

CURRICULUM VITAE

Giovanni Scilla

Sapienza University of Rome - Department of Basic and Applied Sciences for Engineering (SBAI) - Via A. Scarpa 16 - 00169 Rome

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PERSONAL INFORMATION: Born in [REDACTED]

CURRENT POSITION: Assistant Professor (RTDA) in Mathematical Analysis (MAT/05) - Department of Basic and Applied Sciences for Engineering (SBAI), Sapienza University of Rome

PREVIOUS POSITIONS

University of Naples Federico II

- Contract professor (10/03/2020 – 30/04/2021), course of Analisi Matematica II (9 CFU) – Gruppo A-IER – Corsi di Laurea in Ingegneria Chimica – Ingegneria Elettrica – Ingegneria Gestionale della Logistica e della Produzione – Ingegneria Navale – Ingegneria dei Materiali – Canale SG1
- Postdoc position (01/02/2018 – 31/01/2020), project “Disuguaglianze Geometrico-Funzionali ed Equazioni alle Derivate Parziali, Prof. Cristina Trombetti.
- Postdoc position (01/07/2016 – 31/01/2018), project “Metodi variazionali ed applicazioni a problemi evolutivi” Progetto STAR 2014, Prof. Annamaria Barbagallo.

University of Rome “Tor Vergata”

- Postdoc position (01/04/2015 - 31/03/2016), project “Metodi variazionali discreti e continui per cristalli solidi e liquidi” PRIN 2010, Prof. Andrea Braides.

Technische Universität München

- TU Foundation Fellowship TUFF (01/04/2014 - 31/03/2015), Host Professor: Prof. Marco Cicalese, Chair for Analysis M7.

EDUCATION

“Sapienza” University of Rome

- PhD in Mathematics (01/11/2010 – Final exam: 09/01/2014) under the supervision of Prof. Andrea Braides, dissertation “Variational motion of discrete interfaces”.

University of Naples “Federico II”

- Master's Degree in Mathematics (24/03/2010) – Thesis in Mathematical Analysis “Risoluzione classica di equazioni differenziali uniformemente ellittiche con esempi in Elettrostatica” - Advisor Prof. Nicola Fusco - Final mark: 110/110 e lode.
- Bachelor's Degree in Mathematics (24/10/2007) – Thesis in Numerical Analysis “Il solver ODE di Scilab: metodi e strategie” - Advisor Prof. Elvira Russo – Final mark: 110/110 e lode.

RESEARCH INTERESTS

- Applied Mathematics and Calculus of Variations
- Variational Analysis of atomistic and continuous physical models, Analysis of multiscale problems
- Homogenization and Γ -convergence
- Discrete-in-time variational schemes (minimizing movements), Geometric minimizing movements
- Quasi-static limits, Vanishing-viscosity/vanishing-inertia approximations, gradient flows, rate-independent systems
- Deterministic/Stochastic discrete approximation of functionals in Fracture Mechanics
- Finite-difference approximations, non local approximations
- Nonlinear Elasticity, Nematic elastomers
- Partial regularity of the minimizers of integral functionals
- Stochastic homogenization, Percolation

