposito, A. Sciarappa, C. Cavazzoni, M. Aldinucci, *IEEE Access* IEEE Access
- 2025 **Cloud Detection Challenge-Methods and Results**, A. B. Chisari, L. Guarnera, A. Ortis, W. C. Patatu, B. Casella, L. Naso, G. Puglisi, V. Del Zoppo, M. V. Giuffrida, S. Battiato, *IEEE Access* IEEE Access

### WORKSHOP

2023	<b>Experience Replay as an Effective Strategy for Optimizing Decentralized Federated Learning</b> , M. Pennisi, F. Proietto Salanitri, G. Bellitto, <b>B. Casella</b> , M. Aldinucci, S. Palazzo, C. Spampinato, <i>First Workshop on Visual Continual Learning, International Conference on Computer Vision (ICCV)</i>	Paris, France
2023	<b>Architecture-based FedAvg for Vertical Federated Learning</b> , <b>B. Casella</b> , S. Fonio, <i>DML-ICC Workshop, IEEE/ACM International Conference on Utility and Cloud Computing</i>	Taormina, Italy
2024	<b>A Performance Model for Confidential Federated Learning</b> , <b>B. Casella</b> , I. Colonnelli, G. Mittone, R. Birke, W. Riviera, A. Sciarappa, C. Cavazzoni, M. Aldinucci, <i>Deep Learning Security and Privacy Workshop, IEEE Security and Privacy 2024</i>	San Francisco, CA
2024	<b>Federated AdaBoost for Survival Analysis</b> , O. Harrak, <b>B. Casella</b> , S. Fonio, P. Fariselli, G. Mittone, C. Rollo, T. Sanavia, M. Aldinucci, <i>Proceedings of the ECML-PKDD Workshops (Workshop on Advancements in Federated Learning)</i>	Vilnius, Lithuania

### PH.D. THESIS

2025	<b>Advancing Federated Learning - Towards Decentralization and Personalized Models</b> , <b>B. Casella</b> , Ph.D. thesis, University of Turin, pp. 1-223	Turin, Italy
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## Academic Activities and Roles

### ACADEMIC INSTITUTIONS/COMMITTEE

<b>Consiglio di Dipartimento (Informatica)</b>	Turin, Italy
UNIVERSITY OF TURIN	2024 - Today
<ul style="list-style-type: none"> <li>Department of Computer Science, University of Turin</li> </ul>	

### EUROPEAN PROJECTS

<b>EUPilot</b>	Turin, Italy
UNIVERSITY OF TURIN	2022 - Today
<ul style="list-style-type: none"> <li>The European PILOT (EUPilot) - EC H2020 RIA, EuroHPC-02-2020, n. 101034126). <a href="https://eupilot.eu/">https://eupilot.eu/</a></li> </ul>	

<b>EPI</b>	Turin, Italy
UNIVERSITY OF TURIN	2023 - Today
<ul style="list-style-type: none"> <li>European project EPI SGA2 (H2020-JTI-EuroHPC-2020-02). UNITO is a Linked Third Party of Leonardo company. <a href="https://www.european-processor-initiative.eu/">https://www.european-processor-initiative.eu/</a></li> </ul>	

### OTHER NATIONAL AND INTERNATIONAL PROJECTS

<b>Centro Nazionale di Ricerca in High-Performance Computing, Big Data and Quantum Computing.</b>	Turin, Italy
UNIVERSITY OF TURIN	2022 - Today
<ul style="list-style-type: none"> <li>Spoke 1, Flagship 4: "Trustworthiness, security, privacy".</li> </ul>	

### ORGANIZATION COMMITTEE

<b>Tutorial Organizer - Experimenting with Federated Learning: Implementing State-of-the-Art Methods with fluke</b>	Bologna, Italy
EUROPEAN CONFERENCE ON ARTIFICIAL INTELLIGENCE (ECAI - CORE2023: A)	2025
<ul style="list-style-type: none"> <li><a href="https://sites.google.com/view/fluketutorialecai25/home">https://sites.google.com/view/fluketutorialecai25/home</a></li> </ul>	

<b>Workshop Organizer - Scientific HPC in the pre-Exascale era</b>	Turin, Italy
ITALIAN CONFERENCE ON BIG DATA AND DATA SCIENCE (ITADATA)	2025
<ul style="list-style-type: none"> <li><a href="https://www.itadata.it/2025/workshops">https://www.itadata.it/2025/workshops</a></li> </ul>	

