

# CURRICULUM VITAE & STUDIORUM

*Filippo Riva*

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## PERSONAL DATA

DATE AND PLACE OF BIRTH:     • September 24th 1992, Monza (MI).  
CITIZENSHIP:                   • Italian.

## CURRENT POSITION

Postdoctoral research fellow (Assegnista di ricerca) at Università di Pavia, Department of Mathematics, since January 2021.

Title of the project: *Variational methods for stationary and evolution problems with singularities and interfaces.*

Mentor: Prof.ssa Maria Giovanna Mora.

## EDUCATION

- **September 2020.** PhD *cum laude* in Mathematical Analysis, Modelling and Applications, SISSA Trieste.  
Title of the thesis: *On the quasistatic limit of some dynamical problems with dissipative terms.*  
Advisor: Prof. Gianni Dal Maso.
- **September 2016.** Master degree in Mathematics, 110/110 *cum laude*, Università degli Studi di Milano.  
Title of the thesis: *Bifurcation and symmetry breaking for a semilinear elliptic equation.*  
Advisor: Prof. Bernhard Ruf.
- **July 2014.** Bachelor degree in Mathematics, 110/110, Università degli Studi di Milano.  
Title of the thesis: *Equazioni integrali di Volterra.*  
Advisor: Prof. Kevin R. Payne.

## RESEARCH INTERESTS

My research interests are in the fields of Calculus of Variations and PDEs, with particular focus on applications to mathematical models of Elasticity, Fracture, Damage and Debonding. The main lines of investigation may be summarized as follows:

- study of *dynamic* evolutions of debonding models, which couple in a very complex way the wave equation on moving domains and suitable energy criteria ruling the growth of such domains;
- analysis of *nonconvex* Rate-Independent Systems, attempting to incorporate *inertial* effects (dictated by the second principle of dynamics) by means of Vanishing-Inertia and -Viscosity arguments;
- investigation and modelling of defects, fracture and fatigue effects in brittle or cohesive materials via a *sharp interface* or a *phase-field* approach;
- linearization and dimension reduction for variational models of elasticity subject to *live loads*, namely those forces depending on the current deformation of the elastic body.

## LIST OF PUBLICATIONS AND PREPRINTS

- 8) M. G. MORA AND F. RIVA, *Pressure live loads and the variational derivation of linear elasticity*, **Preprint** (2022): arXiv:2203.04078.
- 7) G. LAZZARONI, R. MOLINAROLO, F. RIVA AND F. SOLOMBRINO, *On the wave equation on moving domains: regularity, energy balance and application to dynamic debonding*, **Accepted for publication in Interfaces and Free Boundaries** (2022).
- 6) F. RIVA, G. SCILLA AND F. SOLOMBRINO, *The notions of Inertial Balanced Viscosity and Inertial Virtual Viscosity solution for rate-independent systems*, *Advances in Calculus of Variations* (2022), <https://doi.org/10.1515/acv-2021-0073>.
- 5) E. BONETTI, C. CAVATERRA, F. FREDDI AND F. RIVA, *On a phase-field model of damage for hybrid laminates with cohesive interface*, *Mathematical Methods in the Applied Sciences* (2021), Volume 45, Issue 7, pp. 3520-3553.
- 4) P. GIDONI AND F. RIVA, *A vanishing inertia analysis for finite dimensional rate-independent systems with*

## LIST OF PUBLICATIONS AND PREPRINTS (continued)

- non-autonomous dissipation and an application to soft crawlers*, Calculus of Variations and Partial Differential Equations (2021), Volume 60, Issue 5, n. 191.
- 3) F. RIVA, *On the approximation of quasistatic evolutions for the debonding of a thin film via vanishing inertia and viscosity*, Journal of Nonlinear Science (2020), Volume 30, Issue 3, pp. 903-951.
  - 2) F. RIVA, *A continuous dependence result for a dynamic debonding model in dimension one*, Milan Journal of Mathematics (2019), Volume 87, Issue 2, pp. 315–350.
  - 1) F. RIVA AND L. NARDINI, *Existence and uniqueness of dynamic evolutions for a one-dimensional debonding model with damping*, Journal of Evolution Equations (2020), Volume 21, Issue 1, pp. 63-106.

## PROJECTS

- **Principal Investigator** in the **INdAM-GNAMPA Project 2022**: “*MATERIA - Metodi Analitici nella Trattazione di Evoluzioni Rate-independent e Inerziali e Applicazioni*”.

