

Dario Andrini

Born on July 11, 1994, Ravenna (RA)



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Profile

Postdoctoral researcher at Politecnico di Torino (DISMA), with a strong background in **mathematical modeling** and **numerical analysis** applied to **mechanics** and **optimization**.

Research expertise includes **nonlinear mechanics**, **porous media**, **optimal control**, **shape and topology optimization**, **optimal transport on nets**. Experienced with both theoretical modelling and computational implementation (**CAE**, **Finite Element**, **Finite Differences**, **Lattice Boltzmann**).

Experience

ACADEMIC RESEARCH

2024-ongoing: Postdoctoral researcher, Politecnico di Torino (DISMA-dipartimento di matematica).

- Research activity on mathematical models for **additive manufacturing** under the supervision of prof. Luigi Preziosi
- Working on **topological optimization** of artificial scaffolds for cell culture (**Finite Element Analysis**)

2022-2024: Postdoctoral researcher, Politecnico di Milano (MOX-dipartimento di matematica).

- Mathematical models for **additive manufacturing and industry 4.0** under the supervision of prof. Pasquale Ciarletta
- **Optimal shape design** of 3D printable clothes (**Finite Element Analysis**)
- Developed **nonlinear shell models** with **residual stresses** and investigation of **mechanical instabilities**.

TEACHING EXPERIENCE (+100 hrs)

- **2022/23-2023/24**: Support lecturer - Rational Mechanics - BSc in Ingegneria dei Materiali e delle Nanotecnologie - Politecnico di Milano
- **2023/24-2024/25**: Support lecturer - Mathematical and physical modelling in engineering - MSc in mathematical engineering - Politecnico di Milano

CONFERENCES AND WORKSHOP: My research has been presented at over 10 **international conferences** and workshops.

Education

2018-2022: Ph.D. in "Mathematical analysis modelling and applications", **cum laude** at *Scuola Internazionale Superiore degli Studi Avanzati (SISSA)*.

Thesis title: "Transient morphing and optimal shape design of synthetic and natural active structures"

- **Plate theory** for porous media (nonlinear hydrogel)
- **Optimal control**: optimal shape morphing in **smart materials** (**Finite Element Analysis**)
- **Optimal transport of resources** in plant leaves (**Finite Element Analysis**)
- **Grant winner: Progetto Giovani, 2021**: D. Andrini, G. Bevilacqua, G. Lucci, G. Pozzi, D. Riccobelli (P.I.) "Transizioni di forma nella materia biologica e attiva".

2016-2018: Master's degree in Mathematical Engineering, **cum laude** at *Università degli studi di Padova*, Padova, Italy.

Thesis title: "rheological properties of active liquid crystals emulsions"

2013-2016: Bachelor's degree in Mechanical Engineering, **cum laude** at *Università degli studi di Bologna*, Forlì, Italy.

Thesis Title: "Valutazione delle prestazioni termo-idrauliche ed ottimizzazione di microcanali a spigoli smussati per flussi elettro-osmotici"

Skills

Programming: Matlab, Python, Mathematica, C, Fortran.

Software: Comsol, SolidWorks, MicroSoft Office, ParaView, FEniCS, FireDrake

Languages: Italian (Mother tongue), English (Advanced), French (Basic)

Scientific Production:

Publications:

- D. Andrini, A. Lucantonio, G. Noselli. "A theoretical study on the transient morphing of linear poroelastic plates", Journal of Applied Mechanics, 88(3). 031008, 2020. <https://doi.org/10.1115/1.4048806>.
- D. Andrini, G. Noselli, A. Lucantonio, "Optimal design of planar shapes with active materials", Proceedings of the Royal Society – A, 2022, <https://doi.org/10.1098/rspa.2022.0256>
- D. Andrini, V. Balbi, G. Bevilacqua, G. Lucci, G. Pozzi, D. Riccobelli, "Mathematical modelling of axonal cortex contractility", Brain Multiphysics, 2022, <https://doi.org/10.1016/j.brain.2022.100060>
- D. Andrini, P. Ciarletta, M. Magri, "Optimal surface clothing with elastic nets", Journal of the Mechanics and Physics of Solids, 2024, <https://doi.org/10.1016/j.jmps.2024.105684>
- D. Andrini, X. Chen, P. Ciarletta, "Nonlinear morphoelastic theory of biological shallow shells with initial stress", Journal of Elasticity, 2025, <https://doi.org/10.1007/s10659-025-10113-z>
- D. Andrini, G. Noselli, A. Lucantonio "A gradient flow approach to leaves morphogenesis", (in preparation).

Milano, 16/10/2025