

# Luca Spolaor

## Curriculum Vitae

Massachusetts Institute of Technology (MIT)  
Department of Mathematics  
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### Personal Information

Born March 4, 1988 - Verona (VR), Italy  
Citizenship Italian  
Languages Italian (native), English (fluent), German (intermediate)

### Positions held

Sep 2016 - present **CLE Moore Instructor**, *Massachusetts Institute of Technology (MIT)*, Mentor: Prof. Tobias Colding.  
Sep 2017 - Jun 2018 **Visiting Associate Research Scholar & Visiting Lecturer**, *Princeton University*, (on leave from MIT).  
Sep 2015 - Aug 2016 **Postdoc**, *Max Planck Institute for Mathematics in the Sciences, Leipzig*, Mentor: Prof. Dr. Emanuele Spadaro.

### Education

Sep 2012 - Aug 2015 **Ph.D. Student**, *University of Zurich*, Advisor: Prof. Camillo De Lellis.  
Thesis: Regularity Theory for a class of 2-dimensional almost area minimizing currents.  
Sep 2010-Jul 2012 **Master in Mathematics**, *University of Trento*, Advisor: Prof. Raul Serapioni.  
Thesis: Regularity Theory for Stationary Varifolds

### Grants and Awards

2018 - 2021 NSF grant DMS 1810645 (\$157,841)  
2018 - 2019 AMS Simons travel grant (\$4,000)  
2016 - 2017 Oberwolfach Leibniz Fellow (OWL)  
2015 Oberwolfach Leibniz Graduate Student (OWLG)  
2015 Year Prize of the Science Faculty of the University of Zurich  
2012 Money prize for best graduated students of the University of Trento

### Scientific responsibilities

#### Editorial and Referee work

2018 - present Editor for a special issue of the journal *Mathematics in Engineering*  
Referee for Analysis & PDE, Communications in Analysis and Geometry, Journal of Functional Analysis, Advances in Mathematics, Commentarii Mathematici Helvetici

#### Conferences Organized

Mar 2019 AMS sectional Meeting *New Trends in Geometric Measure Theory*, University of Hawaii Manoa

## Students' mentoring

- 2018 Freshman advisor at MIT
- 2018 - present Coadvisor of the PhD student *Baptiste Trey* at Université Grenoble Alpes (main advisor B. Velichkov)
- 2015 Coadvisor of the master student *Andrea Huber* at University of Zurich (main advisor C. De Lellis)

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## Research

### Research interests

Geometric Measure Theory, PDE, Geometric Analysis, Calculus of Variations, Regularity

### Published/Accepted papers

1. Uniqueness of tangent cones for 2-dimensional almost minimizing currents (with C. De Lellis and E. Spadaro), *Comm. Pure Appl. Math.* 70 (2017), no. 7, 1402-1421
2. Regularity theory for 2-dimensional almost minimizing currents I: Lipschitz approximation (with C. De Lellis and E. Spadaro), *Trans. Amer. Math. Soc.* 370 (2018), no. 3, 1783-1801
3. Regularity theory for 2-dimensional almost minimal currents II: branched center manifold (with C. De Lellis and E. Spadaro), *Ann. PDE* 3 (2017), no. 2, Art. 18, 85
4. Regularity theory for 2-dimensional almost minimal currents III: blowup (with C. De Lellis and E. Spadaro), *accepted JDG* (2017)
5. Almgren's type Regularity for semicalibrated currents, *accepted Adv. in Math.* (2018)
6. On the number of singular points for planar multivalued harmonic functions (with F. Ghiraldin), *Manuscripta Math.* 154 (2017), no. 3-4, 513-525
7. Quantitative estimate on singularities in isoperimetric clusters (with M. Colombo), *accepted CAG* (2017)
8. An epiperimetric inequality for the regularity of some free boundary problems: the 2-dimensional case (with B. Velichkov) *to appear in Comm. Pure Appl. Math.* (2018)
9. A logarithmic epiperimetric inequality for the obstacle problem (with M. Colombo and B. Velichkov), *GAFA Vol. 28* (2018) 1029-1061
10. (Log-)epiperimetric inequality and regularity over smooth cones for almost Area-Minimizing currents (with M. Engelstein and B. Velichkov), *accepted Geom. Topol.* (2018)