Funding: 4.500 €.

- Participant in the **INdAM-GNAMPA Project 2018**: “*Analisi Variazionale per Difetti e Interfacce nei Materiali*”.

Principal Investigator: L. De Luca (SISSA, Trieste).

- Participant in the **PRIN 2017**: “*Variational methods for stationary and evolution problems with singularities and interfaces*”.

Protocol: 2017BTM7SN\_001.

Principal Investigator: G. Dal Maso (SISSA, Trieste).

## TALKS

- **June 2022**. Invited speaker for the Workshop “*YoungPeople4Math*”.  
Title: *Inertial Balanced Viscosity solutions to rate-independent systems*.  
Venue: Università Cattolica del Sacro Cuore, Brescia.  
Organizers: W. Borrelli, C. Franchi.
- **May 2022**. Invited speaker for the Workshop “*PHase field MEthods in applied sciences (PHAME2022)*”.  
Title: *On a rate-independent damage model for hybrid laminates with cohesive interface*.  
Venue: Sapienza, Università di Roma, Department of Mathematics.  
Organizers: E. Beretta, C. Cavaterra, E. Rocca, R. Rossi.
- **October 2021**. Invited speaker in the “*Necas Seminars on Continuum Mechanics*”.  
Title: *Inertial Balanced Viscosity solutions to rate-independent systems*.  
Venue: Charles University of Prague, Faculty of Mathematics and Physics.  
Organizers: M. Feistauer, J. Haslinger, M. Kruzik, S. Necasova.
- **September 2021**. Invited speaker for the Workshop “*Mathematical modeling and Analysis of degradation and restoration in Cultural Heritage (MACH2021)*”.  
Title: *On a rate-independent damage model for hybrid laminates with cohesive interface*.  
Venue: Sapienza, Università di Roma, Department of Mathematics.  
Organizers: G. Bretti, C. Cavaterra, M. Solci, M. Spagnuolo.
- **September 2021**. Invited speaker for the 2020+2021 edition of the congress of the “*Italian Society of Applied and Industrial Mathematics (SIMAI)*”, in the minisimposium “*Variational Methods in Materials Science: Mathematics and Mechanics*”.  
Title: *On a rate-independent damage model for hybrid laminates with cohesive interface*.  
Venue: Università di Parma, Campus Congress Center “Plesso Aule delle Scienze”.  
Organizers of the minisimposium: V. Crismale, F. Freddi, G. Lazzaroni, G. Orlando.
- **February 2021**. Invited speaker in the “*Seminari di Matematica Applicata*”.  
Title: *On a rate-independent damage model for hybrid laminates with cohesive interface*.  
Venue: Università di Pavia, Department of Mathematics (ONLINE).  
Organizers: S. Lisini, L. Tamellini.
- **May 2020**. Invited speaker in the “*Analysis Junior Seminars, webinar edition*”.  
Title: *On a rate-independent damage model for hybrid laminates with cohesive interface*.  
Venue: SISSA, Trieste (ONLINE).  
Organizers: E. Caputo, M. Strazzullo.
- **February 2020**. Contributed speaker in the “*XXX Convegno Nazionale di Calcolo delle Variazioni*”.  
Title: *On the quasistatic limit for a debonding model in dimension one; a vanishing inertia and viscosity approach*.  
Venue: BellaVista Relax Hotel, Levico Terme.

## TALKS (continued)

Organizers: L. Ambrosio, G. Dal Maso, N. Gigli, R. Serapioni, F. Serra Cassano.

- **October 2019.** Invited speaker in the “*Necas Seminars on Continuum Mechanics*”.

Title: *On the quasistatic limit for a debonding model in dimension one; a vanishing inertia and viscosity approach.*

Venue: Charles University of Prague, Faculty of Mathematics and Physics.

Organizers: M. Feistauer, J. Haslinger, M. Kruzík, S. Necasova.

- **June 2019.** Invited speaker in the series of “*Analysis Seminars*”.

Title: *On the quasistatic limit for a debonding model in dimension one; a vanishing inertia and viscosity approach.*

Venue: Politecnico di Milano, Department of Mathematics.

Organizers: G. Catino, F. Cipriani.

- **May 2019.** Invited speaker in the “*Analysis Junior Seminars*”.

