Silvio Fanzon

Curriculum Vitæ

Lecturer in Applied Mathematics
Department of Mathematics, University of Hull

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Academic Profile

I am a Lecturer in Applied Mathematics at the University of Hull, with a research and teaching role. My research is at the interface of *Inverse Problems*, *Optimization*, *Statistics* and *PDEs*. I have also experience in *Optimal Transport*, *Calculus of Variations*, *Measure Theory* and *Numerical analysis* in infinite-dimensional spaces. I am interested in applications to *Materials Science*, *Mathematical Imaging*, *Statistical Models for Sports* and *Machine Learning*. I have taught a diverse range of courses in the areas of *Analysis*, *Geometry*, *Probability*, *Statistics* and *Numerical Analysis*, at both the Undergraduate and Master levels.

Education

2014 – 2018 **PhD in Mathematics**, University of Sussex, UK
Thesis: *Geometric patterns and Microstructures in the study of Material Defects and Composites*
Grade: Pass with no corrections, Advisor: Prof. Mariapia Palombaro

2012 – 2014 **MSc in Mathematics**, Sapienza University, Italy
Thesis: *A variational approach to topological singularities in two-dimensions*
Grade: 110/110 Cum Laude, Advisor: Prof. Marcello Ponsiglione

2008 – 2011 **BSc in Mathematics**, Sapienza University, Italy
Thesis: *The isoperimetric problem*
Grade: 110/110 Cum Laude, Advisor: Prof. Annalisa Malusa

Academic Positions

04/23 – Now **Lecturer in Applied Mathematics**
Department of Mathematics
University of Hull, UK

06/22 – 03/23 **Faculty member (University Assistant)**
Department of Mathematics & Scientific Computing
University of Graz, Austria

04/18 – 10/21 **Postdoctoral Researcher**
Department of Mathematics & Scientific Computing
University of Graz, Austria

09/14 – 03/18 **Associate Tutor**
Department of Mathematics
University of Sussex, UK

Top 4 Publications

[1] *Asymptotic linear convergence of Fully–Corrective Generalized Conditional Gradient methods*
Mathematical Programming, Online First, 2023
K. Bredies, M. Carioni, **S. Fanzon,** D. Walter

[2] *A Generalized Conditional Gradient Method for Dynamic Inverse Problems with Optimal Transport Regularization*
Foundations of Computational Mathematics, 23:833–898, 2023
K. Bredies, M. Carioni, **S. Fanzon,** F. Romero

[3] *A superposition principle for the inhomogeneous continuity equation with Hellinger–Kantorovich-regular coefficients*
Communications in Partial Differential Equations, 47(10):2023–2069, 2022
K. Bredies, M. Carioni**, S. Fanzon**

[4] *Derivation of Linearized Polycrystals from a Two-Dimensional System of Edge Dislocations*
SIAM Journal on Mathematical Analysis, 51(5):3956–3981, 2019
S. Fanzon, M. Palombaro, M. Ponsiglione

List of Publications

I have authored 1 Preprint, 10 Peer-Reviewed Journal Articles, 1 Book and 3 Theses

Preprints

Authors are in alphabetical order, unless marked by **#**

[16] **#** *Heavy tails and negative correlation in a binomial model for sports matches: applications to curling*
arXiv e-print 2406.18601, 2024
J. Fry, M. Austin**, S. Fanzon**

Peer-Reviewed Journal Articles

Authors are in alphabetical order, unless marked by **#**

[15] *Faster identification of faster Formula 1 drivers via time-rank duality*
Economics Letters, 237:111671, 2024
J. Fry, T. Brighton**, S. Fanzon**

[14] *Asymptotic linear convergence of Fully–Corrective Generalized Conditional Gradient methods*
Mathematical Programming, Online First, 2023
K. Bredies, M. Carioni, **S. Fanzon,** D. Walter

[13] *A Generalized Conditional Gradient Method for Dynamic Inverse Problems with Optimal Transport Regularization*
Foundations of Computational Mathematics, 23:833–898, 2023
K. Bredies, M. Carioni, **S. Fanzon,** F. Romero

[12] *A superposition principle for the inhomogeneous continuity equation with Hellinger–Kantorovich-regular coefficients*
Communications in Partial Differential Equations, 47(10):2023–2069, 2022
K. Bredies, M. Carioni**, S. Fanzon**

[11] *On the extremal points of the ball of the Benamou–Brenier energy*
Bulletin of the London Mathematical Society, 53(5):1436–1452, 2021
K. Bredies, M. Carioni, **S. Fanzon,** F. Romero

