

# Curriculum Vitæ - Lorenza D'Elia

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April 2nd, 2024

## Personal Details

Place and year of birth Italy - 1993

Work address Institute of Analysis and Scientific Computing, TU Wien  
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## Research Interests

Calculus of variations,  $\Gamma$ -convergence, periodic and aperiodic homogenization and their applications in Materials Science.

## Positions

**From April 2022 to present** - Post-doctoral researcher in the Research Group *Multiscale Calculus of Variations* (Group Leader: E. Davoli) at Institute of Analysis and Scientific Computing, TU Wien.

**From March 2021 to February 2022** - Post-doctoral researcher in the Research Project *Homogenization of non-local variational problems* (Scientific Responsible: A. Braides) at Department of Mathematics, Università degli Studi di Roma Tor Vergata.

## Education

26.10.2020 **Ph.D in Matematica Pura e Applicata**, *Università degli Studi di Torino and Politecnico di Torino*, Italy.

Title: *Asymptotic analysis of a stiff Neumann problem and homogenization of some degenerate functionals.*

Supervisor: Professor V. Chiadò Piat.

20.07.2017 **M.Sc. in Mathematics**, *Università degli Studi di Torino*, Italy.

Title: *Boundedness of pseudodifferential operators on modulation spaces.*

Advisor: Professor E. Cordero.

14.07.2015 **B.Sc. in Mathematics**, *Università degli Studi di Torino*, Italy.

Title: *A study of stability for the Hill equation.*

Advisor: Professor V. L. Barutello.

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## Additional academic qualification

- 19.02.2021 French Qualification to function as *maître de conférences* in Mathematics (Sector 25).  
Expiry date: 31.12.2025
- 10.02.2021 French Qualification to function as *maître de conférences* in Applied Mathematics  
(Sector 26). Expiry date: 31.12.2025

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## Publications & Preprints

- [9] L. D’Elia, M. Eleuteri, E. Zappale. Homogenization of supremal functionals in the vectorial case (via  $L^p$ -approximation). *Accepted Paper: Anal. Appl.* (2024). [ArXiv: 2310.01175](#).
- [8] E. Davoli, L. D’Elia, J. Ingmanns. Stochastic homogenization of micromagnetic energies and emergence of magnetic skyrmions. *J. Nonlinear Sci.* **34** (2024), 30. [DOI: 10.1007/s00332-023-10005-3](#).
- [7] A. Braides, L. D’Elia. Homogenization of discrete thin structures. *Nonlinear Anal.* **231** (2023), 112951. [DOI: 10.1016/j.na.2022.112951](#).
- [6] L. D’Elia, S. A. Nazarov. Gaps in the spectrum of two-dimensional square packing of stiff disks. *Appl. Anal.* **102** (2023), 2611-2627. [DOI: 10.1080/00036811.2022.2033230](#).
- [5] L. D’Elia.  $\Gamma$ -convergence of quadratic functionals with non uniformly elliptic conductivity matrices. *Netw. Heterog. Media* **17** (2022), 15-45. [DOI: 10.3934/nhm.2021022](#).
- [4] V. Chiadò Piat, L. D’Elia, S. A. Nazarov. The stiff Neumann problem: asymptotic specialty and “kissing” domains. *Asymptot. Anal.* **128** (2022), 113-148. [DOI: 10.3233/ASY-211701](#).
- [3] A. Braides, V. Chiadò Piat, L. D’Elia. An extension theorem from connected sets and homogenization of non-local functionals. *Nonlinear Anal.* **208** (2021), 112316. [DOI: 10.1016/j.na.2021.112316](#).
- [2] E. Cordero, L. D’Elia, S. I. Trapasso. Norm estimates for  $\tau$ -pseudodifferential operators in Wiener amalgam and modulation spaces. *J. Math. An. Appl.* **471** (2019), 541-563. [DOI: 10.1016/j.jmaa.2018.10.090](#).
- [1] L. D’Elia, S. I. Trapasso. Boundedness of pseudodifferential operators with symbols in Wiener Amalgam spaces on modulation spaces. *J. Pseudo-Differ. Oper. Appl.* **9** (2017), 1-10. [DOI: 10.1007/s11868-017-0220-1](#).

