FILIP RINDLER – CURRICULUM VITAE

WORK ADDRESS

Mathematics Institute
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RESEARCH INTERESTS

Partial Differential Equations, Geometric Measure Theory, Calculus of Variations, Mathematics of Material Science

POSITIONS

2020 –	**Professor of Mathematics**, University of Warwick
2016 – 2021	**Turing Fellow**, Alan Turing Institute
2013 – 2020	**Reader**, **Associate Professor**, **Zeeman Lecturer (Assistant Professor)**, University of Warwick
2014 – 2017	**EPSRC Research Fellow**, University of Warwick
2011 – 2015	**Drosier Research Fellow (JRF)**, Gonville & Caius College, University of Cambridge (on leave 2013–2015)

EDUCATION

2009 – 2011	**DPhil (PhD) in Mathematics**, OxPDE, University of Oxford Thesis: *Lower Semicontinuity and Young Measures for Integral Functionals with Linear Growth* (supervisor: Prof. Jan Kristensen)
2004 – 2008	**Diplom in Mathematics** (with distinction), TU Berlin Thesis: *Reverse approximation of rate-independent evolution processes* (supervisors: Prof. Alexander Mielke, Prof. Petra Wittbold)
2004	**Abitur** (high school diploma), Sophie–Charlotte Oberschule, Berlin

AWARDS & MAJOR GRANTS

2024 – 2029	**ERC Consolidator Grant*** **"CONCENTRATE"** (PI, €2M, £1.75M) *selected by the ERC, funded by UKRI (due to UK's exit from EU)
2018	**LMS Whitehead Prize**
2018 – 2024	**ERC Starting Grant "SINGULARITY"** (PI, €1.5M, £1.2M)
2018 – 2021	**Lloyds Register Foundation ATI Grant** (PI, ca. £300k)
2016 – 2021	**Turing Fellow** (20% FTE), Alan Turing Institute
2014 – 2017	**EPSRC Research Fellowship** (£262k)

Total funding to date: £4+ million

TALKS

100+ invited research talks at international conferences, workshops, colloquia, research seminars, and schools in Europe, USA, Asia.

Recent representative talks:

- Jan 2023 NCTS International GMT Seminar (online)
- Feb 2023 HIM workshop "Complex phenomena in solids", Bonn (Germany)
- Aug 2022 Oberwolfach workshop "Calculus of Variations" (Germany)
- Jun 2022 Journées EDP 2022, CNRS, Obernai (France)
- Apr 2022 Workshop "Polycrystals: Microstructure and Plasticity", Edinburg (UK)
- Oct 2021 Wilhelm Killing Colloquium at University of Münster (Germany)
- Jun 2021 8ECM Mini-symposium talk (online)
- Sep 2019 Seminar at Courant Institute, New York (USA)
- Sep 2019 Keynote talk at DEA 2019, Krakow (Poland)
- Oct 2018 Conference "PDEs and Geometic Measure Theory", Zurich (Switzerland)
- Jul 2018 Workshop "Critical Phenomena", NCTU, Hsinchu (Taiwan)
- May 2018 BIRS workshop "Topics in the Calculus of Variations", Banff (Canada)
- Mar 2018 Oxbridge PDE Conference, Cambridge (UK)

EDITORIAL BOARDS

- Math. Models Methods Appl. Sci. (M^3AS) (from 2020)
- Proc. Roy. Soc. Edinburgh Sect. A (from 2023)
- Rev. Mat. Iberoam. (from 2024)

SERVICE

Journal referee for 100+ papers

Grant panels and refereeing for ERC (EU), EPSRC (UK), SNF (Switzerland), FWF (Austria), RGC (Hong Kong), SA (Research Council of Finland), Humboldt Foundation (Germany), ICMS (Scotland)

LMS Prizes committee panel member

CONFERENCE ORGANIZATION

- ICMS Workshop *"Calculus of Variations – Old Problems and New Directions"* (with C. De Filippis, F. Gmeineder), 17–21 February 2025, Edinburgh, UK, funded by ICMS.
- Workshop *"Measures and Materials"* (with P. Bonicatto, T. Hudson), 25–28 March 2024, Warwick, UK, funded by ERC, Warwick.
- BIRS Workshop *"Compensated Compactness and Applications to Materials"* (with J. F. Babadjian, F. Iurlano), 2–7 April 2023, Banff, Canada, funded by BIRS.
- Mini-symposium *"Concentration phenomena under PDE-constraints"*, within DEA 2019, 16–20 September 2019, Krakow, Poland.
- Conference *"Recent Advances in PDEs and the Calculus of Variations"* (with G. De Philippis), 3–6 July 2017, Venice, Italy, funded by EPSRC, MIUR SIR.
- Workshop *"Variational Methods for Stationary and Evolutionary Problems"*, 12 May 2015, Warwick, UK, funded by LMS, EPSRC, Warwick.

