

General Information

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

- Aug. 01, 2024 – present **Fixed-term Assistant Professor (RTD-A) in Mathematical Analysis**, *Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Feb. 01, 2024 – Jul. 31, 2024 **Postdoc (Assegno di Ricerca)**, *Dipartimento di Matematica e Applicazioni "R. Caccioppoli"*, Università degli Studi di Napoli "Federico II", Naples, Italy
Scientific supervisor: Prof. Francesco Solombrino
- Oct. 01, 2022 – Jan. 31, 2024 **Postdoc (Assegno di Ricerca)**, *Dipartimento di Matematica e Applicazioni "R. Caccioppoli"*, Università degli Studi di Napoli "Federico II", Naples, Italy
Scientific supervisor: Prof. Francesco Solombrino
- Oct. 01, 2019 – Sep. 30, 2022 **Postdoc (Wissenschaftlicher Mitarbeiter)**, *Institut für Geometrie*, Technische Universität Dresden, Dresden, Germany
Scientific supervisor: Prof. Peter Hornung

Education

- 2015 – 2019 **Ph.D. cum laude in Mathematical Analysis, Modelling and Applications**, *Scuola Internazionale Superiore di Studi Avanzati (SISSA)*, Trieste, Italy
Advisor: Prof. Gianni Dal Maso
Thesis title: On some mathematical problems in fracture dynamics
Date of attainment: September 25, 2019
- 2013 – 2015 **Master's Degree in Mathematics**, *Università degli Studi di Perugia*, Perugia, Italy
Advisor: Prof. Patrizia Pucci
Thesis title: Schrödinger–Kirchhoff equations in $\mathbb{R}^N$ with the fractional p -Laplacian
Final grade: 110/110 *cum laude*
Date of attainment: July 16, 2015
- 2010 – 2013 **Bachelor's Degree in Mathematics**, *Università degli Studi di Perugia*, Perugia, Italy
Advisor: Prof. Roberta Filippucci
Thesis title: Teoremi di Liouville per le equazioni di Hardy–Hénon
Final grade: 110/110 *cum laude*
Date of attainment: September 26, 2013

Publications

Preprints of the following papers are available at <https://cvgmt.sns.it/person/2331/>.

Journal Articles

- 13 **M. Caponi, A. Carbotti, A. Maione**, *H*-compactness for nonlocal linear operators in fractional divergence form, *Calc. Var. Partial Differential Equations* **64** (2025), Paper No. 290, 36 pp.

- 12 **S. Almi, M. Caponi, M. Friedrich, F. Solombrino**, *A fractional approach to strain-gradient plasticity: beyond core-radius of discrete dislocations*, Math. Ann. **391** (2025), 4063–4115.
- 11 **M. Caponi, V. Crismale**, *A rate-independent model for geomaterials under compression coupling strain gradient plasticity and damage*, ESAIM Control Optim. Calc. Var. **31** (2025), Paper No. 14, 49 pp.
- 10 **S. Almi, M. Caponi, M. Friedrich, F. Solombrino**, *Geometric rigidity on Sobolev spaces with variable exponent and applications*, NoDEA Nonlinear Differential Equations Appl. **32** (2025), Paper No. 12, 50 pp.
- 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), Paper No. 63, 38 pp.
- 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, F. Sapio**, *A dynamic model for viscoelastic materials with prescribed growing cracks*, Ann. Mat. Pura Appl. **199** (2020), 1263–1292.
- 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), Paper No. 14, 48 pp.
- 3 **M. Caponi, I. Lucardesi, E. Tasso**, *Energy-dissipation balance of a smooth moving crack*, J. Math. Anal. Appl. **483** (2020), 123656, 32 pp.
- 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.

Book Chapters

- **M. Caponi**, *A Survey on the Div-Curl Lemma and Some Extensions to Fractional Sobolev Spaces*, To appear in the contributed volume: “New Frontiers in Homogenization and Fractional Calculus”, Trends in Mathematics series, Springer-Birkhäuser (2026).

Preprints

The following preprints are available at <https://cvgmt.sns.it/person/2331/>.

- **G. C. Brusca, M. Caponi, A. Carbotti, A. Maione, F. Paronetto**, *H-convergence and Γ -convergence in the Riesz fractional setting: the nonlinear case*, Preprint (2026), arXiv: 2607.06725.
- **S. Almi, M. Caponi, M. Friedrich, F. Solombrino**, *Riesz fractional gradient functionals defined on partitions: nonlocal-to-local variational limits*, Preprint (2025), arXiv: 2510.04881.

