

Personal Information

Name Maicol Caponi
Date of birth May 05, 1991
Place of birth Castiglione del Lago (PG), Italy
Citizenship Italian
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Working Experiences

- Aug. 2024 – ongoing **Fixed-term researcher (RTDA) in Mathematical Analysis**, Department of Information Engineering, Computer Science and Mathematics, Università degli Studi dell'Aquila, L'Aquila, Italy
- Oct. 2022 – July 2024 **Postdoc (Assegno di ricerca)**, *scientific host: Prof. Francesco Solombrino*, Dipartimento di Matematica e Applicazioni "R. Caccioppoli", Università degli Studi di Napoli "Federico II", Naples, Italy
- Oct. 2019 – Sep. 2022 **Postdoc (Wissenschaftlicher Mitarbeiter)**, *scientific host: Prof. Peter Hornung*, Institut für Geometrie, Technische Universität Dresden, Dresden, Germany

Education

- 2015 – 2019 **Ph.D. cum laude in Mathematical Analysis, Modelling and Applications**, SISSA, Trieste, Italy
Advisor: Prof. Gianni Dal Maso
Thesis Title: On some mathematical problems in fracture dynamics
External Referees: Prof. A. Mielke, Prof. C.J. Larsen
Date of attainment: September 25, 2019
- 2013 – 2015 **M.Sc. in Mathematics**, Università degli Studi di Perugia, Perugia, Italy
Advisor: Prof. Patrizia Pucci
Thesis Title: Schrödinger-Kirchhoff equations in $\mathbb{R}^N$ involving the fractional p -Laplacian
Grade: 110/110 cum laude
Date of attainment: July 16, 2015
- 2010 – 2013 **B.Sc. in Mathematics**, Università degli Studi di Perugia, Perugia, Italy
Advisor: Prof. Roberta Filippucci
Thesis Title: Teoremi di Liouville per le equazioni di Hardy-Hénon
Grade: 110/110 cum laude
Date of attainment: September 26, 2013

Publications

A preprint version of the following papers can be found at <https://cvgmt.sns.it/person/2331/>.

- 10 **S. Almi, M. Caponi, M. Friedrich, F. Solombrino**, *A fractional approach to strain-gradient plasticity: beyond core-radius of discrete dislocations*, online su Math. Ann. (2024), doi: 10.1007/s00208-024-03020-6
- 9 **M. Caponi, A. Carbotti, F. Sapio**, *The viscoelastic paradox in a nonlinear Kelvin-Voigt type model of dynamic fracture*, J. Evol. Equ. **24** (2024), article number 63, doi: 10.1007/s00028-024-00989-0

- 8 **N. Cangiotti, M. Caponi, A. Maione, E. Vitillaro**, *Schrödinger-Maxwell equations driven by mixed local-nonlocal operators*, *Fract. Calc. Appl. Anal.* **27** (2024), 677–705
- 7 **N. Cangiotti, M. Caponi, A. Maione, E. Vitillaro**, *Klein-Gordon-Maxwell equations driven by mixed local-nonlocal operators*, *Milan J. Math.* **91** (2023), 375–403
- 6 **M. Caponi, F. Sapio**, *An existence result for the fractional Kelvin-Voigt's model on time-dependent cracked domains*, *J. Evol. Equ.* **21** (2021), 4095–4143
- 5 **M. Caponi, I. Lucardesi, E. Tasso**, *Energy-dissipation balance of a smooth moving crack*, *J. Math. Anal. Appl.* **483** (2020), 123656
- 4 **M. Caponi**, *Existence of solutions to a phase-field model of dynamic fracture with a crack-dependent dissipation*, *NoDEA Nonlinear Differential Equations Appl.* **27** (2020), 48pp.
- 3 **M. Caponi, F. Sapio**, *A dynamic model for viscoelastic materials with prescribed growing cracks*, *Ann. Mat. Pura Appl.* **199** (2020), 1263–1292
- 2 **M. Caponi**, *Linear Hyperbolic Systems in Domains with Growing Cracks*, *Milan J. Math.* **85** (2017), 149–185
- 1 **M. Caponi, P. Pucci**, *Existence theorems for entire solutions of stationary Kirchhoff fractional p -Laplacian equations*, *Ann. Mat. Pura Appl.* **195** (2016), 2099–2129

Preprints

All the following preprints can be found at <https://cvgmt.sns.it/person/2331/>.