### Submitted papers

11. Direct epiperimetric inequalities for the thin obstacle problem and applications (with M. Colombo and B. Velichkov), *submitted* (2017)
12. The singular set of minimal surfaces near polyhedral cones (with M. Colombo and N. Edelen), *submitted* (2017)
13. Uniqueness of the blow-up at isolated singularities for the Alt-Caffarelli functional (M. Engelstein and B. Velichkov), *submitted* (2018)
14. On the asymptotic behavior of the solutions to parabolic variational inequalities (with M. Colombo and B. Velichkov), *submitted* (2018)
15. Free boundary regularity for a multiphase shape optimization problem (with B. Trey and B. Velichkov), *submitted* (2018)

### In preparation

16. Geometric quantitative inequalities and the Łojasiewicz inequality (with O. Chodosh and B. Velichkov), *in preparation*
17. Regularity at fractional point of the thin-obstacle problem (with B. Velichkov), *in preparation*

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## Teaching Experience

- Spring 2019 Instructor for 18.100A at MIT
- Spring 2018 Teaching Assistant at the Summer school in Harmonic Analysis in Park Clty
- Fall 2017 Instructor for MAT103 at Princeton Univesity
- 2016 - 2017 Teaching Assistant/Instructor for 18.01 and 18.03 at MIT
- Fall 2015 Organiser of the graduate seminar Singularities of minimal hypersurfaces at MPI, Leipzig
- Fall 2014 Organiser of the undergraduate Ananlysis Seminar for the degree course of Mathematics at the University of Zurich (held in German)
- 2012 - 2015 Teaching Assistant for the courses Topology and Geometry, Analysis III and Stochastic for the degree course of Mathematics at the University of Zurich
- 2011 - 2012 Tutor for the course Analysis I for the degree course of Mathematics at the University of Trento

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## Seminars and Visits

### Selected list of talks

- Nov 2018 Geometric Analysis Colloquium, *University of Toronto*, Toronto
- Sep 2018 Conference: *Meeting on Applied Mathematics and Calculus of Variations*, Sapienza, Rome
- Jun 2018 Differential Geometry Seminar, *UCSB*, Santa Barbara
- May 2018 Geometric Analysis Seminar, *University of Beijing*, Beijing
- Apr 2018 Analysis Seminar, *Upenn*, Philadelphia
- Apr 2018 Analysis Seminar, *Courant Institute*, New York
- Mar 2018 Videoseminar UZH-Berkley-Bonn-Paris, *University of Zurich*, Zurich
- Jun 2017 Conference: *Curves and Networks in Geometric Analysis*, University of Pisa, Pisa
- Apr 2017 Differential Geometry seminar, *Harvard University*, Cambridge
- Feb 2017 Differential Geometry seminar, *University of Chicago*, Chicago
- Jan 2017 Analysis seminar, *University of Pisa*, Pisa
- Dec 2016 Geometric Analysis seminar, *MIT*, Cambridge
- Mar 2016 Conference: *Oxbridge*, Cambridge
- Mar 2016 Geometric Analysis seminar, *Imperial College*, London
- Jan 2016 Analysis seminar, *ETH*, Zurich
- 01.21.2016 Conference: *XXVI Convegno Nazionale di Calcolo delle Variazioni*, Levico Terme, Trento
- Oct 2014 Arbeitsgemeinschaft Angewntde Analysis, *Max-Planck-Institut*, Leipzig
- Jan 2014 Conference: *XXIV Convegno Nazionale di Calcolo delle Variazioni*, Levico Terme, Trento

Aug 2013 Conference: *ERC Workshop on Geometric Measure Theory, Analysis in Metric Spaces and Real Analysis*, Pisa

### Short Visits

- 2016 - 2018 University of Zurich (several visits), invited by C. De Lellis and M. Colombo  
2016 - 2018 SISSA (several visits), invited by G. De Philippis  
2016 - 2018 Université Grenoble Alpes (several visits), invited by B. Velichkov  
Feb 2017 Northwestern University (two weeks), invited by A. Naber  
May 2016 University of Cambridge (two weeks), invited by N. Wickramasekera and C. Bellettini  
2013 - 2015 Max Planck Institute for Mathematics in the Sciences (several visits), invited by E. Spadaro

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### References

Prof. **Camillo De Lellis**  
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Prof. **Guido De Philippis**  
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Prof. **Tobias Colding**  
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Prof. **William Minicozzi** (teaching)  
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