RESEARCH SUPERVISION

Postdocs:

- *Paolo Bonicatto* (2020–2022)
- *Giacomo Del Nin* (2019–2022)
- *Adolfo Arroyo-Rabasa* (2018–2021)
- *Bogdan Raita* (2018–2019)
- *David K. E. Green* (2018–2021)

PhD students:

- *Harry Turnbull* (Warwick, 2024–)
- *Dimitrios Andreakis* (Warwick, 2023–)
- *Kamil Kosiba* (Warwick, 2019)
- *Giles W. Shaw* (Cambridge, 2016)

18 Research dissertation & MSc students

TEACHING

Lecturing:

- *Geometric Measure Theory* (4th-year UG / PhD-level, Warwick, 2022/23, 2023/24)
- *Advanced Real Analysis* (4th-year UG / PhDs-level, Warwick, 2021/22, 2022/23)
- *Calculus of Variations* (4th-year UG / PhDs-level, Warwick, 2014/15, 2016/17, 2018/19)
- *Complex Analysis* (3rd-year UG, Warwick, 2018/19)
- *Analysis of Linear PDEs* (PhD-level, Warwick, 2013/14)

Tutorials & mentoring for undergraduate students

BOOK

Calculus of Variations, Springer, Universitext, 2018, 444 pages.

PUBLICATIONS

• *On the converse of Pansu's Theorem* (with G. De Philippis, A. Marchese, A. Merlo, A. Pinamonti), submitted, arXiv:2211.06081.

• *Transport of currents and geometric Rademacher-type theorems* (with P. Bonicatto, G. Del Nin), submitted, arXiv:2207.03922.

• *Higher integrability for measures satisfying a PDE constraint* (with A. Arroyo-Rabasa, G. De Philippis, J. Hirsch, A. Skorobogatova), to appear in Trans. Amer. Math. Soc., arXiv:2106.03077.

• *Existence and uniqueness for the transport of currents by Lipschitz vector fields* (with P. Bonicatto, G. Del Nin), to appear in J. Funct. Anal., arXiv:2303.03218.

• *Energetic solutions to rate-independent large-strain elasto-plastic evolutions driven by discrete dislocation flow*, to appear in J. Eur. Math. Soc. (JEMS), arXiv:2109.14416.

• *Shape optimization of light structures and the vanishing mass conjecture* (with J.-F. Babadjian, F. Iurlano), Duke Math. J. 172 (2023), 43–103.

• *Space-time integral currents of bounded variation*, Calc. Var. Partial Differential Equations 62 (2023), Paper No. 54.

• *Transport of currents*, Oberwolfach Rep. 37/2022 (2022).

• *Elasto-plastic evolution of single crystals driven by dislocation flow* (with T. Hudson), Math. Models Methods Appl. Sci. (M^3AS) 32 (2022), 851–910.

• *Two-speed solutions to non-convex rate-independent systems* (with S. Schwarzacher, J. J. L. Velazquez), Arch. Ration. Mech. Anal. 239 (2021), 1667–1731.

• *Concentration versus oscillation effects in brittle damage* (with J.-F. Babadjian, F. Iurlano), Comm. Pure Appl. Math. 74 (2021), 1803–1854.

• *On the relaxation of integral functionals depending on the symmetrized gradient* (with K. Kosiba), Proc. Roy. Soc. Edinburgh Sect. A, 151 (2021), 473–508.

• *Fine properties of functions of bounded deformation – an approach via linear PDEs* (with G. De Philippis), special issue on "Variational models in elasticity", AIMS Math. Eng. 2 (2020), 386–422.

• *Relaxation for partially coercive integral functionals with linear growth* (with G. Shaw), SIAM J. Math. Anal. 52 (2020), 4806–4860.

• *Lower semicontinuity and relaxation of linear-growth integral functionals under PDE constraints* (with A. Arroyo-Rabasa, G. De Philippis), Adv. Calc. Var. 13 (2020), 219–255.

• *Model inference for ordinary differential equations by parametric polynomial kernel regression* (with D. Green), Proceedings of 3rd International Conference on Uncertainty Quantification in Computational Sciences and Engineering (UNCECOMP 2019), Crete, June 2019, 263-285.