[10] *An optimal transport approach for solving dynamic inverse problems in spaces of measures*
ESAIM: Mathematical Modelling and Numerical Analysis, 54(6):2351–2382, 2020
K. Bredies**, S. Fanzon**

[9] *Uniform distribution of dislocations in Peierls–Nabarro models for semi-coherent interfaces*
Calculus of Variations and Partial Differential Equations, 59(4):141, 2020
S. Fanzon, M. Ponsiglione, R. Scala

[8] *Derivation of Linearized Polycrystals from a Two-Dimensional System of Edge Dislocations*
SIAM Journal on Mathematical Analysis, 51(5):3956–3981, 2019
S. Fanzon, M. Palombaro, M. Ponsiglione

[7] *Optimal lower exponent for the higher gradient integrability of solutions to two-phase elliptic equations in two dimensions*
Calculus of Variations and Partial Differential Equations, 56(5):137, 2017
S. Fanzon, M. Palombaro

[6] *A Variational Model for Dislocations at Semi-coherent Interfaces*
Journal of Nonlinear Science, 27(5):1435–1461, 2017
S. Fanzon, M. Palombaro, M. Ponsiglione

Miscellaneous Authors are in alphabetical order, unless marked by **#**

[5] **#** *Optimal Transport Based Convex Hybrid Image and Motion-Field Reconstruction*
2021 ISMRM & SMRT Annual Meeting & Exhibition, 15-20 May 2021, Vancouver, Canada
I. Middelhoff, M. Schlögl, A. M. Fernández, **S. Fanzon**, K. Bredies, R. Stollberger

[4] *Geometric patterns and microstructures in the study of material defects and composites*
Doctoral Thesis (PhD), University of Sussex, 2018

[3] *A variational approach to topological singularities in two-dimensions (in Italian)*
Master Thesis, Sapienza University, 2014

[2] *Lecture Notes on Ordinary Differential Equations (in Italian)*
Book, ISBN: 8890734175, Edizioni LaDotta, 2013
S. Fanzon, A. Malusa

[1] *The isoperimetric problem (in Italian)*
Bachelor Thesis, Sapienza University, 2011

Research Impact: Projects & Funding

2020/21	Participation in FWF Research Project P29192 led by K. Bredies (€ 231k) Project title: *Regularization Graphs for Variational Imaging*
2019/21	Participation in FWF Research Project P28858 led by K. Bredies (€ 221k) Project title: *Solving bilinear inverse problems by tensorial lifting*
2018/20	Participation in FWF Research Project PIR-27 led by K. Bredies (€ 234k) Project title: *Mathematical methods for motion-aware medical imaging*
2014/18	Full-time PhD Studentship for 3.5 Years from the University of Sussex (£ 49k) Project title: *Rigidity problems and Microstructures in Materials Science*
2014/18	PhD Fees Waiver for 3.5 Years from the University of Sussex (£ 14k)
2014/18	Research Grant from the University of Sussex (£ 5.8k)
2014/17	Travel support from Carnegie Mellon University (US), Oxford University (UK), SISSA (Italy), Warwick University (UK), National Research Council of Italy (total £ 4k)

Teaching Experience

I have taught 17 modules, including 9 as Lecturer and 8 as Teaching Assistant

Lecturer

2024/25		Differential Geometry, Y3 BSc Math	University of Hull, UK
		Numbers, Sequences and Series, Y1 BSc Math	
2023/24		Statistical Models, Y2 BSc Math	
		Numbers, Sequences and Series, Y1 BSc Math	
		Differential Geometry, Y3 BSc Math	
2022/23		Analysis 3 (Exercise Course), Y2 BSc Math	University of Graz, Austria
		Inverse Problems (Exercise Course), Y2 MSc Math	
2020/21		Calculus of Variations, Y1 MSc Math	
2019/20		Advanced Functional Analysis (Exercise Course), Y1 MSc Math	

Teaching Assistant

2017/18		Geometry 1, Y1 BSc Math	University of Sussex, UK
2016/17		Analysis 1, Y1 BSc Math	
		Introduction to Probability, Y1 BSc Math	
		Mathematics Demystified, Y1 BSc Math	
2015/16		Probability and Statistics, Y2 BSc Math	
		Introduction to Probability, Y1 BSc Math	
2014/15		Probability and Statistics, Y2 BSc Math	
2012/13		Ordinary Differential Equations, Y2 BSc Math	Sapienza University, Italy