PUBLICATIONS

- [1] G. Scilla, Variational problems with percolation: rigid spin systems. *Adv. Math. Sci. Appl.* 23 (2013), 187-207, ISSN 1343-4373.
- [2] A. Braides and G. Scilla, Motion of discrete interfaces in periodic media. *Interfaces Free Bound.* 15 (2013), 451-476, Print ISSN 1463-9963, Online ISSN 1463-9971, DOI: 10.4171/IFB/310
- [3] A. Braides and G. Scilla, Nucleation and backward motion of discrete interfaces. *C. R. Acad. Sci. Paris* 351 (2013) 803–806, DOI: 10.1016/j.crma.2013.10.008, ISSN 1631-073X
- [4] G. Scilla. Motion of discrete interfaces in low-contrast periodic media. *Netw. Heterog. Media* 9 (2014), 169-189. DOI: 10.3934/nhm.2014.9.169, Print ISSN 1556-1801, Online ISSN 1556-181X
- [5] A. Barbagallo and G. Scilla, Stochastic weighted variational inequalities in non-pivot Hilbert spaces with applications to a transportation model, *J. Math. Anal. Appl.* 457(2) (2018), 1118-1134, DOI 10.1016/j.jmaa.2017.07.067, ISSN 0022-247X
- [6] G. Scilla, V. Vallocchia, Chirality transitions in frustrated ferromagnetic spin chains: a link with the gradient theory of phase transitions. *J Elast* 132(2) (2018), 271-293, DOI 10.1007/s10659-017-9668-8, Print ISSN 0374-3535, Online ISSN 1573-2681
- [7] G. Scilla and F. Solombrino, Delayed loss of stability in singularly perturbed finite-dimensional gradient flows. *Asymptot. Anal.* 110 (1-2) (2018), 1-19. DOI 10.3233/ASY-181475, Print ISSN 0921-7134, Online ISSN 1875-8576
- [8] G. Scilla and F. Solombrino, Multiscale analysis of singularly perturbed finite dimensional gradient flows: the minimizing movement approach. *Nonlinearity* 31(11)(2018), 5036-5074 DOI 10.1088/1361-6544/aad6ac, Print ISSN 0951-7715, Online ISSN 1361-6544
- [9] G. Scilla and F. Solombrino, A variational approach to the quasistatic limit of viscous dynamic evolutions in finite dimension, *J. Differential Equations* 267 (2019), 6216-6264. DOI 10.1016/j.jde.2019.06.018, Online ISSN 0022-0396
- [10] G. Scilla and B. Stroffolini, Relaxation of nonlinear elastic energies related to Orlicz-Sobolev nematic elastomers, *Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl.* 31 (2020), 349-389, DOI: 10.4171/RLM/895
- [11] G. Scilla. Motion of discrete interfaces on the triangular lattice, *Milan J. Math.* 88 (2) (2020), 315-346, DOI: 10.1007/s00032-020-00316-5, Online ISSN 1424-9294, Print ISSN 1424-9286
- [12] V. Crismale, G. Scilla and F. Solombrino, A derivation of Griffith functionals from discrete finite-differences models, *Calc. Var. Partial Differential Equations* 59, Article number: 193 (2020) DOI: 10.1007/s00526-020-01858-7, Online ISSN 1432-0835, Print ISSN 0944-2669
- [13] G. Scilla and F. Solombrino, Non-local approximation of the Griffith functional, *NoDEA Nonlinear Differential Equations Appl.* 28 (2021), art. 17 DOI: 10.1007/s00030-021-00682-y Online ISSN 1420-9004, Print ISSN 1021-9722
- [14] G. Scilla, Variational motion of discrete interfaces (PhD thesis, 2014).

SUBMITTED PREPRINTS AND PAPERS IN PREPARATION

- [15] A. Braides, G. Scilla and A. Tribuzio, Nucleation and growth of lattice crystals, *Submitted paper* (2020), arXiv: 2012.13772.
- [16] C. Goodrich, G. Scilla and B. Stroffolini, Partial Hölder continuity for minimizers of discontinuous quasi-convex integrals with VMO coefficients and general growth, *Submitted paper* (2021), arXiv: 2101.09472.
- [17] F. Farroni, G. Scilla and F. Solombrino, On some non-local approximation of nonisotropic Griffith-type functionals, *Submitted paper* (2021), arXiv:2104.10498.
- [18] F. Riva, G. Scilla and F. Solombrino, A vanishing viscosity and inertia analysis for finite dimensional rate-independent systems, *In preparation* (2021).
- [19] J. Ok, G. Scilla and B. Stroffolini, Boundary partial Hölder continuity for minimizers of discontinuous quasi-convex integrals with VMO coefficients and general growth, *In preparation* (2021).
- [20] V. Crismale, F. Farroni, G. Scilla and F. Solombrino, Sequences of non-local functionals which approximate free-discontinuity problems in linear elasticity, *In preparation* (2021).
- [21] M. Caroccia, M. Ruf, G. Scilla and F. Solombrino, Discrete approximation on point clouds of functionals in fracture mechanics, *In preparation* (2021).

EDITORIAL ACTIVITY:

- Referee for *Discrete and Continuous Dynamical Systems (S)*, *Journal of Applied Analysis*
- Reviewer for MathSciNet (since October 2014)

