

Max-Planck-Institut für Mathematik
in den Naturwissenschaften

Inselstraße 22
D-04103 Leipzig, Deutschland
Tel: +49 (0) 341 - 9959 - 953
Fax: +49 (0) 341 - 9959 - 585
spadaro@mis.mpg.de
<http://www.mis.mpg.de/spadaro/>

ACTUAL POSITION

SEP. 2011 Research Group Leader at the Max Planck Institute for Mathematics in the Sciences Leipzig.

PREVIOUS POSITIONS

JAN. 2010-OCT. 2011 Postdoc at the Hausdorff Center for Mathematics Universität Bonn, Prof. S. Müller's group.

OCT. 2006-DEC. 2009 Assistant at the Institut für Mathematik, Universität Zürich.

OFFERS

FEB. 2011 Assistant professorship at the University of Warwick.

EDUCATION

Università degli Studi di Pisa

B.SC. IN MATHEMATICS, June 2005, *cum laude*. Thesis: Rectifiable currents (in Italian).
Advisor: Prof. G. Alberti.

M.SC. IN MATHEMATICS, September 2006, *cum laude*. Thesis: A variational model for periodic pattern formation (in Italian).
Advisor: Prof. G. Alberti.

Scuola Normale Superiore di Pisa

M.SC. (LICENZA) IN MATHEMATICS, December 2007, *cum laude*. Thesis: Non-uniqueness for strictly polyconvex functionals.

Universität Zürich

PHD IN MATHEMATICS, May 2010, with a distinction and a money prize. Thesis: Q-valued functions and approximation of minimal currents.
Advisor: Prof. C. De Lellis.

RESEARCH AREAS

Geometric measure theory, calculus of variations and partial differential equations.

- Minimal surfaces and area-minimizing currents; regularity theory.
- Asymptotic analysis of variational models in applied mathematics.

- Existence, uniqueness and regularity of functionals in the calculus of variations.
- Isometric immersions and rigidity problems.
- Analysis of geometric flows.

AWARDS

SEPTEMBER 2011 Grant for a five years “Centrally Announced” Research Group of the Max Planck Society.

MAY 2010. Year Price of the Science Faculty at the Universität Zürich.

JAN. 2010. Two years postdoctoral fellowship of the Hausdorff Center for Mathematics at the Universität Bonn.

JAN. 2009. Forschungskredit of the Universität Zürich n. 57103701, two years grant.

OCT. 2006. Fellowship of the Zürich Graduate School.

SEPT. 2002. Fellowship at the Scuola Normale Superiore di Pisa.

PUBLICATIONS

Published and Accepted

1. Non-uniqueness of minimizers for strictly polyconvex functionals, *Arch. Ration. Mech. Anal.* 193 (2009), no. 3, 659-678.
2. Uniform energy and density distribution: diblock copolymers functional, *Interfaces and Free Bound.* 11 (2009), no. 3, 447-474.
3. Complex varieties and higher integrability of Dir-minimizing Q-valued functions, *Manus. Math.* 132 (2010) no. 3-4, 415-429.
4. Asymptotic analysis of a second-order singular perturbation model for phase transitions (in collaboration with M. Cicalese e C. I. Zeppieri), *Calc. Var. Partial Diff. Equations* 41 (2011), no. 1-2, 127-150.
5. Q-valued functions revisited (in collaboration with C. De Lellis), *Memoirs of the Amer. Math. Soc.* 211 (2011), no. 991, vi+79 pp.
6. Lower semicontinuity functionals for Almgren’s multiple valued functions (in collaboration with C. De Lellis e M. Focardi) *Ann. Acad. Scient. Fenn. Math.* 36 (2011), 393-410.
7. Center manifold: a study case (in collaboration with C. De Lellis) *Disc. Cont. Din. Syst. A* 31 (2011), no. 4 1249-1272.
8. A variational view at the time-dependent minimal surface equation (in collaboration with U. Stefanelli) *J. Evol. Equ.* 11 (2011), no. 4 793-809.
9. An intrinsic approach to manifold constraint variational problems (in collaboration with M. Focardi) *Ann. Mat. Pura Appl.* Published Online, 11 August 2011.
10. Nondoubling A_∞ weights, *Adv. Calc. Var.* 5 (2012), no 3 345-354.

11. A representation formula for the p -Energy of metric space valued Sobolev maps (in collaboration with Ph. Logaritsch) *Comm. in Contemp. Math.* 14 (2012), no. 6 (10 pages).

Preprints

12. Higher integrability and approximation of minimal currents (in collaboration with C. De Lellis), <http://arxiv.org/abs/0910.5878>
13. Droplet minimizers to an isoperimetric problem with long-range interactions (in collaboration with M. Cicalese), <http://arxiv.org/abs/1110.0031>
14. Mean-convex sets and minimal barriers, <http://arxiv.org/abs/1112.4288>.

