Paolo Conti

Milano, Italy • Via Piccinni, 23 • paolo.conti@polimi.it • (+39)3406332219 • www.paolo-conti.com •

Education

PhD in Machine Learning May 2021 – Ongoing
Polytechnic University of Milan Milan, Italy

Conducted scientific machine learning (ML) research, with focus on conceptualizing, designing, and implementing algorithms dedicated to advancing reduced-order modeling and multi-fidelity data fusion. Key achievements include:

- Developed cutting-edge multi-fidelity techniques to accelerate and improve the accuracy of long-term forecasting for high-dimensional dynamical systems by leveraging multiple sources of low-fidelity data.
- Constructed interpretable ML frameworks for reduced-order modeling and identification of dynamical systems.

Teaching Assistant for courses in Numerical Mathematics, Dynamical Systems Modeling, and Scientific Communication.

MSc in Mathematical Engineering Sept 2018 – Apr 2021
Polytechnic University of Milan – Score: 110/110 cum laude Milan, Italy

- MSc. Thesis: *"Multi-fidelity regression with artificial neural networks: efficient approximation of output quantities for parametrized systems"*. Advisor: Prof. A. Manzoni.
- Relevant Coursework: Applied and Bayesian statistics; Model identification and data analysis; Algorithms and parallel computing; Advanced methods for scientific computing; Partial differential equations and numerical analysis.

BSc in Mathematical Engineering Sept 2015 – Sept 2018
Polytechnic University of Milan – Score: 110/110 Milan, Italy

- BSc. Thesis: "*Stationary Schrödinger equation: existence of a fundamental state*". Advisor: Prof. S. Salsa.

Experiences

Visting Researcher Oct 2023 – Nov 2023
SimTech Cluster of Excellence – University of Stuttgart Stuttgart, Germany

- Developed a generative ML framework for reduced order modeling under uncertainty using variational autoencoders. Conceptualized and implemented a data-driven system identification method based on variational inference.

Research Intern Oct 2022 – May 2023
Artificial Intelligence Institute in Dynamic System – University of Washington Seattle (WA), USA

Advisors: Prof. J. Nathan Kutz, Prof. Steven L. Brunton.

- Designed and constructed physics-informed models for Micro-Electrical Mechanical Systems (MEMS) devices. Application and validation on MEMS micromirrors and resonator devices from STMicroelectronics.
- Developed a multi-fidelity method to recover and predict high-quality solutions from multiple, low-fidelity data sources.

Study Exchange Sept 2019 – July 2020
Sorbonne University Paris, France

Study abroad coursework in the departments of Applied Mathematics and Sorbonne Polytech.

Publications

- **Conti**, Guo, Manzoni, Frangi, Brunton., Kutz, "*Multi-fidelity reduced-order surrogate modeling",* preprint, 2023.
- **Conti**, Gobat, Fresca, Manzoni, Frangi, "*Reduced order modeling of parametrized systems through autoencoders and SINDy approach: continuation of periodic solutions",* Computer methods in applied mechanics and engineering, 2023.
- **Conti**, Guo, Manzoni, Hesthaven, "*Multi-fidelity surrogate modeling using long short-term memory networks*", Computer methods in applied mechanics and engineering, 2023.
- Guo, Manzoni, Amendt, **Conti**, Hesthaven, "*Multi-fidelity regression using artificial neural networks: efficient approximation of parameter-dependent output quantities*", Computer methods in applied mechanics and engineering, 2022.

Scientific Projects github.com/ContiPaolo

- **Multi-fidelity tutorial** `Python` at the "Scientific ML and Dynamical Systems" Autumn School Amsterdam.
- **Applied Statistics** `R` *"What do you need to climb the charts?"* – Analysis of Spotify Dataset.
- **Model Identification** `Python` `MATLAB` "*Modeling from measurements"* – Implemented numerical and machine learning techniques for data-driven system identification.
- **High performance computing** `CUDA` "*GPU Merge Path*": batch merge and merge path sorting algorithms**.**
- **C++ library implementation** `C/C++` **"***Poisson differential equation solver"* – Implemented a library for the finite difference resolution of partial differential equations.

Achievements

Academic awards

- *Best Poster Award* at the 6th International Workshop on Model Order Reduction Techniques (MORTech).
- Winner of 8 months grant funding as research intern at the AI Institute in Dynamic Systems, Seattle (USA).
- Best project presentation award at Deep Learning School at the Machine Learning Genoa Center.
- Outstanding project award at the *Data Scientist Academy*, organized by KPMG, Saipem, TeamSystem and WindTre.
- *"Academic & Sporting Merit scholarship"* Four times recipient of the Academic and Sporting Merit scholarship, established by Polytechnic University of Milan, 2015 – 2018.

Sport Career awards – Aerobic Gymnastics

- *"Medal of Athletic Value"*, awarded by the Italian National Olympic Committee in 2023.
- *"Oscar awards for Gymnastics",* awarded by the Italian National Olympic Committee in 2015.
- World Championship medalist in 2021, 2016 and European Champion in 2015.
- Italian National Champion in 2021 and Member of the National Team of Aerobic Gymnastics, 2010 – 2021.

Skills

Programming: Python (Tensorflow), C/C++, R, MATLAB, SQL, CUDA.

Languages: English (Fluent), Italian (Native Language), French (Intermediate), Spanish (Intermediate).

Activities

LGBTQIA+ right activist and volunteer in *Bergamo Pride*

- Organized and coordinated *Bergamo Pride* (2020 – 2022). Promoted and organized awareness and prevention events; fundraising and volunteering programs for the LGBTQIA+ community; educational and social activities.

International gymnastic coach and choreographer

- Coached and choreographed teams in Italy, France, Finland (National Team), Hungary, Lithuania and USA.

Selected presentations

Oral presenter

- Invited speaker at *SimTech Data Integrated* workshop at University of Stuttgart – Stuttgart, Oct 2023.
- Math 2 Product (M2P) Emerging Technologies in Computational Science for Industry, Sustainability and Innovation – Taormina, May 2023.
- AAAI Symposium on computational approaches to scientific discovery – San Francisco, Mar 2023.
- SIAM conference on computational science and engineering (CSE23) – Amsterdam, Feb 2023.

Poster presenter

- 6th International Workshop on Model Order Reduction Techniques (MORTech) – Paris, Nov 2023.
- Common Task Framework for AI in Science and Engineering – Seattle, Feb 2023.
- Mediterranean Machine Learning (M^2L) Summer School (organized by Deep Mind) – Milan, Sept 2022.
- Deep Learning Summer School – Genoa, July 2021.