• *Theme & variations on* $\mathrm{div}\mu = \sigma$, Oberwolfach Rep. 34/2019 (2019).

• *Dimensional estimates and rectifiability for measures satisfying linear PDE constraints* (with A. Arroyo-Rabasa, G. De Philippis, J. Hirsch), Geom. Funct. Anal. 29 (2019), 639–658.

• *Liftings, Young measures, and lower semicontinuity* (with G. Shaw), Arch. Ration. Mech. Anal. 232 (2019), 1227–1328.

• *On the two-state problem for general differential operators* (with G. De Philippis, L. Palmieri), Nonlinear Anal. 177 (2018), 387–396

• *On the structure of measures constrained by linear PDEs* (with G. De Philippis), Proc. ICM 2018, Vol. 3, 2233–2258.

• *Regularity and approximation of strong solutions to rate-independent systems* (with S. Schwarzacher, E. Süli), Math. Models Methods Appl. Sci. (M^3AS) 27 (2017), 2511–2556.

• *On a conjecture of Cheeger* (with G. De Philippis, A. Marchese), "Measure Theory in Non-Smooth Spaces" (Nicola Gigli, ed.), 2017, De Gruyter.

• *Characterization of generalized Young measures generated by symmetric gradients* (with G. De Philippis), Arch. Ration. Mech. Anal. 224 (2017), 1087–1125.

• *On the structure of $\mathscr{A}$-free measures and applications* (with G. De Philippis), Ann. of Math. 184 (2016), 1017–1039.

• *Orientation-preserving Young measures* (with K. Koumatos, E. Wiedemann), Q. J. Math. 67 (2016), 439–466.

• *Piecewise affine approximations for functions of bounded variation* (with J. Kristensen), Numer. Math. 132 (2016), 329–346.

• *Differential inclusions and Young measures involving prescribed Jacobians* (with K. Koumatos, E. Wiedemann), SIAM J. Math. Anal. 47 (2015), 1169–1195.

• *Strictly continuous extension of functionals with linear growth to the space BV* (with G. Shaw), Q. J. Math. 66 (2015), 953–978.

• *Thin-film limits of functionals on $\mathscr{A}$-free vector fields* (with C. Kreisbeck), Indiana Univ. Math. J. 64 (2015), 1383–1423.

• *Directional oscillations, concentrations, and compensated compactness via microlocal compactness forms*, Arch. Ration. Mech. Anal. 215 (2015), 1–63.

• *Differential inclusions and Young measures involving prescribed Jacobians*, Proc. Appl. Math. Mech. 14 (2014), 1049–1052.

• *A local proof for the characterization of Young measures generated by sequences in BV*, J. Funct. Anal. 266 (2014), 6335–6371.

• *Lower semicontinuity and Young measures in the space BD of functions of bounded deformation*, Oberwolfach Rep. 36/2012 (2012), 2247–2249.

• *Lower semicontinuity and Young measures in BV without Alberti's Rank-One Theorem*, Adv. Calc. Var. 5 (2012), 127–159.

• *Lower semicontinuity for integral functionals in the space of functions of bounded deformation via rigidity and Young measures*, Arch. Ration. Mech. Anal. 202 (2011), 63–113.

• *Lower Semicontinuity and Young Measures for Integral Functionals with Linear Growth*, DPhil thesis, University of Oxford, 2011.

• *Characterization of generalized gradient Young measures generated by sequences in $W^{1,1}$ and BV* (with J. Kristensen), Arch. Ration. Mech. Anal. 197 (2010), 539–598.

• *Relaxation of signed integral functionals in BV* (with J. Kristensen), Calc. Var. Partial Differential Equations 37 (2010), 29–62.

• *Approximation of rate-independent optimal control problems*, SIAM J. Numer. Anal. 47 (2009), 3884–3909.

• *Reverse approximation of energetic solutions to rate-independent processes* (with A. Mielke), NoDEA Nonlinear Differential Equations Appl. 16 (2009), 17–40.

• *Optimal control for nonconvex rate-independent evolution processes*, SIAM J. Control Optim. 47 (2008), 2773–2794.

• *Reverse Approximation of Rate-Independent Evolution Processes*, Diploma thesis (Diplomarbeit), Technical University Berlin, 2008.

• *On the Proper Interference Protection in Wireless Multi-hop Networks* (with M. Kubisch, E. Carlson, and D. Hollos), Proceedings of the IEEE Wireless Communications and Networking Conference (WCNC) 2007, Hong Kong, March 2007, 452–457.