Tristan Ozuch(-Meersseman)

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Employment

- | **C.L.E. Moore Instructor**
2020 | Massachusetts Institute of Technology, Cambridge, MA

Education

2020 | **PhD Student at ENS**, Mathematics, Paris, France
2017 | Advisor : Olivier Biquard
Subject : *Completion of the moduli space of Einstein* 4*-manifolds.*

2017 | **Student at École Normale Supérieure (ENS)**, Paris, France
2013 | 2016-2017 Pre-PhD Internships supervised by Olivier Biquard and Aaron Naber
2015-2016 Master's degree (Analysis, Arithmetics, Geometry, Paris 11), with honors
2014-2015 Master's degree (ENS, UPMC), with honors
2013-2014 Bachelor's degree (ENS, UPMC), with honors

Teaching

2023 | **C.L.E. Moore Instructor**, MIT, Cambridge, MA, USA
2020 | Spring 2023 | Course-head: Differential Equations with theory (18.032).
Fall 2022 | Course-head: Seminar in Analysis (18.104).
Spring 2022 | Course-head: Differential Equations with theory (18.032).Supervision of 3 undergraduate research internships.
Fall 2021 | Course-head: Seminar in Analysis (18.104). Supervision of 2 undergraduate research internships.
Summer 2021 | Supervision of 2 undergraduate research internships.
Spring 2021 | Course-head: Differential Equations with theory (18.032).
Fall 2020 | TA Multivariable Calculus (18.02).

2020 | **Teaching assistant**, ENS, Paris, France
2017 | 2020 | In charge of the class **Mathematics for Humanities**.
2019 | Coorganizer and jury of the **undergraduate theses** at ENS.

2019 | In charge of the class **Mathematics for Humanities**.
2018 | Coorganizer and jury of the **undergraduate theses** at ENS.
Supervision of three undergraduate theses on **level set methods** for curve shortening flow and mean curvature flow.

2018 | In charge of the class **Mathematics for Humanities**.
2017 | Coorganizer and jury of the **undergraduate theses** at ENS.

Publications and preprints

2022 (with Julius Baldauf) *The spinorial energy for asymptotically Euclidean Ricci flow*, 2022 preprint arXiv, arXiv:2206.09198 [math.DG], 2022, submitted

2022 (with Carlos Alvarado and Daniel Santiago) *Families of degenerating Poincaré-Einstein metrics on* $\mathbf{R}^4$, 2022 preprint arXiv, arXiv:2206.07993 [math.DG], 2022, submitted

2022 (with Julius Baldauf) *Spinors and mass on weighted manifolds*, 2022 to appear in **Commun. Math. Phys.**

2021 *Integrability of Einstein deformations and desingularizations*, 2021, to appear in **Comm. Pure Appl. Math.**

2021 (with Alix Deruelle) *Dynamical (in)stability of Ricci-flat ALE metrics along Ricci flow* , 2021, to appear in **Calc. Var.**

2021 (with Luca Venturi, Samy Jelassi and Joan Bruna) *Depth separation beyond radial functions*, 2021, **J. Mach. Learn. Res.**

2020 *Higher order obstructions to the desingularization of Einstein metrics*, 2021, **Camb. J. Math.**

2020 *Completion of the Moduli Space of Einstein* 4*-manifolds.*, PhD thesis, 2020, **École Normale Supérieure**.

2020 (with Alix Deruelle) *A Lojasiewicz inequality for Ricci-flat ALE spaces*, preprint arxiv, math.DG, 2007.09937, 2020, submitted.

2019 *Noncollapsed degeneration of Einstein* 4*-manifolds II*, preprint arXiv, 2019, to appear in **Geom. Topol.**

2019 *Noncollapsed degeneration of Einstein* 4*-manifolds I*, 2019, to appear in **Geom. Topol.**

2019 *Perelman's functionals on cones and Construction of type III Ricci flows coming out of cones*, **J. Geom. Anal.** 2019, https://doi.org/10.1007/s12220-018-00131-w.

2019 (with Dmitri Burago and Jinpeng Lu) *How large isotopy is needed to connect homotopic diffeomorphisms* (of $\mathbf{T}^2$), **J. Topol. Anal.** 2019, https://doi.org/10.1142/S1793525320500028.

List of students mentored

5.1 Graduate students

MIT: Julius Baldauf

5.2 Undergraduate students

MIT: Carlos Alvarado, Daniel Santiago, Zachary Hunsucker.

Research visits

August 2021 – July 2021 **Young Research Fellow at University of Münster**
Invited by : Hans-Joachim Hein
Studied the literature on toric Einstein metrics.

December 2019 – September 2019 **Visit at Courant institute**
Advisor : Bruce Kleiner
Desingularization of Einstein manifolds and Ricci flows.

July 2017 – February 2017 **Pre-PhD internship at Northwestern University**
Advisor : Aaron Naber
Study of the degeneration of Einstein 4-manifolds.

