

## Davide Riccobelli

Born in Brescia (Italy) on 18<sup>th</sup> December 1991

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**CURRENT POSITION**                      **Politecnico di Milano**                      Since Jan 2021  
Researcher in Mathematical Physics  
(Ricercatore a tempo determinato - tipo A).

**PAST POSITIONS**                      **SISSA**                      Nov 2018 to Jan 2021  
Postdoc  
– Supervisor: A. De Simone

**VISITING PERIODS**                      **École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (ESPCI Paris)**                      Apr 2017 to Oct 2017  
Visiting Ph.D. student  
– Supervisor: L. Truskinovsky

**Université Pierre et Marie Curie**                      Sept 2017 to Oct 2017  
Visiting Ph.D. student  
– Supervisor: C. Maurini

**University of Oxford**                      July 2018  
Visiting Ph.D. student  
– Supervisor: D. Vella

**EDUCATION**                      **Politecnico di Milano**                      Nov 2015 to Oct 2018  
Ph.D. in Mathematical Models and Methods in Engineering  
– Title of the thesis: *Mathematical modelling of Soft and active matter*  
– Date of the thesis defence: 8<sup>th</sup> February 2019  
– Advisor: P. Ciarletta

**Università Cattolica del Sacro Cuore**                      Sept 2013 to July 2015  
Laurea Magistrale (M.Sc.) in Mathematics (110/110 summa cum laude)

**Università Cattolica del Sacro Cuore**                      Sept 2011 to Sept 2013  
Laurea (B.Sc.) in Mathematics (110/110 summa cum laude)

**QUALIFICATIONS**

- Italian national scientific qualification as associate professor (professore di seconda fascia) for the disciplinary fields
  - 01/A4 - Mathematical Physics (valid until 3/10/2032).
  - 08/B2 - Structural Mechanics (valid until 27/09/2032).
- French qualification for the position of Maître de conférences,
  - Section 26 - *Mathématiques appliquées et applications des mathématiques* (Applied mathematics).
  - Section 60 - *Mécanique, génie mécanique, génie civil* (Mechanics, mechanical engineering, civil engineering).

REFEREED  
JOURNAL  
PUBLICATIONS

1. P. Ciarletta, G. Pozzi, and D. Riccobelli. [The Föppl–von Kármán equations of elastic plates with initial stress](#). *R. Soc. Open Sci.*, accepted, 2022
2. D. Riccobelli. [Active elasticity drives the formation of periodic beading in damaged axons](#). *Phys. Rev. E*, 104(2):024417, 2021
3. D. Riccobelli, G. Noselli, and A. DeSimone. [Rods coiling about a rigid constraint: Helices and perversions](#). *Proc. R. Soc. A*, 477(2246):20200817, 2021
4. D. Riccobelli, G. Noselli, M. Arroyo, and A. DeSimone. [Mechanics of axisymmetric sheets of interlocking and slidable rods](#). *J. Mech. Phys. Solids*, 141:103969, 2020
5. D. Riccobelli and G. Bevilacqua. [Surface tension controls the onset of gyrification in brain organoids](#). *J. Mech. Phys. Solids*, 134:103745, 2020
6. D. Riccobelli and D. Ambrosi. [Activation of a muscle as a mapping of stress–strain curves](#). *Extreme Mech. Lett.*, 28:37–42, 2019
7. D. Riccobelli, A. Agosti, and P. Ciarletta. [On the existence of elastic minimizers for initially stressed materials](#). *Phil. Trans. R. Soc. A*, 377(2144):20180074, 2019
8. G. Giantesio, A. Musesti, and D. Riccobelli. [A comparison between active strain and active stress in transversely isotropic hyperelastic materials](#). *J. Elast.*, 137(1):63–82, 2019
9. D. Riccobelli and P. Ciarletta. [Morpho-elastic model of the tortuous tumour vessels](#). *Int. J. Non-Linear Mech.*, 107:1–9, 2018
10. D. Riccobelli and P. Ciarletta. [Shape transitions in a soft incompressible sphere with residual stresses](#). *Math. Mech. Solids*, 23(12):1507–1524, 2018
11. D. Riccobelli and P. Ciarletta. [Rayleigh–Taylor instability in soft elastic layers](#). *Phil. Trans. R. Soc. A*, 375(2093):20160421, 2017
12. D. Ambrosi, S. Pezzuto, D. Riccobelli, T. Stylianopoulos, and P. Ciarletta. [Solid tumors are poroelastic solids with a chemo-mechanical feedback on growth](#). *J. Elast.*, 129(1-2):107–124, 2017

AWARDS

The paper “D. Riccobelli. [Active elasticity drives the formation of periodic beading in damaged axons](#). *Phys. Rev. E*, 104(2):024417, 2021” has been selected as *Editor’s Suggestion* by the editorial board of *Physical Review E*.