<b>Web and Social Media Co-Chair</b>	Turin, Italy
EUROMICRO INTERNATIONAL CONFERENCE ON PARALLEL, DISTRIBUTED, AND NETWORK-BASED PROCESSING (PDP - CORE2023: C)	2025
<ul style="list-style-type: none"> <li><a href="https://pdp2025.org/">https://pdp2025.org/</a></li> </ul>	

<b>Workshop Organizer - Federated Learning in Medical Imaging and Vision</b>	Udine, Italy
INTERNATIONAL CONFERENCE ON IMAGE ANALYSIS AND PROCESSING	2023
<ul style="list-style-type: none"> <li><a href="https://fedmedw.github.io/">https://fedmedw.github.io/</a></li> </ul>	

### JOURNALS EDITING

### PC MEMBER AND REVIEWER/REFeree

For each of the following journals, Bruno Casella has officially revised *at least* one paper. The specified quartiles are based on Scimago.

- Future Generation Computer Systems (Elsevier)[Q1]
- Applied Clinical Informatics (Thieme)[Q2]
- Parallel Computing (Elsevier)[Q2]
- International Journal of Parallel Programming (Springer)[Q3]
- Computing (ACM)[Q1]
- SoftwareX (Elsevier)[Q3]
- Computers in Biology and Medicine (Elsevier)[Q1]
- Expert Systems with Applications (Elsevier)[Q1]
- Transaction on Medical Imaging (IEEE)[Q1]
- Journal of Control Science and Engineering (Wiley)[Q3]
- Star Protocols (Cell Press)[Q1]
- Journal of Parallel and Distributed Computing (Elsevier)[Q1]
- Medical Image Analysis (Elsevier)[Q1]
- Information Fusion (Elsevier)[Q1]
- Computer Communications (Elsevier)[Q1]
- Transactions on Artificial Intelligence (IEEE)[Q1]
- Transactions on Parallel and Distributed Systems (IEEE)[Q1]
- Neural Computing and Applications (Springer)[Q1]
- Computer Methods and Programs in Biomedicine Update (Elsevier)[Q1]
- Transactions on Pattern Analysis and Machine Intelligence (IEEE)[Q1]

## CONFERENCE

For each of the following conferences, Bruno Casella was an official reviewer or part of the Program Committee.

- European Conference on Parallel and Distributed Computing (**Euro-Par**)
- International Joint Conference on Neural Networks (**IJCNN**)
- International Joint Conference on Artificial Intelligence (**IJCAI**)
- International Conference for High Performance Computing, Networking, Storage, and Analysis (**Supercomputing**)
- Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (**PDP**)

## WORKSHOP

For each of the following workshops, Bruno Casella was an official reviewer or part of the Program Committee.

- 4th Workshop on Distributed Machine Learning for the Intelligent Computing Continuum (DML-ICC@UCC 2024)
- AI in Pancreatic Disease Detection and Diagnosis (AIPAD@MICCAI 2024)
- 1st Workshop on Advancements in Federated Learning (WAFL@ECML-PKDD 2023)
- 3rd Workshop on Distributed Machine Learning for the Intelligent Computing Continuum (DML-ICC@UCC 2023)

## SCIENTIFIC COMMUNICATION

Bruno Casella has presented the following papers.

- B. Casella, *A performance analysis of VM-based Trusted Execution Environments for Confidential Federated Learning*, Euromicro International Conference on Parallel, Distributed, and Network-Based Processing, Turin (Italy), 12-14 March 2025.
- B. Casella, M. Jakobs, M. Aldinucci, S. Buschjäger, *Federated time series classification with rocket features*, European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning, Bruges (Belgium), 8-11 October 2024.
- B. Casella, A. B. Chisari, M. Aldinucci, S. Battiato, M. V. Giuffrida, *Federated learning in a semi-supervised environment for earth observation data*, European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning, Bruges (Belgium), 8-11 October 2024.
- B. Casella, I. Colonnelli, G. Mittone, R. Birke, W. Riviera, A. Sciarappa, C. Cavazzoni, M. Aldinucci, *A Performance Model for Confidential Federated Learning*, Deep Learning Security and Privacy Workshop in conjunction with IEEE Security and Privacy, San Francisco (CA), 20-22 May 2024.