Talks at Conferences and Workshops

- Jul. 07, 2026 **A fractional approach to strain-gradient plasticity: beyond core-radius of discrete dislocations**, *The 15th AIMS Conference*, Special Session 126 “Defects, Microstructures, and Failure: Multiscale Variational Models”, Athens, Greece (contributed talk)
- May 26, 2026 **H-convergence and Γ -convergence in the Riesz fractional setting: the nonlinear case**, *International Conference on Elliptic and Parabolic Problems: GAETA-2026*, Session MS-2 “FRACTIONAL: Fractional Regularity, Applications, Comparison Theorems, Inequalities, Operators, Nonlocalities And Localization”, Gaeta, Italy (contributed talk)
- Feb. 09, 2026 **Riesz fractional gradient functionals defined on partitions: nonlocal-to-local variational limits**, *XXXV Convegno Nazionale di Calcolo delle Variazioni*, Riccione, Italy (contributed talk)

- Mar. 25, 2025 **A fractional approach to strain-gradient plasticity: beyond core-radius of discrete dislocations**, *School on New Frontiers in Homogenization and Fractional Calculus*, Barcelona, Spain (invited talk)
- Jul. 26, 2024 **The viscoelastic paradox in a nonlinear Kelvin–Voigt type model of dynamic fracture**, *2nd International Joint Meeting AMS-UMI*, Session “PDEs Applications to Nonlinear Phenomena”, Palermo, Italy (contributed talk)
- Feb. 22, 2024 **Geometric rigidity on Sobolev spaces with variable exponent and applications**, *Variational Models in Materials Science II*, Naples, Italy (invited talk)
- Jun. 22, 2022 **An existence result for the fractional Kelvin–Voigt model on time-dependent cracked domains**, *Summer School in Nonlinear Analysis, A Special Tribute to Patrizia Pucci*, Viterbo, Italy (contributed talk)
- Oct. 08, 2021 **An existence result for the fractional Kelvin–Voigt model on time-dependent cracked domains**, *9th GAMM-Workshop on Analysis of PDEs*, Freiburg im Breisgau, Germany (contributed talk)
- May 10, 2019 **Existence of solutions to a phase-field model of dynamic fracture with a crack-dependent dissipation**, *Calculus of Variations and PDE Day*, Dresden, Germany (invited talk)
- Feb. 05, 2019 **Energy–dissipation balance for the dynamic evolution of smooth cracks**, *XXIX Convegno Nazionale di Calcolo delle Variazioni*, Levico Terme, Italy (contributed talk)
- Jan. 12, 2018 **Hyperbolic systems in domains with growing cracks**, *Two Nonlinear Days in Perugia on the occasion of Patrizia Pucci's 65th birthday*, Perugia, Italy (invited talk)
- May 23, 2016 **Existence of entire solutions for Kirchhoff fractional p-Laplacian equations**, *9th European Conference on Elliptic and Parabolic Problems*, Session “Variational models and transportation problems”, Gaeta, Italy (contributed talk)

Invited Seminars

- Apr. 20, 2026 **Riesz fractional gradient functionals defined on partitions: nonlocal-to-local variational limits**, *Dipartimento di Matematica “Guido Castelnuovo”*, Rome, Italy
- Jan. 14, 2026 **Riesz fractional gradient functionals defined on partitions: nonlocal-to-local variational limits**, *Dipartimento di Meccanica, Matematica e Management*, Bari, Italy
- Oct. 17, 2024 **A fractional approach to strain-gradient plasticity: beyond core-radius of discrete dislocations**, *Seminari di Analisi Junior, Dipartimento di Matematica e Applicazioni “R. Caccioppoli”*, Naples, Italy
- Apr. 24, 2024 **A fractional approach to a gradient theory for plasticity via discrete dislocations: beyond core radius**, *Dipartimento di Matematica e Fisica “Ennio De Giorgi”*, Lecce, Italy
- Dec. 21, 2023 **Geometric rigidity on Sobolev spaces with variable exponent and applications**, *Barcelona Analysis Seminar*, Barcelona, Spain
- Jun. 14, 2023 **Geometric rigidity on Sobolev spaces with variable exponent and applications**, *Seminari di Analisi Junior, Dipartimento di Matematica e Applicazioni “R. Caccioppoli”*, Naples, Italy
- May 31, 2019 **Energy-dissipation balance of a smooth moving crack**, *Analysis Junior Seminar, SISSA*, Trieste, Italy
- Apr. 03, 2019 **Existence of solutions to a phase-field model of dynamic fracture with a crack-dependent dissipation**, *Universität Münster*, Münster, Germany
- Apr. 20, 2018 **Existence of solutions to a phase-field model of dynamic crack propagation**, *Analysis Junior Seminar, SISSA*, Trieste, Italy
- Apr. 07, 2017 **Linear Hyperbolic Systems in Domains with Growing Cracks**, *Analysis Junior Seminar, SISSA*, Trieste, Italy

Organizing Activities

- Feb. 08 – 10, 2023 **Organizer** (together with F. Dipasquale, G. Scilla, F. Solombrino, and B. Stroffolini) of the Workshop *Variational Models in Materials 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 *Analisi Matematica, Modelli ed Applicazioni*, 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