- **M. Caponi, A. Carbotti, A. Maione**, *H -compactness for nonlocal linear operators in fractional divergence form*, preprint (2024), arXiv: 2408.10984
- **M. Caponi, V. Crismale**, *A rate-independent model for geomaterials under compression coupling strain gradient plasticity and damage*, preprint (2023), arXiv: 2311.13863
- **S. Almi, M. Caponi, M. Friedrich, F. Solombrino**, *Geometric rigidity on Sobolev spaces with variable exponent and applications*, preprint (2023), arXiv: 2305.00740

Seminars and Talks (last 5 years)

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| Oct. 17, 2024 | A fractional approach to strain-gradient plasticity: beyond core-radius of discrete dislocations , <i>Seminari di Analisi Junior</i> , Naples, Italia |
| July 26, 2024 | The viscoelastic paradox in a nonlinear Kelvin-Voigt type model of dynamic fracture , <i>2nd International Joint Meeting AMS-UMI, session "PDEs Applications to Nonlinear Phenomena"</i> , Palermo, Italy |
| Apr. 24, 2024 | A fractional approach to a gradient theory for plasticity via discrete dislocations: beyond core radius , <i>Dipartimento di Matematica e Fisica "E. De Giorgi"</i> , Lecce, Italy |
| Feb. 22, 2024 | Geometric rigidity on Sobolev spaces with variable exponent and applications , <i>Variational Models in Materials Science II</i> , Naples, Italy |
| Dec. 21, 2023 | Geometric rigidity on Sobolev spaces with variable exponent and applications , <i>Barcelona Analysis Seminar</i> , Barcelona, Spain |
| June 14, 2023 | Geometric rigidity on Sobolev spaces with variable exponent and applications , <i>Seminari di Analisi Junior</i> , Naples, Italy |
| June 22, 2022 | An existence result for the fractional Kelvin-Voigt's model on time-dependent cracked domains , <i>Summer School in Nonlinear Analysis, A Special Tribute to Patrizia Pucci</i> , Viterbo, Italy |
| Oct. 08, 2021 | An existence result for the fractional Kelvin-Voigt's model on time-dependent cracked domains , <i>9th GAMM-Workshop on Analysis of PDEs</i> , Freiburg, Germany |
| May 31, 2019 | Energy-dissipation balance of a smooth moving crack , <i>Analysis Junior Seminar</i> , SISSA, Trieste, Italy |
| May 10, 2019 | Existence of solutions to a phase-field model of dynamic fracture with a crack-dependent dissipation , <i>Calculus of Variations and PDE Day</i> , Dresden, Germany |

- April 03, 2019 **Existence of solutions to a phase-field model of dynamic fracture with a crack-dependent dissipation**, Münster, Germany
- Feb. 05, 2019 **Bilancio energia-dissipazione per l'evoluzione dinamica di fratture regolari**, XXIX *Convegno Nazionale di Calcolo delle Variazioni*, Levico Terme, Italy

Schools and Conferences Attended (last 5 years)

- July 23 - 26, 2024 **2nd International Joint Meeting AMS-UMI**, Palermo, Italy
- June 24 - 28, 2024 **Vito Volterra Meeting 2024**, Rome, Italy
- June 06 - 07, 2024 **Calculus of Variations and Nonlinear Analysis in the Applied Sciences**, Rome, Italy
- May 17 - 18, 2024 **Two Nonlinear Days**, Perugia, Italy
- Feb. 21 - 23, 2024 **Variational models in Materials Science II**, Naples, Italy
- Feb. 12 - 16, 2024 **XXXIII Convegno Nazionale di Calcolo delle Variazioni**, Riccione, Italy
- Jan. 22 - 26, 2024 **Modeling, analysis, and control of multi-agent systems across scales**, Pisa, Italy
- Sep. 20 - 22, 2023 **Variational models for material failure**, Erlangen, Germany
- June 05 - 09, 2023 **Vito Volterra Meeting 2023 in Calculus of Variations**, Rome, Italy
- May 08 - 12, 2023 **XXXII Convegno Nazionale di Calcolo delle Variazioni**, Levico Terme, Italy
- Feb. 20 - 24, 2023 **Between Regularity and Defects: Variational and Geometrical Methods in Materials Science**, ESI, Vienna, Austria
- Jan. 30 - 31, 2023 **Shape Optimization, Geometric Inequalities and Related Topics**, Naples, Italy
- June 20 - 24, 2022 **Summer School in Nonlinear Analysis**, Viterbo, Italy
- May 09 - 13, 2022 **XXXI Convegno Nazionale di Calcolo delle Variazioni**, Levico Terme, Italy
- Feb. 21- 25, 2022 **Free Boundary Problems and Related Evolution Equations**, ESI, online
- Oct. 06 - 08, 2021 **9th GAMM-Workshop on Analysis of PDEs**, Freiburg, Germany
- Feb. 03 - 07, 2020 **XXX Convegno Nazionale di Calcolo delle Variazioni**, Levico Terme, Italy
- Jan. 27 - Feb. 01, 2020 **Calculus of Variations and Applications (on the occasion of Gianni Dal Maso's birthday)**, SISSA, Trieste, Italy
- Nov. 11 - 15, 2019 **Modeling of Crystalline Interfaces and Thin Film Structures: A Joint Mathematics-Physics Symposium**, ESI, Vienna, Austria
- May 10, 2019 **Calculus of Variations and PDE Day**, Dresden, Germany
- April 10 - 12, 2019 **Italian-Romanian Colloquium on Differential Equations and Applications**, Udine, Italy
- Feb. 04 - 08, 2019 **XXIX Convegno Nazionale di Calcolo delle Variazioni**, Levico Terme, Italy