In preparation

15. Equidimensional isometric maps (in collaboration with L. Székelyhidi and B. Kirchheim).
16. Multiple valued functions and integral currents (in collaboration with C. De Lellis).
17. Regularity of area-minimizing currents I: L^p -gradient estimates (in collaboration with C. De Lellis).
18. Regularity of area-minimizing currents II: center manifold (in collaboration with C. De Lellis).
19. Regularity of area-minimizing currents III: blow-up (in collaboration with C. De Lellis).

Other publications

20. Q-valued functions and approximation of minimal currents (PhD thesis) (May 2010).

TEACHING

- Teaching assistant at the Universität Zürich:
 - Analysis I, II, III
 - Functional Analysis
 - Geometry and Topology
- Supervisor of the master thesis of Philippe Logaritsch at the Universität Zürich for the academic year 2010-2011.
- Winter School in Geometric Measure Theory, Scuola Normale Superiore di Pisa, January 2011: *The role of multi-valued functions in the regularity theory of minimal surfaces*.
- Teaching assistant at the Summer School Geometric Measure Theory and Applications at MSRI Berkely, July 2011.
- 2011-2012 MPI Leipzig, PhD course: *Introduction to sets of finite perimeter*.
- 2012 MPI Leipzig, PhD course: *Regularity and Singularity in Obstacle problems*.
- 2012 MPI Leipzig, Reading seminar (in collaboration with A. Choffrut, P. Hornung, B. Kirchheim, S. Luckhaus, F. Otto, L. Székelyhidi): *De Giorgi's method*.

PHD STUDENTS

Jan. 2012 Max-Planck-Institut MIS Leipzig: Philippe Logaritsch.

POSTDOC COLLABORATORS

June. 2012 Max-Planck-Institut MIS Leipzig: Andrea Marchese.

Jan. 2013 Max-Planck-Institut MIS Leipzig: Katharina Bellova.

SELECTED INVITED TALKS

- *Examples of non-uniqueness for minimizers of strictly polyconvex functionals*, Max Planck Institut Leipzig Analysis Oberseminar 09.10.2007.
- *Q-valued functions revisited*, Analysis Oberseminar ETH Zürich 22.04.2008.
- *Examples of non-uniqueness for minimizers of strictly polyconvex functionals*, Meeting Applied Math. and Calculus of Variations, Università di Roma la Sapienza 10.06.2008.
- *Higher integrability and approximation of minimal currents*, meeting in GMT and Calc. Var., Levico Terme 11.02.2009.
- *A variational model for periodic pattern formation*, analysis seminar Università di Napoli 19.02.2009.
- *Lipschitz isometries*, Meeting Applied Math. and Calculus of Variations, Università di Roma la Sapienza 12.06.2010.
- *Asymptotic analysis of a second-order singular perturbation model for phase transitions*, SIMAI biannual meeting Cagliari 21.06.2010.
- *Higher integrability and approximation of minimal currents*, Calculus of Variations Seminar Oberwolfach 22.07.2010.
- *On Almgren's center manifold: higher regularity of minimal surfaces without Schauder*, Warwick analysis seminar, 11.01.2011.
- *Nondoubling weights, higher integrability and a new a priori estimate for minimal currents*, Università degli Studi di Firenze analysis seminar 25.03.2011.
- *The analysis of the higher codimension Plateau problem*, HCM- Hausdorff Kolloquium, Bonn 21.04.2011.
- *On Almgren's center manifold and regularity of minimal surfaces*, PDEs Seminar Oberwolfach 08.08.2011.
- *Least barriers to minimal hypersurfaces: an approach via MCF with obstacle*, Variational Methods for Evolution Seminar Oberwolfach 07.12.2011.
- *Least barriers to minimal hypersurfaces*, Oberseminar Geometry, Max-Planck-Institut AEI Golm 06.02.2012.

- *Regularity of minimal currents*, Conference on Geometric Measure Theory, Max-Planck-Institut AEI Golm 02.-04.07.2012.
- *Regularity of minimal currents*, Meeting Applied Math. and Calculus of Variations, Università di Roma la Sapienza 04-07.09.2012.
- *Droplet minimizers of a nonlocal variational problem*, Workshop on Variational Models and Methods for Evolution, Levico Terme 10-12.09.2012.
- *Mean-curvature flow with obstacles*, ERC Workshop on Geometric Partial Differential Equations, Pisa 10-14.09.2012.

ACTIVITIES

- Refereeing activities for the following journals: *Archive for Rational Mechanics and Analysis*, *Mathematical Communications*, *Annales de l'Institut Henri Poincaré (C)*, *Annali della Scuola Normale Superiore di Pisa*, *Discrete and Continuous Dynamical Systems B*, *Advances in Mathematical Analysis*, *Mathematische Zeitschrift*, *SIAM Journal of Mathematical Analysis*, *Communications on Pure and Applied Mathematics*, *Journal of Geometric Analysis*, *Journal of the European Mathematical Society*, *Manuscripta Mathematica*, *Journal für die Reine und Angewandte Mathematik*, *International Mathematics Research Notices*, *Proceedings of the London Mathematical Society*.
- Co-organization of the Analysis Seminar at the Max-Planck-Institut für Mathematik in Leipzig.
- Arbeitsgemeinschaft in Geometric Measure Theory at the Max Planck Institut.