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## Talks & Poster presentations

### Invited Talks

- July 2022 - IMSE Online 2022, 16th International Conference on Integral Methods in Science and Engineering, on-line.
- December 2021 - Meeting “*Variational Problems in Domains with Complex Geometrical Structure*”, Torino, Italy.

- January 2020 - Mini-Workshop “*Mathematical Models in Continuum Mechanics*”, Torino, Italy.

### Contributed Talks

- November 2023 - Third Austrian Calculus of Variations Day, Vienna, Austria.
- February 2023 - Third Austrian Day of Women in Mathematics, on-line.
- December 2021 - Winter School “*Analytical Methods in Quantum and Continuum Mechanics*”, Torino, Italy.
- October 2019 - Conference “*Asymptotic Analysis and Spectral Theory*”, Orsay, France.
- May 2019 - Conference “*International Conference on Elliptic and Parabolic Problems*”, Gaeta, Italy.

### Invited seminars

- May 17th, 2023 - Seminar at Radboud University, Netherlands.
- March 1st, 2023 - PDE Afternoon, University of Vienna, Austria.
- November 9th, 2021 - Seminar on Differential Equations, University of Roma Tor Vergata, Italy.

### Poster presentations

- April 2023 - Workshop “*Taming Complexity in Partial Differential Systems*”, Vienna, Austria.
- October 2019 - Workshop “*Calculus of Variations and applications*”, Trani, Italy.

## Organization activity

- November 2023 - Workshop *3rd Austrian Calculus of Variations Day* co-organized with A. Daniilidis, E. Davoli, C. Gavioli, L. Happ, K. Nik, F. Stark-McNeilly, S. Riccò, S. Tapia-García, M. Tommasini at TU Wien, Austria.
- January 2023 - *Young Researchers’ Meeting* embedded in the *22nd GAMM Seminar on Micro-structures* co-organized with V. Pagliari at TU Wien, Austria.

## Teaching

- Fall 2023 Course “*VO: An introduction to homogenization theory*” for master and PhD students at TU Wien.
- Fall 2022 Exercise Course “*UE: Modelling with Partial Differential Equations*” for master students at TU Wien.
- Fall 2020 PhD course “*Introduction to Homogenization Methods for multi-scale problems*” in collaboration with Professor V. Chiadò Piat for PhD students at Politecnico di Torino.
- Fall 2019 Teaching assistant for *Analysis 1* for bachelor students in Engineering at Politecnico di Torino.
- Fall 2017 Tutor for *Analysis* for master students in Stochastic and Data Science at Università degli Studi di Torino.

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## Research visits

- May 15th - 19th, 2023, Radboud University, Nijmegen (Netherlands). Host: R. Cristoferi.
- February 2nd - July 15th, 2020, INSA de Rennes, Rennes (France). Host: M. Briane.
- July 29th - August 6th, 2019, University of Helsinki, Helsinki (Finland). Host: J. Taskinen and S. A. Nazarov.
- December 6th - 21st, 2018, University of Helsinki, Helsinki (Finland). Host: J. Taskinen and S. A. Nazarov.

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## Honours and awards

- 2024: Research in Teams “*Novel effective theories of phase separation in quasi-crystals*” awarded from BIRS Research Center, Banff, Canada. In collaboration with R. Cristoferi.
- 2024: Research in Residence “*Phase separations in quasi-crystalline structures*” awarded from CIRM, Luminy, France. In collaboration with R. Cristoferi.
- 2022: Project “*Variational modeling of quasi-crystalline microstructures*” awarded a MSCA Seal of Excellence.

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## Participation in scientific projects

- 2023: Member of the Research Project: *Perspectives in materials science: variational models, analysis asymptotic and homogenization* awarded by INdAM - GNAMPA.
- 2020: Member of the Research Project: *Variational analysis of non-local models in applied sciences* awarded by INdAM - GNAMPA.
- 2019: Member of the Research Project: *An asymptotic approach to complex structures in biology and engineering* awarded by INdAM - GNAMPA.