February 2017 – September 2016 **Pre-PhD internship at ENS**
Advisor : Olivier Biquard
Study of the desingularization of Einstein orbifolds and obstructions

July 2016 – February 2016 **Internship at UC Berkeley/MSRI**
Advisor : Richard Bamler
Study of Ricci flows and Perelman's functionals on cones – Conditions on the possible conical singularities of a Ricci flow and construction of asymptotically conical expanding solitons. Presentation of several theorems of the proof of the "Codimension 4 conjecture" at the Graduate student seminar. Proofreading of Richard Bamler's notes on "Structure theory of singular spaces".

July 2015 – February 2015 **Internship at Penn. State University**
Advisor : Dmitri Burago
Study of some Geometric flows, Finslerian geometry and other topics in differential geometry. Some isotopy existence results proven (explicit constructions) by geometric flows.

June 2014 – February 2014 **Undergraduate thesis**
Advisor : Irène Waldspurger
Semester long study of of "Riemannian geometries on the space of plane curves" Peter W. Michor, David Mumford. And redaction of a memoir explaining this article to an undergraduate level written in collaboration with Siarhei Finski.

Seminars and conferences

As an invited speaker :

June 2022 **Canadian Mathematical Society Meeting**, Canadian mathematical society.

May 2022 **CMSA workshop on scalar curvature, minimal surfaces, and initial data sets**, Harvard University.

April 2022 **Metric measure spaces and convergence**.

April 2022 **Geometry & Topology seminar**, University of Science and Technology of China.

April 2022 **KIT Geometric Analysis Seminar**, KIT.

February 2022 **Cornell Analysis and Geometric analysis seminar**, Cornell University.

February 2022 **BOWL Seminar**, Brussels, Oxford, Warwick, London.

October 2021 **Geometric analysis seminar**, UCL.

October 2021 **Séminaire d'analyse**, Université de Toulouse.

October 2021 **Geometry Topology Dynamical Systems Seminar**, UT Dallas.

October 2021 **Geometric analysis seminar**, MIT.

September 2021 **Geometric analysis seminar**, Yale University.

August 2021 **Workshop on Curvature and Global Shape**, University of Münster.

July 2021 **International Conference on Geometric Analysis and PDEs**, Princeton University - Shanghai Jiaotong.

July 2021 **Curvature constraints and spaces of metrics**, Institut Fourier Summer School.

May 2021 **Numerical and Geometric Methods for Ricci-flat Metrics and Flows**, Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics.

March 2021 **Geometric Analysis Seminar**, University of Chicago.

March 2021 **Differential Geometry and Geometric Analysis Seminar**, Princeton University.

November 2020 **UCSD Seminar on Cheeger–Colding theory, Ricci flow, Einstein metrics, and Related Topics** , USCD.

November 2020 **Stanford's Geometry seminar**, Stanford University.

November 2020 **BOWL Seminar**, Brussels, Oxford, Warwick, London.

June 2020 **Oberseminar of Differential Geometry**, Münster.

February 2020 **Séminaire Darboux**, Montpellier.

December 2019 **Differential Geometry Seminar**, UC Berkeley.

November 2019 **Geometric Analysis and Topology Seminar**, Courant institute, NYU.

October 2019 **Geometry/Topology Seminar**, Stony Brook University.

May 2019 **Convergence and Low Regularity in General Relativity**, Simons Center, Stony Brook.

March 2019 **Geometry seminar**, Bruxelles.

February 2019 **Geometry seminar**, Nantes.

March 2018 **Masters-PhD meeting**, Jussieu.

February 2018 **Geometry seminar of IMJ**, Paris Diderot.

January 2018 **Graduate students seminar**, ENS.

April 2016 **Graduate student seminar on the proof of Cheeger-Naber of the codimension 4 conjecture**, MSRI, Berkeley.

As a participant :

September 2022 **Special Holonomy: Progress and Open Problems 2022**
Simons Center, Stony Brook University

September 2022 **Sixth Annual Meeting: collaboration on special holonomy**
Simons Foundation, NYC

June 2022 **Simons collaboration meeting**
University of Freiburg

May 2021 **Atelier sur la Géométrie différentielle et l'analyse globale**
UQAM

October 2019 **Recent advances in nonlinear problems Symposium**
Graduate Center, CUNY

May 2019 **Master class in differential geometry : the structure of limit spaces**
Institut Henri Poincaré, Paris

December 2018 **Geometric analysis at IHP**

Institut Henri Poincaré, Paris

27 July 2018 **McGill University Geometric Analysis Workshop 2018**
23 July 2018 McGill University, Montréal

1 June, 2018 **Geometric Analysis**
28 May, 2018 ICMS, Edimburgh

16 February 2018 **Géométrie : échanges et perspectives**
Institut Henri Poincaré, Paris

9 December 2017 **Riemannian Geometry Past, Present and Future: an homage to Marcel**
6 December 2017 **Berger**, IHES, Bures-sur-Yvette

13 October 2017 **Conference - Geometric Analysis at Roscoff**,
9 October 2017 Centre Henri Lebesgue, Roscoff

21 July 2017 **Summer school in Geometric Analysis**,
10 July 2017 The Fields institute, Toronto
"Ricci flow and intrinsic flat convergence" research team.

July 2016 **Differential geometry semester at MSRI**,
February 2016 MSRI, Berkeley

Other Skills

Languages French : Native speaker
English : Fluent
Italian : Good command

Activities Competitive swimming, running, cycling, sculpting