INVITED  
PRESENTATIONS

1. 4 July 2022: *From coronavirus infections to Alzheimer’s disease: Buckling of damaged axons*, 11<sup>th</sup> European Solid Mechanics Conference, NUI Galway.
2. 2 Dec 2021: *Mechanical instabilities in slender structures*, Industrial and Applied Mathematics Seminar, University of Oxford.
3. 30 Sept 2021: *Mathematical modeling of axonal beading: From coronavirus infections to Alzheimer’s disease*, Recent Advances in Mechanics and Mathematics of Materials, Università la Sapienza, Rome.
4. 23 Sept 2021: *Shape transitions in damaged axons*, INdAM Meeting: “Active Materials: from Mechanobiology to Smart Devices”, Cortona.
5. 7 Apr 2021: *Role of tissue surface tension in brain organoid morphogenesis*, British Applied Mathematics Colloquium, Glasgow.
6. 17 June 2020: *Mechanics of axisymmetric sheets of interlocking and slidable rods*, Giornate Signorini, Università degli Studi di Perugia.
7. 14 May 2020: *Morphoelasticity of solid tumours*, webinar organized by the

University of Glasgow.

8. 28 Jan 2020: *Morphogenesis of sulci in brain organoids*, Institut Jean Le Rond d’Alembert, Sorbonne Université, Paris.
9. 17 Sept 2019: *Spatially constrained growth triggers tumour vessel tortuosity*, XXIV AIMETA Conference, Università la Sapienza, Rome.
10. 3 Sept 2019: *Influence of mechanical stress on solid tumor growth*, Workshop “The Mechanics of Cell Aggregates: Experiments and Models”, Politecnico di Torino.
11. 7 June 2019: *Role of tissue surface tension in the morphogenesis of brain organoids*, Workshop “Maths from the Body II”, organized by the Catholic University of Sacred Heart, Venice
12. 26 Feb 2018: *On the modeling of muscle contraction*, The Mathematics of Mechanobiology and Cell Signaling, Mathematisches Forschungsinstitut Oberwolfach.
13. 23 Oct 2017: *Rayleigh–Taylor instability in elastic bilayers*, Université Pierre et Marie Curie, Paris.
14. 31 Aug 2017: *Chemo–mechanical feedback in solid tumor growth*, INdAM Meeting: “Mathematical Physics of Living Systems”, Cortona.

OTHER  
PRESENTATIONS

1. 17 June 2022: *Mathematical modelling of initially stressed materials*, XXIII Symposium on Trends in Applications of Mathematics to Mechanics, Catholic University of Sacred Heart, Brescia.
2. 2 Sept 2021: *From coronavirus infections to Alzheimer’s disease: Pearling of damaged axons*, Congress of the Italian Society of Applied and Industrial Mathematics, University of Parma.
3. 1 Sept 2020: *Innovative structures inspired by microorganism motility*, XLV Summer School on Mathematical Physics (GNFM – INdAM), Ravello.
4. 13 Sept 2018: *On the mathematical modelling of muscle contraction*, XLIII Summer School on Mathematical Physics (GNFM – INdAM), Ravello.
5. 05 July 2018: *On the stability of soft incompressible spheres with residual stresses*, 10<sup>th</sup> European Solid Mechanics Conference, Bologna.
6. 29 June 2017: *Rayleigh–Taylor instability in soft elastic layers*, International Workshop on Modelling of Nonlinear Continua, Castro Urdiales.
7. 12 Sept 2016: *Chemo–mechanical feedback in solid tumor growth*, XLI Summer School on Mathematical Physics (GNFM – INdAM), Ravello.
8. 1 Sept 2016: *Chemo–mechanical feedback in solid tumor growth*, Workshop “Constitutive behaviour of soft tissues: connecting experimental and modelling perspectives”, University of Manchester, Manchester.
9. 23 Sept 2015: *A mathematical model of skeletal muscle tissue with damage due to aging*, XL Summer School on Mathematical Physics (GNFM – INdAM), Ravello.

ORGANIZING  
ACTIVITY

- Member of the organizing committee of the conference *MOX 20*.
- Co-organizer (together with V. Balbi) of the mini-symposium *Soft tissue biomechanics: From experiments to mathematical modelling* at the congress of the *Italian Society of Applied and Industrial Mathematics* 2020-21 held at the University of Parma (30/8/2021 – 3/9/2021)

REVIEWER Reviewer for *Computer Methods and Programs in Biomedicine*, *International Journal of Engineering Science*, *International Journal of Non-Linear Mechanics*, *International Journal of Solids and Structures*, *Journal of Engineering Mathematics*, *Journal of the Mechanics and Physics of Solids*, *Mathematics in Engineering*, *Physical Review E*, *Physical Review Letters*, *Proceedings of the Royal Society A* for a total of 22 reviews certified by [Web of Science](#).