Organization Activities

- Feb. 08 - 10, 2023 *Organizer* (together with F. Dipasquale, G. Scilla, F. Solombrino, and B. Stroffolini) of the Workshop **Variational Models in Material Science**, Dipartimento di Matematica e Applicazioni "R. Caccioppoli", Università degli studi di Napoli "Federico II", Naples, Italy
- Nov. 2017 - Sep. 2019 *Student representative* for the Ph.D. course in **Mathematical Analysis, Modelling, and Applications**, SISSA, Trieste, Italy
- Dec. 16 - 19, 2018 *Organizer* (together with E. Caputo, V. Fantini, M. Gallone, and A. Rubin) of the second edition of **Junior Math Days 2018**, SISSA, Trieste, Italy
- May 06 - 10, 2018 *Organizer* (together with M. Caorsi, V. Fantini, and M. Gallone) of **Junior Math Days 2018**, SISSA, Trieste, Italy

Teaching Activities

- Sep. 2024 - Jan. 2025 **Teaching for the course "Fundamentals of Partial Differential Equations and Numerical Methods" (with Prof. Vladimir Protasov)**, 30 hours - 3CFU, Master course in *Control Systems and Automation Engineering*, Università degli Studi dell'Aquila, L'Aquila, Italy

- Sep. 2024 – **Teaching for the course “Analisi Matematica I” (with Prof. Klaus Engel)**, 15 hours - 1.5
 Jan. 2025 CFU, Bachelor course in *Information and Communication Technologies Engineering*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Sep. 2024 – **Teaching for the course “Analisi Matematica” (with Prof. Klaus Engel)**, 15 hours - 1.5
 Jan. 2025 CFU, Bachelor course in *Computer Science*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Oct. 2021 – **Tutoring activities for the course “Analysis - Grundlegende Konzepte”**, 3 hours a week,
 Feb. 2022 Fakultät Mathematik, Technische Universität Dresden, Dresden, Germany
- Oct. 2020 – **Tutoring activities for the course “Fortgeschrittene Analysis für Physiker”**, 1.5 hours a
 July 2021 week, Fakultät Mathematik, Technische Universität Dresden, Dresden, Germany
- Oct. 2019 – **Tutoring activities for the course “Funktionalanalysis”**, 1.5 hours a week, Fakultät Mathe-
 Feb. 2020 matik, Technische Universität Dresden, Dresden, Germany
- Nov. 2014 – **Tutoring activities for the course “Matematica e Statistica”**, 30 hours, Dipartimento di
 Feb. 2015 Chimica, Biologia e Biotecnologie, Università degli Studi di Perugia, Perugia, Italy
- Nov. 2013 – **Tutoring activities for the course “Analisi Matematica I”**, 18 hours, Dipartimento di
 Feb. 2014 Matematica e Informatica, Università degli Studi di Perugia, Perugia, Italy

Participation to Research Projects

- Ago. 2024 – Participant to the PNRR Project *National Centre for HPC, Big Data and Quantum Computing*.
 ongoing
- Feb. 2024 – Participant to the PRIN 2022 Project 2022HKBF5C *Variational Analysis of Complex Systems*
 July 2024 *in Material Science, Physics and Biology*.
- 2024 – ongoing Participant to the INdAM – GNAMPA Project 2024 *Pairing e div-curl lemma: estensioni a campi debolmente derivabili e differenziazione non locale*.
- 2023 Participant to the INdAM – GNAMPA Project 2023 *Equazioni differenziali alle derivate parziali di tipo misto o dipendenti da campi di vettori*.
- Oct. 2022 – Participant to the project STAR PLUS 2020 - Linea 1 - 21-UNINA-EPIG-172 *New perspectives*
 Jan. 2024 *in the Variational Modeling of Continuum Mechanics*.
- Mar. 2022 – Participant to the research group DFG SPP 2256 *Variational Methods for Predicting Complex*
 Sep. 2022 *Phenomena in Engineering Structures and Materials*, Projekt 1: *Modellierung und Simulation des Knickverhaltens dünner elastischer Körper*.
- Aug. 2019 – Participant to the PRIN 2017 Project 2017BTM7SN *Variational methods for stationary and*
 Dec. 2019 *evolution problems with singularities and interfaces*.
- 2018 Participant to the INdAM – GNAMPA Project 2018 *Problemi non lineari alle derivate parziali*.
- 2017 Participant to the INdAM – GNAMPA Project 2017 *Equazioni differenziali non lineari*.
- 2016 Participant to the INdAM – GNAMPA Project 2016 *Problemi variazionali su varietà riemanniane e gruppi di Carnot*.

Languages

Italian Mother tongue
 English Fluent
 German Intermediate

Date: October 23, 2024