CURRICULUM VITAE of SARA DANERI

ADDRESS

Gran Sasso Science Institute
Viale Francesco Crispi 7
67100 L'Aquila
Italy

E-mail: sara.daneri at gssi.it

ACTUAL POSITION

Associate Professor at the **Gran Sasso Science Institute**, L'Aquila. **since 14 Dec 2021**

PREVIOUS POSITIONS AND EDUCATION

Assistant Professor at the **Gran Sasso Science Institute**, L'Aquila. **14 Dec 2018 to 13 Dec 2021**

Juniorprofessor at the **Friedrich-Alexander Universität**, Erlangen-Nürnberg. **Sep 2015-Dec 2018**

Postdoc at the **University of Leipzig**, Leipzig. **Oct 2013 - Aug 2015**
In the group of Prof. Laszlo Székelyhidi

Postdoc at the **University of Zürich**, Zürich. **Jan 2012 - Sept 2013**
In the group of Prof. Camillo De Lellis

Postdoc at the **University of Pavia**, Pavia **Jan 2011 - Dec 2011**
In the group of Prof. Aldo Pratelli

Ph.D. in Analysis at the **S.I.S.S.A./I.S.A.S.**, Trieste **Nov 2007 - Oct 2011**
PhD Thesis: "Dimensional reduction and approximation of measures and weakly differentiable homeomorphisms"
Advisor: Prof. Stefano Bianchini

Master in Mathematics at the **University of Pavia**, Pavia **Oct 2005 - Jul 2007**
Date: 17 Jul 2007
Grade: 110/110 *with distinction*
Thesis: "Displacement convexity for integral functionals on Riemannian manifolds"
Advisor: Prof. Giuseppe Savaré

Bachelor in Mathematics at the **University of Pavia**, Pavia **Oct 2002 - Sept 2005**
Date: 22 Sept 2005
Grade: 110/110 *with distinction*
Thesis: "Topological dynamics in case of non-uniqueness"
Advisor: Prof. Giulio Schimperna

PREPRINTS

1. A rigorous approach to pattern formation for isotropic isoperimetric problems with competing nonlocal interactions preprint arXiv:2406.13773
con E. Runa

2. Exact periodic stripes for a local/nonlocal minimization problem with volume constraint preprint arXiv:2106.08135
with E. Runa

PUBLICATIONS

1. Deterministic particle approximation of aggregation diffusion equations with nonlinear mobility
Journal of Hyperbolic Differential Equations (2023) 20(3), pp. 707?744
with E. Radici e E. Runa

2. Periodic striped configurations in the large volume limit
Annali della Scuola Normale Superiore di Pisa (2023)
$https://doi.org/10.2422/2036-2145.202111\_021$
with E. Runa

3. On the sticky particle solutions to the multi-dimensional pressureless Euler equations
J. Diff. Eq. 368 (2023): 173-202.
with S. Bianchini

1. One-dimensionality of the minimizers for a diffuse interface generalized antiferromagnetic model in general dimension
J. Funct. Anal. 283.12 (2022): 109715.
with A. Kerschbaum and E. Runa

2. Deterministic particle approximation of aggregation-diffusion equations on unbounded domains
Journal of Differential Equations 312(11):474-517 (2022)
with E. Radici and E. Runa

3. One-dimensionality of the minimizers in the large volume limit for a diffuse interface attractive/repulsive model in general dimension
Calculus of Variations and Partial differential Equations 61:12 (2022)
with E. Runa

4. Non-uniqueness for the Euler equations up to Onsager's critical exponent
Annals of PDE, 7 (2021) 1, 8
with E. Runa and L. Szekelyhidi Jr

5. Pattern formation for a local/nonlocal interaction functional arising in colloidal systems
SIAM J. Math. Anal. (2020)
with E. Runa

6. Numerical Solution of Monge-Kantorovich Equations via a dynamic formulation
Journal of Scientific Computing (2020) with E. Facca, F. Cardin, M. Putti

7. On the symmetry breaking and structure of the minimizers for a family of local/nonlocal interaction functionals
Rendiconti del seminario matematico (2019).
with E. Runa

8. Exact periodic stripes for minimizers of a local/non-local interaction functional in general dimension

Arch. Rat. Mech. Anal. 231, 1, 519–589 (2019)
with E. Runa.