SUPERVISED STUDENTS Co-supervised master's students:

- Donato Cerrone (Corso di Laurea Magistrale in Ingegneria Matematica, Politecnico di Milano, ongoing), subject: mathematical modelling of tumor growth, co-supervisor: P. Ciarletta.
- G. Ewald (Master 2, Génie Mécanique et Matériaux, Ecole des Ponts ParisTech, Mar-Aug 2022), subject: mechanical instabilities in materials with softening, co-supervisor: P. Ciarletta. Currently Ph.D. student at the Université Grenoble Alpes.

TEACHING EXPERIENCE **Lecturer**

- **Rational mechanics**, Bachelor's Degree in Civil Engineering, Politecnico di Milano.  
*Academic year:* 2021–2022, 2022–2023.  
*Number of students:* ~30.  
*Language:* English.

#### Tutorials

- **Rational mechanics**, Bachelor's Degree in Biomedical Engineering and Telecommunication Engineering, Politecnico di Milano.  
*Academic year:* 2020–2021 (2 courses).  
*Number of students:* ~150.  
*Language:* Italian.
- **Calculus II**, Bachelor's Degree in Electronic and Computer Engineering, Università di Trieste.  
*Academic year:* 2019–2020.  
*Number of students:* ~100.  
*Language:* Italian.
- **Linear algebra and geometry**, Bachelor's Degree in Naval Architecture and Marine Engineering, Università di Trieste.  
*Academic year:* 2019–2020.  
*Number of students:* ~100.  
*Language:* Italian.
- **Mathematical and physical modeling in engineering**, Master's Degree in Mathematical Engineering, Politecnico di Milano.  
*Academic years:* 2015–2016, 2016–2017, 2017–2018.  
*Number of students:* ~25.  
*Language:* English.
- **Calculus I**, Bachelor's degree in Civil Engineering, Politecnico di Milano.  
*Academic year:* 2016–2017.  
*Number of students:* ~150.  
*Language:* Italian.

## Other teaching activities

- **Biomathematical Modelling**, Master's Degree in Mathematical Engineering, Politecnico di Milano.  
*Substitution for one lesson*  
*Academic year: 2016–2017.*  
*Number of students: ~50.*  
*Language: English.*

### RESEARCH FUNDING: PI

- GNFM 2020 young project: *Transizioni di forma nella materia biologica e attiva.*
  - Amount: 4 k€.
  - Participants: D. Andrini (SISSA), G. Bevilacqua (Università di Pisa), G. Lucci (Politecnico di Torino), G. Pozzi (Politecnico di Milano).

### PARTICIPATION TO RESEARCH PROJECTS

- PRIN 2020: *Mathematics for Industry 4.0*
  - Role: member.
  - P.I.: P. Ciarletta.
  - Amount: 0.48 M€.
- Regione Lombardia *NEWMED* project: Materials and methods for personalized and precision medicine
  - Role: member.
  - P.I.: D. Polli.
  - Amount: 3.3 M€.
- *MicroMotility* ERC Advanced Grant.
  - Role: member.
  - P.I. A. De Simone.
  - Amount: 1.3 M€.
- GNFM 2017 young project: *Evoluzione e Controllo della Forma nei Materiali Attivi.*
  - Role: member.
  - P.I.: A. Lucantonio.
  - Amount: 2.5 k€.
- GNFM 2016 young project: *Fenomeni di frattura e instabilità nei Materiali Soffici Attivi.*
  - Role: member.
  - P.I.: G. Noselli.
  - Amount: 5 k€.

### INSTITUTIONAL ACTIVITY

- Since Sept 2021: member of the Programme Board of Civil Engineering at the Politecnico di Milano.

- RECRUITMENT
- Sept 2022: participation to the committee for the selection of tutors for the bachelor's degree in Civil Engineering at the Politecnico di Milano.
  - Jan 2022: participation to the committee for the selection of teaching assistants for the courses of Mathematical Physics at the Politecnico di Milano.
  - Oct 2021: participation to the committee for the selection of a postdoc in Mathematical Physics at the Politecnico di Milano.
- MEMBERSHIPS
- 2016–present: member of the *Gruppo Nazionale di Fisica Matematica* of the *Istituto Nazionale di Alta Matematica* (National Institute of Higher Mathematics).
- POPULARIZATION  
– ARTICLES
1. D. Riccobelli. Un'introduzione ai modelli matematici. *Nuova Secondaria*, 9, 2016
- POPULARIZATION  
– OTHER  
ACTIVITIES
- Participation to the “SISSA for schools” program (2019).
  - Participation to the “Meet me tonight – Incontri con la scienza” (2017–2018).
  - Tutor for high school students in preparation for the Italian Mathematical Olympiad (2014–2018).
- LANGUAGE  
SKILLS
- Italian*: mother tongue.  
*English*: fluent, FCE certification level B2.  
*French*: basic knowledge.