- Feb. 2026 – Jun. 2026 **Analisi Matematica II** (joint course with M. Nolasco), 30 hours (of a total of 90), 3 CFU, Bachelor's course in *Ingegneria dell'Informazione*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Sep. 2025 – Gen. 2026 **Introductory Real Analysis** (joint course with R. Sampalmieri), 30 hours (of a total of 90), 3 CFU, Master's course in *Ingegneria Matematica*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Set. 2025 – Gen. 2026 **Matematica** (joint course with F. Leonetti), 5 hours (of a total of 90), 0.5 CFU, Bachelor's course in *Scienze Biologiche*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Sep. 2024 – Gen. 2025 **Fundamentals of Partial Differential Equations and Numerical Methods** (joint course with V. Protasov), 30 hours (of a total of 60), 3 CFU, Master's course in *Ingegneria dei Sistemi di Controllo e dell'Automazione*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Sep. 2024 – Gen. 2025 **Analisi Matematica I** (joint course with K. Engel), 15 hours (of a total of 90), 1.5 CFU, Bachelor's course in *Ingegneria dell'Informazione*, Università degli Studi dell'Aquila, L'Aquila, Italy
- Sep. 2024 – Gen. 2025 **Analisi Matematica** (joint course with K. Engel), 15 hours (of a total of 90), 1.5 CFU, Bachelor's course in *Informatica*, Università degli Studi dell'Aquila, L'Aquila, Italy

Tutoring

- Oct. 2021 – Feb. 2022 **Tutoring Activities** for the course *Analysis – Grundlegende Konzepte*, Fakultät Mathematik, Technische Universität Dresden, Dresden, Germany
- Oct. 2020 – Jul. 2021 **Tutoring Activities** for the course *Fortgeschrittene Analysis für Physiker*, Fakultät Mathematik, Technische Universität Dresden, Dresden, Germany
- Oct. 2019 – Feb. 2020 **Tutoring Activities** for the course *Funktionalanalysis*, Fakultät Mathematik, Technische Universität Dresden, Dresden, Germany
- Nov. 2014 – Feb. 2015 **Tutoring Activities** for the course *Matematica e Statistica*, 30 hours, Dipartimento di Chimica, Biologia e Biotecnologie, Università degli Studi di Perugia, Perugia, Italy
- Nov. 2013 – Feb. 2014 **Tutoring Activities** for the course *Analisi Matematica I*, 18 hours, Dipartimento di Matematica e Informatica, Università degli Studi di Perugia, Perugia, Italy

Coordination of and Participation in Research Projects

- 2026 **Principal Investigator** of the INdAM – GNAMPA 2026 project: *Analisi variazionale per operatori locali e non locali, possibilmente singolari o degeneri*
- 2025 **Participant** and **Principal Investigator** of the INdAM – GNAMPA 2025 project: *DISCOVERIES - Difetti e Interfacce in Sistemi Continui: un'Ottica Variazionale in Elasticità con Risultati Innovativi ed Efficaci Sviluppi*. Principal Investigators: Dr. F. Riva (until September 2025), Dr. M. Caponi (from October 2025)

- Mar. 16 – 28, 2025 **Participant** in the International Programme for Research in Groups (IP4RG): *A mathematical approach to the homogenisation of nonlocal composite materials: H-convergence, G-convergence and Gamma-convergence*, at Centre de Recerca Matemàtica (CRM), Barcelona, Spain. Coordinator: Dr. A. Maione
- Feb. 2024 – **Participant** to the PRIN 2022 project 2022HKBF5C: *Variational Analysis of Complex Systems in Material Science, Physics and Biology*. Principal Investigator: Prof. F. Solombrino
- Jul. 2024 **Participant** to the INdAM – GNAMPA project 2024: *Pairing e div-curl lemma: estensioni a campi debolmente derivabili e differenziazione non locale*. Principal Investigator: Dr. G. E. Comi
- 2024 **Participant** to the INdAM – GNAMPA project 2023: *Equazioni differenziali alle derivate parziali di tipo misto o dipendenti da campi di vettori*. Principal Investigator: Prof. F. Paronetto
- Oct. 2022 – **Participant** to the project STAR PLUS 2020 - Linea 1 - 21-UNINA-EPIG-172: *New perspectives in the Variational Modeling of Continuum Mechanics*. Principal Investigator: Prof. F. Solombrino
- Jan. 2024 **Participant** to the research group DFG SPP 2256: *Variational Methods for Predicting Complex Phenomena in Engineering Structures and Materials*, Projekt 1: *Modellierung und Simulation des Knickverhaltens dünner elastischer Körper*. Principal Investigators: Prof. S. Bartels and Prof. P. Hornung
- Mar. 2022 – **Participant** to the INdAM – GNAMPA project 2018: *Problemi non lineari alle derivate parziali*. Principal Investigator: Prof. P. Pucci
- Set. 2022 **Participant** to the INdAM – GNAMPA project 2017: *Equazioni differenziali non lineari*. Principal Investigator: Prof. D. Mugnai
- 2018 **Participant** to the INdAM – GNAMPA project 2016: *Problemi variazionali su varietà riemanniane e gruppi di Carnot*. Principal Investigator: Prof. G. Molica Bisci

Language Skills

Italian	Mothertongue
English	Advanced
German	Intermediate

Date: July 21, 2026