9. Pattern formation for a family of models with local/nonlocal interaction
Proceedings in Applied Mathematics and Mechanics (2018).
with E. Runa

10. On Sudakov's type decomposition of transference plans with norm costs
Memoirs of the American Mathematical Society, Volume 251, Number 1197 (2018)
with S. Bianchini.

11. Non-uniqueness and h-principle for Hölder-continuous weak solutions of the Euler equations
Arch. Rat. Mech. Anal. May 2017, Volume 224, Issue 2, pp. 471–514 (2017)
with L. Székelyhidi.

12. A planar bi-Lipschitz extension theorem
Adv. Calc. Var. 8 n.3, 221-266 (2015)
with A. Pratelli.

13. Cauchy problem for dissipative Hölder solutions to the incompressible Euler equations
Comm. Math. Phys. 329 n.2, 745-786 (2014).

14. Smooth approximation of bi-Lipschitz orientation-preserving homeomorphisms
Ann. Inst. H. Poincaré Anal. Non Linéaire 31 n.3, 567-589 (2014)
with A. Pratelli

15. Lecture notes on gradient flows and optimal transport
Optimal transportation 100-144, London Math. Soc. Lecture Note Ser. 413
Cambridge Univ. Press, Cambridge (2014)
with G. Savaré.

16. Variational models for the incompressible Euler equations
Libro AIMS: "HCDTE Lecture Notes. Part II.: Nonlinear Hyperbolic PDEs, Dispersive and Transport Equations"
AIMS Ser. Appl. Math. 7 (2012)
with A. Figalli.

17. The disintegration of the Lebesgue measure on the faces of a convex function
J. Funct. Anal. 258, 3604-3661 (2010)
with L. Caravenna.

18. Eulerian calculus for the displacement convexity in the Wasserstein distance
SIAM J. Math. Anal. 40, 3, 1104-1122 (2008)
with G. Savaré.

INVITED TALKS

2024

Workshop: "PDE Days in Maremma" Sorano, 28-30 Oct 2024

Workshop: "Calculus of Variations: A new generation" Bonn, 16-20 Sep 2024

Plenary speaker at AMS-UMI joint meeting in Palermo, 23-26 Jul 2024

Analysis Seminar at Institute for Advanced Study, Princeton, 24 May 2024

Workshop"Aggregation-Diffusion Equations and Collective Behavior: Analysis, Numerics and Applications" at CIRM, Marseille, 8-12 Apr 2024

Workshop "Calculus of Variations in Siena", 31 Jan-2 Feb 2024

2023

Unfinished Business: Problems in Applied GMT, Many-particle Systems, Epidemiology, and Phase Transitions, Bingen am Rein, 24-28 Jul 2023

Workshop in Geometric Measure Theory, Bressanone, 29 May-02 Jun 2023

2022

Online Seminar "Geometric Analysis" organized by Simon Blatt, Philipp Reiter, Armin Schikorra, Guofang Wang, 27 Sep 2022

INDAM conference "Anisotropic isoperimetric problems and related topics", Rome 5-9 Sep 2022

12th Meeting on Nonlinear evolution PDEs, fluid dynamics and transport equations, Univ. L'Aquila, 13-15 Jul 2022

Conference "Recent Developments in Incompressible Fluid Dynamics", Institute for Adavances Study, Princeton, 4-8 Apr 2022

Two contributed talks at SIAM Conference on Analysis of PDEs , 15 Mar 2022

Conference "Rigorous analysis of incompressible fluid models and turbulence", Isaac Newton institute, Cambridge, 14 Feb 2022

Conference "Frontiers in the analysis of kinetic equations", Isaac Newton Institute, Cambridge, 13 Jan 2022

2021
UC Louvain, 12 Nov 2021

NC State University, 3 Nov 2021

University of Oxford, 28 Oct 2021

RISM Congress on "PDEs and Continuum Mechanics", Varese, 21-23 Jul 2021

SISSA SIAM Chapter Colloquium, 5 Lug 2021

8th ECM, Jun 2021

2020

ICTS conference:"Turbulence: Problems at the Interface of Mathematics and Physics", Bangalore (online) 7 Dec 2020

Università di Roma Tor Vergata, 19 Nov 2020

University of Nottingham, 8 Oct 2020

Oberwolfach workshop:"Variational Methods for Evolution" (online participant), 13-19 Sep 2020

Workshop on Euler and Navier-Stokes Equations (online), Fields Institute, Toronto , 14-18 Sep 2020

2019

LIASFMA China-Italy conference on PDEs and their applications. Fudan University, Shanghai, 9-13 Dec 2019.