Title: *On the quasistatic limit for a debonding model in dimension one; a vanishing inertia and viscosity approach.*

Venue: SISSA, Trieste.

Organizers: E. Caputo, E. Tasso.

- **May 2018.** Invited speaker in the “*Analysis Junior Seminars*”.

Title: *Peeling test: a simple model within the theory of dynamic and quasistatic fractures.*

Venue: SISSA, Trieste.

Organizer: E. Tasso.

- **April 2017.** Invited speaker in the event “*PhD days 2017*”.

Title: *Homogenization of a Dirichlet problem in perforated domains. A Gamma-convergence approach.*

Venue: Università degli Studi di Milano, Department of Mathematics.

Organizers: G. Romani, P. Zanotti.

- **March 2016.** Seminar for the attainment of 3 CFU during the Master’s degree.

Title: *Esistenza dell’attrattore globale per le equazioni di Navier–Stokes.*

Venue: Università degli Studi di Milano, Department of Mathematics.

## TEACHING

- **October 2022 - January 2023.** Contract professor (Docente a contratto) for the course *Matematica per l’Edilizia e il Territorio*, 40 hours.

Università di Pavia, Tecnologie Digitali per le Costruzioni, l’Ambiente e il Territorio (TeDCAT).

- **April 2022 - June 2022.** Teaching assistant (Esercitatore) for the course *Analisi Matematica 2*, 8 hours.

Università di Pavia, Ingegneria Civile e Ambientale.

- **April 2022 - June 2022.** Teaching assistant (Esercitatore) for the course *Analisi Matematica 2*, 10 hours.

Università di Pavia, Ingegneria Elettronica e Informatica.

- **March 2021 - June 2021.** Teaching assistant (Esercitatore) for the course *Analisi Matematica 2*, 9 hours.

Università di Pavia, Ingegneria Elettronica e Informatica.

- **November 2020 - February 2021.** Tutor for the course *Analisi Matematica 2*, 20 hours.

Politecnico di Milano, School of Industrial and Information Engineering.

- **November 2020 - January 2021.** Tutor for the course *Analisi Matematica 1 e Geometria*, 20 hours.

Politecnico di Milano, School of Industrial and Information Engineering, Ingegneria Fisica.

- **November 2020 - January 2021.** Tutor for the course *Analisi Matematica 1*, 20 hours.

Politecnico di Milano, School of Industrial and Information Engineering, Ingegneria Matematica.

- **November 2018 - January 2019.** Tutor for the course *Analisi Matematica 2*, 30 hours.

Università di Trieste, Department of Engineering and Architecture.

- **November 2017 - January 2018.** Tutor for the course *Analisi Matematica 1*, 30 hours.

Università di Trieste, Department of Engineering and Architecture.

- **October 2015 - December 2015.** Tutor for the course *Analisi Matematica 1*, 20 hours.

Università degli Studi di Milano, Department of Mathematics.

## CONFERENCES

- **September 2022.** Participation in the “*Summerschool on Analysis and Applied Mathematics*”.

Venue: University of Münster.

Organizers: M. Friedrich, L. Kreutz, K. Zemas.

- **May 2022.** Participation in the Conference “*Beyond Elasticity: Advances and Research Challenges*”.

Venue: CIRM, Luminy.

Organizers: M. Bonacini, R. Cristoferi, E. Davoli, M. Morandotti.