- B. Casella, L. Paletto, *Predicting cryptocurrencies market phases through on-chain data long-term forecasting*, IEEE International Conference on Blockchain and Cryptocurrency, Dubai (UAE), 1-5 May 2023.
- B. Casella, R. Esposito, C. Cavazzoni, M. Aldinucci, *Benchmarking FedAvg and FedCurv for Image Classification Tasks*, Italian Conference on Big Data and Data Science, Milan (Italy), 20-21 September 2023.
- B. Casella, A. B. Chisari, S. Battiato, M. V. Giuffrida, *Transfer learning via test-time neural networks aggregation*, International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications, Online, 6-8 February 2022.

### THIRD MISSION AND TECHNOLOGICAL TRANSFER

- **Collaboration** with Tim for a federated learning project. (Jun. 2025 - Today)
- **Collaborations** with companies and institutions such as Martur, Bylogix, Emsense, and PoliTo for the development of a smart textile for health monitoring in drivers. (Jan. 2024 - Today)
- **Article for Agenda Digitale:** Federated learning, come coniugare intelligenza artificiale e privacy, <https://www.agendadigitale.eu/sicurezza/privacy/federated-learning-coniugare-machine-learning/>. (11 Jan. 2023)

## Mentoring/Supervision

### ADVISOR

I have supervised four international students from the Polytech Clermont (France) and one from the ENSEEIHT Toulouse (France) during their internships at the University of Turin.

### Co-ADVISOR

During my period at the University of Turin, I have co-supervised one master's student and two bachelor's degree students.

## Certificates and Awards

2024	<b>Honorable Mention Award</b> , Premio Internazionale Galileo Galilei per la promozione della Ricerca Umanistica e Scientifica riservato a giovani studiosi	Stresa, Italy
2024	<b>7th Advanced Course on Data Science and Machine Learning</b> , Universities of Catania and Florida, <a href="https://acdl2024.icas.events/">https://acdl2024.icas.events/</a>	
2023	<b>International Computer Vision Summer School</b> , University of Catania, <a href="https://iplab.dmi.unict.it/icvss2023/">https://iplab.dmi.unict.it/icvss2023/</a>	
2022	<b>Deep Learning for Medical Imaging Summer School</b> , ETS, Montreal, <a href="https://event.fourwaves.com/dlmi2022/pages">https://event.fourwaves.com/dlmi2022/pages</a>	
2022	<b>CIS Edge AI Summer School</b> , EPFL, Losanna <a href="https://www.epfl.ch/research/domains/cis/center-for-intelligent-systems-cis/events/cis-edge-ai-summer-school/">https://www.epfl.ch/research/domains/cis/center-for-intelligent-systems-cis/events/cis-edge-ai-summer-school/</a>	
2021	<b>DEEP LEARNING WITH PYTORCH: ZERO TO GANS – Jovian.ai</b> , Jovian.ai <a href="https://jovian.com/certificate/MFQTINJVGA">https://jovian.com/certificate/MFQTINJVGA</a>	
2021	<b>IMPROVING DEEP NEURAL NETWORKS: HYPERPARAMETER TUNING, REGULARIZATION AND OPTIMIZATION</b> , DeepLearning.AI, Coursera "Specialization" <a href="https://www.coursera.org/account/accomplishments/verify/HRA43JLWKNAT">https://www.coursera.org/account/accomplishments/verify/HRA43JLWKNAT</a>	
2021	<b>NEURAL NETWORKS AND DEEP LEARNING</b> , DeepLearning.AI, Coursera "Specialization" <a href="https://www.coursera.org/account/accomplishments/verify/F9BLUEYK3HUN">https://www.coursera.org/account/accomplishments/verify/F9BLUEYK3HUN</a>	
2021	<b>BLOCKCHAIN BASICS</b> , University of Buffalo, Coursera "Specialization" <a href="https://www.coursera.org/account/accomplishments/verify/GKL4ZULKLE4U">https://www.coursera.org/account/accomplishments/verify/GKL4ZULKLE4U</a>	

## Language skills

### Italian

MOTHER TONGUE

### English

PROFICIENT

## **Other Info**

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**Gimp | Adobe Photoshop | DaVinci Resolve**

PHOTO AND VIDEO EDITING

**Basket | Calisthenics and Streetlifting | Chess | Reading | Videogames**

HOBBIES AND SPORTS

I consent to the use of my personal data in accordance with the provisions of Italian decree 196/2003. I declare that the reported information is truthful and current under the provisions of art. 46 and 47 of the Italian decree 445/2000.

Bruno Casella, Torino, July 11, 2025