The mathematics of the Onsager's conjecture Course at Shanghai Jiao Tong University, 3-6 Dec 2019.

Workshop Mathematics for Mechanics
Institute of Information Theory and Automation, Prague, 29 Oct-01 Nov 2019.

XXI Congresso UMI, Section on partial differential equations
University of Pavia, Pavia 02-07 Sept 2019.

Contributed talk at International Congress on Industrial and applied Mathematics, Minisymposium on "Recent developments in nonlocal geometric variational problems"
University of Valencia, Valencia, 15-19 July 2019.

Conference "GMT and PDEs in Basel. A young researchers meeting"
University of Basel, Basel, 08-10 July 2019.

Mini-course "The mathematics of Onsager's conjecture"
Courses in PDEs/Fluid Mechanics
University of Warwick, Coventry, 13-16 May 2019.

Conference "Applied Analysis. Contributions of young researchers"
Polytechnic University of Turin, Turin, 8-9 Apr 2019.

International School of Advanced Studies (SISSA), Trieste, 03 Apr 2019.

University of Regensburg, 01 Feb 2019.

2018

Meeting on Applied Mathematics and Calculus of Variations in Rome
University La Sapienza, Rome, 3-6 Sept 2018.

International Workshop on Hyperbolic and Kinetic Problems: Theory and Applications
Academia Sinica, Taipei, Taiwan, 10-14 Jul 2018.

Invited speaker at HYP 2018
Penn State University, 25-29 Jun 2018.

International Workshop on Differential Equations
Central European University, Budapest, 4-6 Apr 2018.

XXVIII Convegno Nazionale di Calcolo delle Variazioni
CIRM Levico Terme (Italy), 15 Feb 2018.

Brainstorming in Rome
University La Sapienza, Rome, 22 Jan 2018.

2017

University of Augsburg, 23 Nov 2017.

University of Basel, 6 Nov 2017.

Mathematical Analysis of Incompressible Fluid Flows
University of Sussex, Brighton, 21 Sept 2017.

IperPV 2017
University of Pavia, Pavia, 7 Sept 2017.

PhD Course *Dissipative Euler flows and Onsager's conjecture* (in English) at Gran Sasso Science Institute, L'Aquila, Italy, from 13/03/2017 to 24/03/2017.

Ideal Fluids and Transport
Banach Center, Warsaw, 11 Feb 2017.

2016

University of Warwick, 17 Nov 2016.

University of Padova, 11 Oct 2016.

Women and research in Mathematics: the contribution of SISSA
SISSA, Trieste, 08 Sept 2016.

Contributed talk at HYP 2016
University of Aachen, 1 Aug 2016.

Partial Differential Equations and their Applications
STIAS, Stellenbosch, Southafrica, 10 Mar 2016.

2015

IperGSSI 2015
GSSI, L'Aquila (Italy) 24 Oct 2015.

Penn State University, State College 09 Apr 2015.

2014

University of Basel, 05 Nov 2014.

Talk at Conference on Differential Equations and Dynamical Systems at People's Friendship University of Moscow, 24 Aug 2014.

SIMAI workshop, Taormina 08 Jul 2014.

2013

University of Cambridge, 11 Nov 2013.

Conference "Two days on Hyperbolic PDEs, Geometric Measure Theory and Optimal Transportation"
S.I.S.S.A. (Trieste), 28-29 Oct 2013.

Dissipative Hölder solutions to the incompressible Euler equations
Analysis workshop

Děčín, 25-27 Oct 2013.

Universitá di Pisa (Pisa), 20 Feb 2013.

2012

ERC workshop "Geometric inequalities in Calculus of Variations".
Centro Ennio De Giorgi (Pisa), 10 Jul 2012.

Poster for SFB Transregio.
University of Tubingen (Tubingen), 15-16 e 20-22 Jun 2012.