TALKS

- 11 April 2013 – invited talk “Motion of discrete interfaces in periodic media”** - Meeting “Problems with Multiple Scales: Results and New Perspective / A week of brainstorming in Rome”, Rome (8-12 Aprile 2013);
- 21 October 2013 – talk “Variational motion of discrete interfaces”** - Seminario di Equazioni differenziali, Dipartimento di Matematica “G. Castelnuovo”, “Sapienza” University of Rome, Rome;
- 4 November 2014 – invited talk “Variational motion of discrete interfaces in periodic media”** - Interview Prof. Alexander Mielke and his research group, WIAS Berlin, Berlin;
- 18 December 2015 – talk “Motion of discrete interfaces in periodic media”** - Giornata di Dipartimento 2015, Department of Mathematics, University of Rome “Tor Vergata”;
- 30 May 2016 – talk “Chirality transitions in frustrated ferromagnetic spin chains: a link with the gradient theory of phase transitions”** - Working seminar on Calculus of Variations and Gamma-convergence, Department of Mathematics “G. Castelnuovo”, Sapienza University of Rome;
- 22 May 2017 – invited talk “Stochastic weighted variational inequalities in non-pivot Hilbert spaces: theoretical results and applications”** - International Conference on Elliptic and Parabolic problems, Gaeta (22-26 May 2017);
- 20 June 2017 – invited talk “Stochastic weighted variational inequalities in non-pivot Hilbert spaces: theoretical results and applications”** - International Workshop: Variational Analysis and Equilibrium Models in Physical and Socio-Economic Phenomena, Naples (19-21 June 2017).
- 17 May 2018 – poster “Multiscale analysis of singularly perturbed finite dimensional gradient flows via minimizing movements”** - Workshop “Sobolev spaces and Partial Differential Equations”, Rome, Accademia dei Lincei (17-18 May 2018).
- 18 September 2018 – invited talk “Multiscale analysis of singularly perturbed finite dimensional gradient flows via minimizing movements”** - Workshop “Methods of Real Analysis and Theory of Elliptic Systems”, Rome, INDAM, (17-21 September 2018).
- 30 October 2018 - invited talk “Multiscale analysis of singularly perturbed finite dimensional gradient flows via minimizing movements”** - Workshop “New developments in PDEs and related topics”, Naples, (29-31 Ottobre 2018).
- 7 February 2019 – invited talk “Un approccio variazionale al limite quasi statico di evoluzioni dinamiche viscosse in dimensione finita”** - XXIX Convegno Nazionale di Calcolo delle Variazioni, Levico Terme (4-8 February 2019).

11 July 2019 – invited talk “**A variational approach to the quasistatic limit of viscous dynamic evolutions**” - INDAM Intensive Period 2019 “Shape optimization, control and inverse problems for PDEs” , Naples (6 May - 12 July 2019) - Young researchers minisymposium

11 September 2019 – poster session “**Chirality transitions in frustrated ferromagnetic spin chains: a link with the gradient theory of phase transitions**” - Workshop “Mathematical Modeling for Science and Engineering 2019”, Naples (11-13 September 2019)

30 October 2019 – poster session “**Multiscale analysis of singularly perturbed finite dimensional gradient flows via minimizing movements**” - Workshop “Calculus of Variations and Applications in Trani”, Trani (28-31 October 2019)

02 March 2021 – invited talk “**Variational approximations of Griffith-type functionals**” - Department of Basic and Applied Sciences for Engineering (SBAI) – Sapienza University of Rome, Rome

AWARDS

- **selected for the “Research Opportunity Week (ROW)”** (Munich, 11-15 November 2013). <https://www.tum.de/en/research/postdocs/research-opportunities-week/>

- **winner of the TUM University Foundation Fellowship (TUFF)**, to spend one year as a postdoc at TU München (April 2014 – March 2015).

PARTICIPATION IN RESEARCH PROJECTS

- **Member of PRIN 2008** “Metodi e modelli variazionali nella meccanica dei materiali”, scientific coordinator: Prof. G. Dal Maso, responsabile scientifico: Prof. A. Garroni, Università degli Studi di Roma “La Sapienza”.

- **Member of PRIN 2010-11** “Calcolo delle Variazioni”, scientific coordinator: Prof. G. Dal Maso, local coordinator: Prof. L. Orsina, Università degli Studi di Roma “La Sapienza”.

- **Member of PRIN 2010-11** “Calcolo delle Variazioni”, scientific coordinator: Prof. G. Dal Maso, local coordinator: Prof. A. Braides, Università degli Studi di Roma “Tor Vergata”.

- **Member of PRIN 2017** “Variational methods for stationary and evolution problems with singularities and interfaces”, scientific coordinator: Prof. G. Dal Maso, local coordinator: Dr. Francesco Solombrino, Università degli Studi di Napoli Federico II.

- **Member of Project Star 2014 – Linea 1** – Università degli Studi di Napoli Federico II: “Variational Analysis and equilibrium models in physical and socio-economic phenomena”, scientific coordinator: Prof. A. Barbagallo.

- **Member of GNAMPA project 2017** “Approccio stocastico per le disequazioni quasi-variazionali ed applicazioni”, scientific coordinator Prof. A. Barbagallo.

