Mario Vozza

AI Researcher & Machine Learning Engineer

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Employment History

2025 – present

Visiting Research Fellow, University of Durham, Durham, UK
Developing neural network-based approaches, such as Fourier Neural Operators, to approximate solutions of drift–diffusion equations in organic electronic devices such as Bulk HeteroJunction.

2023 – present

Research Affiliate, Italian National Research Council (CNR), Bologna, Italy
Worked on several national and European projects applying artificial intelligence techniques for the prediction of key properties of nanostructured and quasi-2D materials, such as graphene. Main contributor to the creation of one of the first FAIR-compliant datasets on graphene properties.

2022 – 2022

Research Fellow, Italian National Research Council (CNR), Bologna, Italy
Contributed to AI-driven simulation tools and digital twins for mobility services and infrastructure. Developed microsimulation platforms for scenario analysis and performance evaluation.

2021 – 2022

Research Fellow, University of Naples, Federico II, Naples, Italy
Applied AI to model complex physical phenomena in metal additive manufacturing, focusing on property prediction and anomaly detection. Used computer vision and deep learning for real-time monitoring and quality control.

2020 – 2021

R&D Engineer Stage, Kineton, Naples, Italy
Involved in real-world testing and sensor data acquisition for ADAS. Contributed to pedestrian detection for AEB systems.

Automotive Engineer Intern, Kineton, Naples, Italy
Worked on a proof-of-concept project in collaboration with Jaguar Land Rover Group (Coventry), focusing on the design and implementation of optimal control strategies for an electro-actuated Exhaust Gas Recirculation (EGR) valve in automotive applications.

Education

2022 – present

Ph.D., Computer Engineering Polytechnic University of Turin in Artificial Intelligence (National Doctorate Program)
Main Topics: Approximation of complex physical phenomena, with a particular emphasis on the simulation of nanostructured materials using advanced artificial intelligence techniques within the field of Scientific Machine Learning *(SciML)*. Additional topics included unsupervised learning for industrial anomaly detection and pattern recognition in sensor-rich environments.

2018 – 2020

M.Sc. Automation Engineering, University of Naples, Federico II
Thesis: Modeling and optimal control of electro-actuated valves, with a case study on the Exhaust Gas Recirculation (EGR) system in automotive applications.

2014 – 2018

B.Sc. Mechanical Engineering, University of Naples, Federico II
Thesis: Caracterization of titanium and aluminum alloys for advanced aerospace applications.

Skills

Languages	Italian: Native English: B2
Coding	Python, C, C++, MATLAB
Databases	SQL, MongoDB NoSQL Databse
DevOps	Docker, Podman, Kubernetes, AWS
Computing & Infrastructure	HPC Cluster (Distributed Training), Slurm, Linux Shell, SSH, Git
AI Frameworks and Library	PyTorch, TensorFlow, Scikit-learn, Hugging Face
Soft Skills	Public Speaking, Scientific Communication, Research Mentoring, Project Management, Interdisciplinary Collaboration, Adaptability

Miscellaneous Experience

Awards and Achievements

2024 **Poster Award**, Second place for poster presentation at the EuMINe conference in Bologna.
Title: Efficient Workflow Automation for Materials Modeling: Towards Predictive AI Systems Using High Throughput Synthetic Dataset Generation

Certification

2023 Introduction to Parallel Computing with MPI and OpenMP. Certified by CINECA

Debbuging and Optimization of Scientific Applications. Certified by CINECA

2022 MasterLab Experis and Unimore on Autonomous driving system and AI. Certified by EXPERIS

2021 NVIDIA-Fundamentals of Accelerated Computing with CUDA Python. Certified by NVIDIA

Research Publications

Journal Articles

1. F. Le Piane, M. Vozza, M. Baldoni, and F. Mercuri, "Integrating high-performance computing, machine learning, data management workflows, and infrastructures for multiscale simulations and nanomaterials technologies," *Beilstein Journal of Nanotechnology*, vol. 15, no. 1, pp. 1498–1521, 2024.
2. G. Mattera, M. Vozza, J. Polden, L. Nele, and Z. Pan, "Frequency informed convolutional autoencoder for in situ anomaly detection in wire arc additive manufacturing," *Journal of Intelligent Manufacturing*, pp. 1–16, 2024.
3. L. Nele, G. Mattera, E. W. Yap, M. Vozza, and S. Vespoli, "Towards the application of machine learning in digital twin technology: A multi-scale review," *Discover Applied Sciences*, vol. 6, no. 10, p. 502, 2024.
4. L. Nele, G. Mattera, and M. Vozza, "Deep neural networks for defects detection in gas metal arc welding," *Applied Sciences*, vol. 12, no. 7, p. 3615, 2022.

References

Available on Request