University of Basel (Basel), 28 Mar 2012.

2011

Universitá degli Studi di Parma (Parma), 9 May 2011.

"XXI Convegno di Calcolo delle Variazioni".
Levico Terme, 10 Feb 2011.

ERC School "Analysis in Metric Spaces und Geometric Measure Theory".
Centro Ennio De Giorgi (Pisa), 12 Jan 2011.

2010

VIII meeting "Hyperbolic Conservation Laws and Fluid dynamics: Recent results and research Perspectives".
SISSA (Trieste), 4 Sept 2010.

IMATI-CNR (Pavia), 25 May 2010.

2009

Summer school and workshop "Optimal transportation and applications"
Institut Fourier (Grenoble), Jul 2009.

"First Winter School at IMDEA on PDE's and Inequalities".
IMDEA (Madrid), Jan 2009.

Organization of Conferences

Coordinator and organizer of the intentive trimester on "Particles, Fluids and Patterns: Analytical and Computational Challenges", which will take place at Gran Sasso Science Institute from 31st March to 4th July 2025.

Organizer of a Minisymposium at 8th ECM, Jun 2021.

Organizer of the Special Session "Analysis of nonlinear Flows" at the next AIMS Conference Series on Dynamical Systems and Differential Equations, taking place in Taipei (Taiwan) from 5 to 9 Jul 2018.

Supervision of Students

Phd Thesis, from Alicja Kerschbaum, "Pattern formation for local/nonlocal interaction functionals" (defended Feb 2022)

PhD Thesis, from Michele Gorini, "Non-uniqueness of Leray-Hopf solutions to the fractional Navier Stokes equations" (defended Sep 2023)

TEACHING

PhD Course "An Introduction to Geometric Measure Theory and its Applications" GSSI Nov-Dic 2023.

PhD Course"Energy driven pattern formation: emergence of one-dimensional periodic structures" GSSI May 2023.

Invited PhD Course "Convex integration: from isometric embeddings to Euler and Navier Stokes equations" University of Padova 3-13 May 2022.

PhD Course "Energy driven pattern formation: emergence of one-dimensional periodic structures" GSSI Mar 2022.

PhD Course "Incompressible fluids equations" GSSI, Nov 2020.

Invited PhD Course "The mathematics of the Onsager's conjecture" Shanghai Jiao Tong University, 3-6 Dec 2019.

PhD Course "Classical dynamics of incompressible fluids: the Euler and the Navier Stokes equations" Nov 2019 at GSSI.

Invited PhD Course "The mathematics of Onsager's conjecture" May 2019 at University of Warwick.

Phd Course "Convex integration and applications", Apr-May 2019 at GSSI.

Bachelor Course "Partial Differential Equations I", WS 2018/2019 at the FAU.

Invited Phd Course at "Fall School on Hyperbolic Conservation Laws and Mathematical Fluid Dynamics", 01-05 Oct 2018.

Bachelor Course "Elements of linear Algebra II", SS 2018 at the FAU in Erlangen.

Master Course "Functional Analysis and Operator Theory" (in German), WS 2017/2018 at the FAU.

Master Course "Partial Differential Equations II" (in German), SS 2017 at the FAU.

Invited PhD Course "Dissipative Euler flows and Onsager's conjecture" (in English) at Gran Sasso Science Institute, L'Aquila, Italy, from 13/03/2017 to 24/03/2017.

Master Course "Functional Analysis II", WS 2016/2017 at the FAU (in German).

Bachelor Course "Ordinary Differential Equations", SS 2016 at the FAU (in German).

Master Course "Real Analysis", WS 2015/16 at the FAU (in German).

PhD Course "The incompressible Euler equations: existence and (non-)uniqueness", 2014 Course at Max Planck Institute for Mathematics in the Sciences, Leipzig (in English).

Exercises for "Introduction to PDEs", course given by Dr. G. Koch at the University of Zürich, WS 2012/2013 (in English).

Exercises for “Analysis II”, course given by Prof. A. Torelli and Prof. P. Colli at the University of Pavia, WS 2005/2006 (in Italian).

LANGUAGES

Italian: Mother tongue
English: fluent
German: fluent
Albanian: fluent.