Academic Supervision

I have supervised 6 students, including 3 Master students and 3 Undergraduate students

Master Students

2023/24		Olapeju Enitan Arowobusoye, MSc Mathematics Thesis title: *A Complex Analysis approach to the isoperimetric inequality*	University of Hull, UK
		Lucky Ekeshili, MSc Mathematics Thesis title: *The Euler-Lagrange equation*	
2022/23		David Awuku, MSc Mathematics Thesis title: *The Isoperimetric Problem*	

Undergraduate Students

2024/25	Declan Hodges, BSc Mathematics Thesis title: *The isoperimetric inequality*	University of Hull, UK
	Sam Fowler, BSc Mathematics Thesis title: *Optimal transport*	
	Joe Varley, BSc Mathematics Thesis title: *The Hausdorff measures*	

Administrative Experience

2024/25	Organized Welcome Week for BSc and MSc in Mathematics at the University of Hull
2023/24	Responsible for open days Mathematics desk at the University of Hull

Professional Qualifications & Memberships

Start 09/23	Enrolled in the Postgraduate Certificate in Academic Practice (PCAP) programme at the University of Hull. This comprises 3 modules over one year, and leads to a Postgraduate Certificate qualification and a Fellowship of the Higher Education Academy (FHEA)
Since 2023	Member of the *Inverse Problems International Association* (IPIA)

Technical Skills

Coding	Python, Matlab, R, C, Mathematica
Teaching	LaTex, Quarto, Canvas, Panopto, MS Office, MS Teams, Moodle
Web	Git, HTML, CSS, JavaScript, Jekyll, Liquid, YAML, Markdown

Reviewer Activity

SIAM Journal on Mathematical Analysis	Numerische Mathematik
SIAM Journal on Imaging Sciences	Inverse Problems and Imaging
Mathematics in Engineering	Managerial Finance

Research Stays

2022	University of Sussex, UK, 1–22 Jul and 27 Oct–5 Nov	Filippo Cagnetti
	Heriot-Watt University, UK, 12–16 Sep	Panagiota Birmpa
2019	Sapienza University, Italy, 15-19 Apr and 8–17 Jul	Marcello Ponsiglione
2018	Sapienza University, Italy, 17–21 Dec	Marcello Ponsiglione
	University of Graz, Austria, 31 Jan–2 Feb	Kristian Bredies

Communication

I have given 15 presentations, including 12 oral presentations (11 invited) and 3 poster presentations (1 invited)

Oral Presentations

✉ Denotes invited presentation

2023 ✉ AIP 2023: 11th Applied Inverse Problems Conference
University of Göttingen, Germany, 4-8 Sep 2023

2022 ✉ Sussex Mathematics Seminar
University of Sussex, UK, 3 Nov 2022

✉ Seminar, Department of Mathematics
Heriot-Watt University, UK, 13 Sep 2022

✉ Seminar, Department of Mathematics & Scientific Computing
University of Graz, Austria, 18 Feb 2022

2021 ✉ SIMAI 2020-2021 Parma
University of Parma, Italy, 30 Aug - 3 Sep 2021

2019 ✉ M.A.G.A. Days (Monge-Ampère et Géométrie Algorithmique)
Laboratoire de mathematiques d'Orsay, France, 20-21 Nov 2019

✉ 1st Austrian Calculus of Variations Day
University of Vienna, Austria, 17-18 Oct 2019

✉ ICCOPT: 6th International Conference on Continuous Optimization
Technical University Berlin, Germany, 3-8 Aug 2019

2018 ✉ Topics in Nonlinear Analysis: Calculus of Variations and PDEs
University of Lisbon, Portugal, 10-12 Oct 2018

✉ Seminar, Department of Mathematics & Scientific Computing
University of Graz, Austria, 31 Jan 2018

2017 XXVII National meeting of Calculus of Variations
Levico Terme, Italy, 6-10 Feb 2017

2016 ✉ Working Seminar on Calculus of Variations
Sapienza University, Italy, 19 Dec 2016

Poster Presentations

✉ Denotes invited presentation

2021 ✉ ITN TraDe-OPT Winter School
Online, 15-19 Feb 2021

2016 Hysteresis, Avalanches and Interfaces in Solid Phase Transformations
University of Oxford, UK, 19-21 Sep 2016

PIRE-CNA. New Frontiers in Nonlinear Analysis for Materials
Carnegie Mellon University, US, 2-10 Jun 2016