- **Member of GNAMPA project 2020** “Analisi di alcuni modelli variazionali per cristalli liquidi”, scientific coordinator Dott. Giacomo Canevari.

PARTICIPATION IN NATIONAL/INTERNATIONAL RESEARCH GROUP

- **January 2012 - today**, member of Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni (GNAMPA).

- **November 2010 – January 2014**: PhD student, member of Gruppo di ricerca di Calcolo delle Variazioni – Sapienza University of Rome, Prof. Andrea Braides.

- **April 2014 – March 2015**: TUFF research fellow, guest member of the Chair for Analysis M7, TU München, host Professor: Prof. Marco Cicalese.

- **April 2015 – March 2016**: postdoc, member of Gruppo di ricerca di Calcolo delle Variazioni – University of Rome “Tor Vergata”, Prof. Andrea Braides.

- **July 2016 – January 2018**: postdoc, member of Gruppo di ricerca di Analisi Variazionale ed Ottimizzazione – University of Naples Federico II, Prof. Annamaria Barbagallo.

- **February 2018 – 31/01/2020**: postdoc, member of Gruppo di ricerca di Analisi Matematica, Proprietà analitico-geometriche di soluzioni di equazioni alle derivate parziali – University of Naples Federico II, Prof. Cristina Trombetti.

- **May 2021-today:** Assistant Professor (RTDA) in Mathematical Analysis, Department of Basic and Applied Sciences for Engineering (SBAI), Sapienza University of Rome

ORGANIZATION OF WORKSHOPS/CONFERENCES

- **local organizer** of the International Workshop: Variational Analysis and Equilibrium Models in Physical and Socio-Economic Phenomena, Naples (19-21 Giugno 2017).

- **organizer** of Advanced School on Theories and Applications of Liquid Crystals, Naples (3-7 September 2018).

TEACHING

March - June 2012: Exercises to Mathematical Analysis I, bachelor's degree in Mathematics, "Sapienza" University of Rome, Prof. Fabiana Leoni and Prof. Adriana Garroni.

May - June 2012: Exercises to Mathematical Analysis II, bachelor's degree in Chemistry, "Sapienza" University of Rome, Prof. Ada Ardito.

October 2012 - February 2013: Exercises to Mathematical Analysis I, bachelor's degree in Business Engineering, "Sapienza" University of Rome, Prof. Lorenzo Giacomelli and Prof. Roberto Gianni.

October 2012 - February 2013: Exercises to Mathematical Analysis I, bachelor's degree in Electronic and Communications Engineering, "Sapienza" University of Rome, Prof. Paola Loreti.

October 2013 - February 2014: Exercises to Mathematical Analysis I, bachelor's degree in Chemical Engineering, "Sapienza" University of Rome, Prof. Maria Agostina Vivaldi.

October 2013 - February 2014: Exercises to Mathematical Analysis I, bachelor's degree in Clinical/Environmental Engineering, "Sapienza" University of Rome, Prof. Angela Pistoia.

September 2016 – December 2016: Exercises to Mathematical Analysis I, bachelor's degree in Computer and Automation Engineering, University of Naples "Federico II", Prof. Annamaria Barbagallo.

September 2016 – June 2017: Exercises to Mathematical Analysis I, bachelor's degree in Mathematics, University of Naples "Federico II", Prof. Angelo Alvino.

September 2017 – June 2018: Exercises to Mathematical Analysis I, bachelor's degree in Mathematics, University of Naples "Federico II", Prof.ssa Anna Verde.

October 2018 – December 2018: Exercises to Mathematical Analysis I, bachelor's degree in Mathematics, University of Naples "Federico II", Prof. Angelo Alvino e Prof.ssa Cristina Trombetti.

October 2019 – December 2019: Exercises to Mathematical Analysis II, bachelor's degree in Mathematics, University of Naples "Federico II", Prof. Angelo Alvino e Prof.ssa Cristina Trombetti.

- Contract Professor at University of Naples Federico II:

March 2020 – March 2021 – Course of Mathematical Analysis II (9 CFU) – Gruppo A-IER – Corsi di Laurea in Ingegneria Chimica – Ingegneria Elettrica – Ingegneria Gestionale della Logistica e della Produzione – Ingegneria Navale – Ingegneria dei Materiali – Canale SG1

2011 – 2019: Docente ALPHATEST, corsi di Matematica e Logica per la preparazione ai test di ammissione per I corsi a numero chiuso (collaborazione con SIRONI Editore) www.alphatest.it/

LANGUAGES

English: UniCert level C1 (Advanced)

Updated on April 28, 2021