## CONFERENCES (continued)

- **May 2022.** Participation in the Workshop “XXXI Convegno Nazionale di Calcolo delle Variazioni”.  
Venue: BellaVista Relax Hotel, Levico Terme.  
Organizers: L. Ambrosio, G. Dal Maso, N. Gigli, R. Serapioni, F. Serra Cassano.
- **February 2022.** Participation in the Workshop “Free Boundary Problems and Related Evolution Equations”.  
Venue: ESI, Wien.  
Organizers: G. Bellettini, S. Kholmatov, P. Piovano.
- **December 2021.** Participation in the Workshop “Recent Advances in Analysis, PDEs and Applications”.  
Venue: Politecnico di Milano, Department of Mathematics.  
Organizers: G. Meglioli, M. Muratori, C. Patriarca, F. Punzo.
- **May 2021.** Participation in the “SIAM Conference on Mathematical Aspects of Material Science (MS21)”.  
Venue: Bilbao (ONLINE).  
Sponsors: SIAM, BCAM Basque Centre for Applied Mathematics.
- **April 2021.** Participation in the School “Optimization of Shape and Material Properties: Advanced Mathematical Methods and 3D Printing”.  
Venue: University of Udine, CISM (ONLINE).  
Organizers: G. Noselli, R. Toader.
- **February 2021.** Participation in the “Winterschool on Analysis and Applied Mathematics”.  
Venue: University of Münster (ONLINE).  
Organizers: M. Friedrich, L. Kreutz.
- **December 2020.** Participation in the Workshop “Understanding locomotion: Nature-inspired mathematical models”.  
Venue: ONLINE.  
Organizers: P. Gidoni, M. Morandotti, M. Zoppello.
- **January 2020.** Participation in the Workshop “Calculus of Variations and Applications. An International Conference to celebrate Gianni Dal Maso’s 65th Birthday”.  
Venue: SISSA, Trieste.  
Organizers: V. Chiadò-Piat, A. Garroni, N. Gigli, M.G. Mora, F. Solombrino, R. Toader.
- **November 2019.** Participation in the Workshop “Modeling of Crystalline Interfaces and Thin Film Structures”.  
Venue: ESI, Wien.  
Organizers: U. Diebold, I. Fonseca, P. Piovano.
- **October 2019.** Participation in the Workshop “Mathematics for Mechanics”.  
Venue: UTIA, Prague.  
Organizers: B. Benesova, M. Friedrich, M. Kruzik.
- **July 2019.** Participation in the “Summer School on PDEs from theory to applications”.  
Venue: Università degli Studi di Milano, Department of Mathematics.  
Organizers: C. Bucur, S. Dipierro.
- **April 2019.** Participation in the Workshop “Italian-Romanian Colloquium on Differential Equations and Applications” and presentation of a poster.  
Venue: Università di Udine, Department of Mathematics.  
Organizers: R. Toader, F. Zanolin.
- **March 2019.** Participation in the Workshop “Mathematical modeling and Analysis of degradation and restoration in Cultural Heritage (MACH2019)”.  
Venue: Sapienza, Università di Roma, Department of Mathematics.  
Organizers: E. Bonetti, C. Cavaterra, B. De Filippo, M. Di Berardo, R. Natalini, M. Solci.
- **February 2019.** Participation in the Workshop “XXIX Convegno Nazionale di Calcolo delle Variazioni”.  
Venue: BellaVista Relax Hotel, Levico Terme.  
Organizers: L. Ambrosio, G. Dal Maso, P. Marcellini, R. Serapioni, F. Serra Cassano.
- **September 2018.** Participation in the “Meeting in Applied Mathematics and Calculus of Variations”.  
Venue: Sapienza, Università di Roma, Department of Mathematics.  
Organizers: A. Braides, A. Garroni, A. Malusa, E. Spadaro.
- **June 2018.** Participation in the Summer School “Geometric Measure Theory in Verona”.  
Venue: Chostro Santa Maria delle Vittorie of the Università di Verona, Verona.  
Organizers: G. De Philippis, A. Massaccesi, D. Vittone, G. Orlandi.
- **February 2018.** Participation in the “XXVIII Convegno Nazionale di Calcolo delle Variazioni”.  
Venue: BellaVista Relax Hotel, Levico Terme.  
Organizers: L. Ambrosio, G. Dal Maso, P. Marcellini, R. Serapioni, F. Serra Cassano.
- **July 2017.** Participation in the Workshop “Recent Advances in PDE’s and the Calculus of Variations”.  
Venue: Palazzo Pesaro Papafava, Venezia. University of Warwick’s base.  
Organizers: G. De Philippis, F. Rindler.
- **February 2017.** Participation in the Workshop “Dislocations, Plasticity and Fractures”.

## CONFERENCES (continued)

Venue: SISSA, Trieste.

Organizers: G. Dal Maso, R. Toader.

• **October 2016.** Participation in the Workshop “*GMT, Shape Optimization and Free Boundaries*”.

Venue: SISSA, Trieste.

Organizers: G. De Philippis, G. Franzina.

## OTHER ACTIVITIES

- Reviewer for *Mathematical Reviews/MathSciNet*.

## LANGUAGES

MOTHER TONGUE:   • Italian  
OTHERS:           • English (fluent)

Last update: September 20th, 2022

Sign: