

Costante Bellettini

General information	<ul style="list-style-type: none"> • work address: University College London, 25 Gordon Street WC1H 0AY - U.K. • e-mail address: c.bellettini AT ucl DOT ac DOT uk
Employment	<ul style="list-style-type: none"> • October 2021 - present: <i>Professor of Mathematics</i> at the Department of Mathematics of UCL (University College London). • October 2019 - September 2021: <i>Associate Professor</i> at the Department of Mathematics of UCL (University College London). • September 2016 - September 2019: <i>Lecturer in Pure Mathematics</i> at the Department of Mathematics of UCL (University College London). • September 2014 - August 2016: <i>Research Fellow</i> at the DPMMS (Department of Pure Mathematics and Mathematical Statistics) of the University of Cambridge. • September 2011 - June 2014: <i>Veblen Research Instructor</i> at the Department of Mathematics of Princeton University and at the Institute for Advanced Study.
Education	<ul style="list-style-type: none"> • October 2006 - May 2011: PhD student in Mathematics at ETH (Swiss Federal Institute of Technology) in Zürich. Advisor: Prof. Tristan Rivière. PhD defense: 27/05/2011. PhD award: 16/03/2012. • July 2007: Masters diploma in mathematics at Scuola Normale Superiore of Pisa (Italy), grade: 70/70 cum laude. Advisor: Prof. Luigi Ambrosio. • July 2006: Masters degrees in mathematics, University of Pisa, grade: 110/110 cum laude. • October 2004: 1st level diploma in mathematics at Scuola Normale Superiore of Pisa. • July 2004: Bachelor degrees in mathematics, University of Pisa, grade: 110/110 cum laude.
Awards	<ul style="list-style-type: none"> • 2018-2023 <i>EPSRC New Investigator Award</i> (Principal investigator, EP/S005641/1): £ 287,098 for the project <i>Stable hypersurfaces with prescribed mean curvature</i>. • Aug-Dec 2024 <i>Research Professor at SLMath/MSRI</i>, special program ‘Special Structures and Analysis’. • Jan-July 2019 <i>Member of the Institute for Advanced Study (Princeton)</i>, special program ‘Variational methods in geometry’, supported by the National Science Foundation Grant No. DMS-1638352. • 2014-2015 <i>NSF grant</i>, nominated for award, proposal withdrawn due to relocation to Cambridge, UK. • 2012 <i>ETH Medal</i> and <i>prize-money</i> for distinguished PhD Thesis. • 2010-2011 Swiss Polytechnic Federal Institute Graduate Research Fellowship (ETH-0109-3) for the project <i>The singular set of calibrated currents</i>. • 2010 Swiss National Science Foundation Graduate Research Fellowship (200021-126489) for the project <i>The analysis of singular or blow up sets for solutions to PDE’s arising in physics and geometry</i>.
Research interests	<p>Geometric Analysis, Geometric Measure theory, Calculus of Variations, Calibrated geometries, Elliptic and parabolic PDEs, SubRiemannian Geometry.</p>

**Publications
& Preprints**

- with T. Rivière: *The regularity of Special Legendrian integral cycles*
Ann. Sc. Norm. Sup. Pisa Cl. Sci. (5) 11 (2012), n.1, 61-142.
- *Almost complex structures and calibrated integral cycles in contact 5-manifolds*
Adv. Calc. Var. 6 (2013), n.3, 339-374.
- *Tangent cones to positive-(1,1) De Rham currents*
J. Reine Angew. Math. 709 (2015) 15-50 DOI 10.1515.
- *Uniqueness of tangent cones to positive-(p,p) integral cycles*
Duke Math. J. 163, N. 4 (2014), 705-732.
- with E. Le Donne: *Regularity of sets with constant horizontal normal in the Engel group*
Comm. Anal. Geom. 21 (2013), n.3, 469-507.
- *Rate of decay for the mass ratio of pseudo holomorphic integral 2-cycles*
Calc. Var. Partial Differential Equations (2015) 54: 3141-3160.
- *Semi-calibrated 2-currents are pseudo holomorphic, with applications*
Bull. Lond. Math. Soc. (2014) 46 (4): 881-888.
- with G. Tian *Compactness results for triholomorphic maps*
J. Eur. Math. Soc. (2019) 21, 1271-1317.
- with N. Wickramasekera *Stable CMC integral varifolds of codimension 1: regularity and compactness*, preprint 2018.
- with O. Chodosh and N. Wickramasekera *Curvature estimates and sheeting theorems for weakly stable CMC hypersurfaces*
Adv. Math. 352 (2019) 133-157.
- with N. Wickramasekera *Stable prescribed-mean-curvature integral varifolds of codimension 1: regularity and compactness*, preprint 2019.
- with E. Le Donne: *Sets with constant normal in Carnot groups: properties and examples*
Comment. Math. Helv. 96 (2021), pp. 149-198.
- *Multiplicity-1 minmax minimal hypersurfaces in manifolds with positive Ricci curvature*
Comm. Pure Appl. Math. 77 (2024) no. 3, 2081–2137.
- with N. Wickramasekera *The inhomogeneous Allen–Cahn equation and the existence of prescribed-mean-curvature hypersurfaces*, preprint 2020.
- *Generic existence of multiplicity-1 minmax minimal hypersurfaces via Allen–Cahn*
Calc. Var. Partial Differential Equations 61, 149 (2022), 25pp.
- *Embeddedness of liquid-vapour interfaces in stable equilibrium*
Interfaces Free Bound. 25 (2023) no. 4, 525–566.
- *Hypersurfaces with mean curvature prescribed by an ambient function: compactness results*
J. Funct. Anal. 285, 10 (2023), 110125 30pp.
- with M. Workman *Embeddedness of min-max CMC hypersurfaces in manifolds with positive Ricci curvature*
NoDEA Nonlinear Differential Equations Appl. 31, 27 (2024) 57pp.
- with K. Marshall-Stevens *On isolated singularities and generic regularity of min-max CMC hypersurfaces*, preprint 2023.
- *Extensions of Schoen–Simon–Yau and Schoen–Simon theorems via iteration à la De Giorgi*,
Inventiones Math. (to appear) 34pp.
- with K. Leskas *Smooth approximations for constant-mean-curvature hypersurfaces with isolated singularities*, preprint 2024, 32pp.

**Reports,
announcements,
proceedings.**

- C. R. Math. Acad. Sci. Paris 349 (2011), n.19-20, 1025-1029.
- contribution in MFO Report No. 33/2014 (Calculus of Variations 2014).
- contribution in MFO Report No. 34/2016 (Calculus of Variations 2016).
- contribution in MFO Report No. 22/2020 (Calculus of Variations 2020).
- contribution in MFO Report No. 35/2021 (Partial Differential Equations 2021).
- contribution in MFO Report No. 35/2023 (Partial Differential Equations 2023).

**Invited
speaker-
seminars**

March 31 2009, *ETH Zürich*,
Feb. 22 2011 and Feb. 25 2011 *Imperial College, London*,
June 01 2011 *University of Cambridge*,
Oct. 07 2011: *Princeton University*,
Nov. 10 2011 *Columbia University*,
Nov. 17 2011 *Institute for Advanced Study*,
June 28 2012 *MIS Leipzig*,
Sept. 25 2012 *ETH Zürich*,
Nov. 12 2012 *Johns Hopkins University*,
March 7 2013 *CUNY*,
March 25 2013 *University of Toronto*,
Apr. 9 2013 *Institute for Advanced Study*,
Apr. 17 2013 *Rice University*,
Nov. 26 2013 *Courant Institute (NYU)*,
Feb. 20 2014 *University of California, Santa Cruz*,
Oct. 17 2014 *Princeton University*,
Nov. 6 2014 *University of Warwick*,
Nov. 20 2014 *Imperial College, London*,
Dec. 4 2014 *AEI Potsdam*,
Dec. 9 2014 *UCL/King's College*,
Dec. 12 2014 *Cambridge-Imperial-Warwick postdoc meeting*,
Sept. 17 2015 *Courant Institute (NYU)*,
Sept. 21 2015 *Northwestern University*,
Sept. 25 2015 *Princeton University*,
Oct. 12 2015 *University of Cambridge*,
Feb. 24 2016 *University of Leeds*,
Apr. 12 2016 *ETH Zürich*,
Apr. 4 2017 *Princeton University*,
Oct. 19 2017 *University of Bath*,
Nov. 24 2017 *Scuola Normale Superiore, Pisa*,
Jan. 24 2018 *UCL/KCL*,
Mar. 28 2018 *Courant Institute (NYU)*,
Apr. 10 2018 *University of Chicago*,
Oct. 31 2018 *University of Leeds*,
Apr. 2 2019 *Institute for Advanced Study*,
Apr. 16 2019 *Rutgers University*,
Sept. 16 2019 *University of Connecticut*,
June 17 2020 *Princeton University*,
Nov. 4 2020 *Stanford and UCSD geometric analysis colloquium*,
Feb. 16 2021 *University of Chicago*,
May 25 2021 *Brussels-Oxford-Warwick-London geometry seminar*,
May 27 2021 *Roma Tor Vergata*,
June 1 2021 *Hebrew University Jerusalem*.
Nov. 2 2021 *Rutgers University*,
Nov. 18 2021 *University of Bath*

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May 2 2022 *University of Oxford*,
May 5 2022 *University of Warwick*,
July 20 2022 *International Geometric Measure Theory Seminar NCTS*,
May 9 2023 *ETH Zürich*,
Feb 1 2024 *University of Warwick*,
Apr 17 2024 *Princeton University*,
Apr 26 2024 *Courant Institute (NYU)*,
May 6 2024 *Lehigh University*,
October 4 2024 *California Institute of Technology*,
October 9 2024 *Stanford University*,
November 14 2024 *University of California, San Diego*.

**Invited
speaker-
conferences,
schools, work-
shops**

- Jan. 13 2011 ERC School on Analysis in Metric Spaces and Geometric Measure Theory, *Centro De Giorgi/Scuola Normale Superiore, Pisa.*
- Apr. 25 2012: Workshop on Mean Curvature Flow, Low-dimensional Topology and Related Topics, *MIT.*
- July 04 2012: Conference “Geometric Measure Theory”, *AEI Potsdam.*
- Apr. 27 2013: Workshop on minimal surfaces, 3-dimensional manifolds and related topics, *MIT.*
- July 29 - Aug 2 2013: Workshop on Geometric Measure Theory and Optimal Transport, *ICTP Trieste.*
- Sept. 23-27 2013: Summer School “Metric and variational structures in singular varieties”, *Chambery.*
- Oct. 7-11 2013: ERC Workshop on Analysis in Metric Spaces, *Centro De Giorgi/SNS.*
- Dec. 16-20 2013: BIRS Workshop on Geometric variational problems, *Banff, Canada.*
- March 17-18 2014: Workshop on Geometric PDEs, *Mathematical Institute, Oxford.*
- July 13-19 2014: Workshop on Calculus of Variations, *Oberwolfach.*
- June 1-5 2015: Conference “Recent trends in Geometric Analysis”, *Carry-Le-Rouet.*
- June 15-17 2015 Workshop “Geometric Analysis, Free Boundary Problems and Measure Theory” *MPI Leipzig.*
- March 15-16 2016 Oxbridge PDE conference, *Cambridge.*
- July 11-15 2016: Workshop on Calculus of Variations, *Oberwolfach.*
- October 26-29 11-15 2016: Workshop on GMT, Shape Optimisation, Free Boundaries *SISSA Trieste.*
- December 12-16 2016: Geometric PDE Workshop, *Warwick.*
- January 4-7 2017: Singularities, Symmetries and Submanifolds (Japan-UK conference) *University College London.*
- June 6-9 2017: Advances in Geometric Analysis *ETH Zürich.*
- September 4-8 2017: Fourth Taiwan International Conference on Geometry, *National Taiwan University, Taipei.*
- June 4-8 2018: Recent advances in Geometric Analysis *Centro De Giorgi/SNS Pisa.*
- December 17-19 2018: Workshop in Geometric Analysis *Institut Henri Poincaré, Paris.*
- March 22-24 2019: Special Session on Analysis of Nonlinear Geometric Equations, University of Hawai'i at Mānoa, *AMS Spring Central and Western Joint Sectional Meeting.*
- March 22-24 2019: Special Session on New Trends in Geometric Measure Theory, University of Hawai'i at Mānoa, *AMS Spring Central and Western Joint Sectional Meeting.*
- June 3-7 2019: Special Holonomy and Calibrated Geometry, Imperial College (2 lectures), *Simons Collaboration on Special Holonomy in Geometry, Analysis and Physics.*
- August 3-7 2020: Workshop on Calculus of Variations, *Oberwolfach.*
- July 26-30 2021: Workshop on Partial Differential Equations, *Oberwolfach.*
- March 14-18 2022: SIAM 2022 Conference on Analysis of Partial Differential Equations (MS97), *virtual.*
- April 11-13 2022: Oxbridge PDE conference, *Oxford.*
- June 13-17 2022 (postponed from June 2020): Summerschool/workshop “Geometric analysis and calibrated geometries” *ETH Zürich.*
- December 13-16 2022: Workshop on Geometric PDEs, *University of Warwick.*

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June 19-23 2023: Workshop on Regularity Theory for Free Boundary and Geometric Variational Problems III *Levico Terme*.

July 24-28 2023: Workshop on Partial Differential Equations, *Oberwolfach*.

September 4-8 2023: Recent advances in the theory of submanifolds, *INDAM, Rome*.

March 18-22 2024: Oxbridge PDE conference, *Oxford*.

June 24-28 2024: Workshop on Regularity Theory for Free Boundary and Geometric Variational Problems IV *Levico Terme*.

September 4-7 2024: Introductory Workshop: Special Geometric Structures and Analysis, *Simons Laufer Mathematical Sciences Institute (MSRI)*.

November 18-22 2024: Geometry and analysis of special structures on manifolds, *Simons Laufer Mathematical Sciences Institute (MSRI)*.

December 18 2024: Geometric Analysis and PDE Workshop, *Università Bocconi, Milano*.

Teaching
experience

Undergraduate classes (at ETH)

- Fall 2007/2008: **Analysis 1** (One-variable Calculus) for Engineers, exercise classes.
- Spring 2007/2008: **Functional Analysis**, exercise classes.
- Fall 2008/2009: **Partial Differential Equations** (for Chemistry), coordination of the exercise classes.
- Spring 2008/2009: **Measure Theory and Integration**, coordination of the exercise classes.
- Fall 2010/2011: **Analysis 1** (One-variable Calculus) for Information Scientists, coordination of the exercise classes.
- Spring 2010/2011: **Analysis 2** (Multi-variable Calculus) for Information Scientists, coordination of the exercise classes.

Graduate classes (at ETH)

- Spring 2009/2010: **Regularity questions in calibrated geometry**.

Undergraduate classes (at Princeton)

- Fall 2011/2012: **Linear Algebra and Multivariable Calculus for Economists**, instructor.
- Spring 2011/2012: **Linear Algebra with Applications**, instructor.
- Fall 2013/2014: **Multivariable Calculus**, instructor.
- Spring 2013/2014: **Linear Algebra with Applications**, instructor.

Master level classes (Part III courses) (at Cambridge)

- Spring 2014/2015: **Elliptic Partial Differential Equations**.
- Spring 2015/2016: **Elliptic Partial Differential Equations**.

Undergraduate classes (at UCL)

- Fall 2016/2017: **Measure Theory**.
- Spring 2016/2017: **Analysis 2** (problem class).
- Fall 2017/2018: **Measure Theory**.
- Spring 2017/2018: **Analysis 2** (problem class).
- Fall 2018/2019: **Measure Theory**.
- Fall 2018/2019: **Analysis 1** (problem class).
- Fall 2019/2020: **Measure Theory**.
- Fall 2019/2020: **Analysis 1** (problem class).
- Fall 2020/2021: **Measure Theory**.
- Fall 2021/2022: **Measure Theory**.
- Spring 2021/2022: **Elliptic Partial Differential Equations**.
- Spring 2022/2023: **Elliptic Partial Differential Equations**.
- Spring 2023/2024: **Elliptic Partial Differential Equations**.
- Spring 2024/2025: **Differential Geometry**.

**Supervision/
Mentoring**

- Kobe Marshall-Stevens (PhD student), UCL, 2020-2024.
- Konstantinos Leskas (PhD student), UCL, 2018 - 2023.
- Myles Workman (PhD student), UCL (LSGNT) 2021-2024.
- Yuze Jiang (PhD student), UCL, 2024-.
- Natasha Diederer (LSGNT 1st year project), 2024/25.
- Myles Workman (LSGNT 1st year project), 2020/21.
- Nicolas Manrique (LSGNT 1st year project), UCL, 2021/22.
- Inés Garcia Redondo (LSGNT 1st year project), UCL, 2021/22.
- Mahdi Haghshenas (LSGNT 1st year project), UCL, 2022/23.
- Fritz Hiesmayr (postdoctoral research associate, EP/S005641/1), UCL 2019-2021.
- James Tissot (LMS undergraduate research bursary), UCL 2021.
- Timothy Johnston (EPSRC undergraduate research bursary), UCL 2019.
- Timothy Johnston (4th year project - Master level thesis), UCL 2019/20.
- Mikolaj Gorlikowski (4th year project - Master level thesis), UCL 2023/24.
- Sebastian Lunz (Part III essay - Master level thesis), Cambridge, 2016.

**Organization
and Service**

- Editorial board, Journal of the European Mathematical Society (JEMS), 2023- present.
- Editorial board, *Mathematika*, 2024- present.
- *Workshop on Geometric Measure Theory and Applications*, UCL, July 25-27 2022 (co-organisation).
- *Lectures on Regularity of area minimizing hypersurfaces, generically*, UCL, July 10-11 2023 (organisation).
- *Graduate Summer School: Special Geometric Structures and Analysis*, St. Mary's College (MSRI/SLMath), June 17-28 2024 (co-organisation).
- Management committee member for the LSGNT (London Doctoral centre, 2018-2023).
- Co-organization of the *UCL geometry seminar* (2022-present).
- Co-organization of the *B.O.W.L. geometry seminar* (2020-2022).
- Co-organization of the *KCL/UCL geometry seminar* (2019/20).
- Co-organization of the *London Geometric Analysis Reading Seminar* (2018-present).
- Member of the Department Research Committee (2023-present, at UCL).
- Member of the Department Teaching Committee (2019-present, at UCL).
- Geometry and Topology area leader for second year group projects (2019/2020).
- Leader of the working group for Geometry in the teaching committee (2019, at UCL).
- Internal (4, UCL) and external (5: Cambridge (2), King's College London, Jyväskylä, ETH Zürich) examiner for PhD vivas.
- Organization of the *Differential Geometry & Geometric Analysis Seminar* (2012-2014, at Princeton).
- Referee for top international journals.

Languages

- Italian (primary)
- English (fluent)
- French (good)
- German (good)