# ROBERT HASLHOFER

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## Research Interests

**Geometric Analysis**, **Geometric Flows**, **Differential Geometry**, **Partial Differential Equations**, **Calculus of Variations**, **Stochastic Analysis**, **General Relativity**

## Academic Appointments

**Professor**, University of Toronto, 2024 – now
**Associate Professor**, University of Toronto, 2021 – 2024
**Assistant Professor**, University of Toronto, 2015 – 2021

**Courant Instructor**, New York University, 2012 – 2015

## Education

**PhD** in Mathematics, ETH Zürich, 2008 – 2012
**MSc** in Mathematics, ETH Zürich, 2006 – 2008
**BSc** in Mathematics, ETH Zürich, 2003 – 2006

## Honors and Awards

**ICM Invited Lecture**, 2026
**Frontiers of Science Award**, 2023
**Coxeter-James Prize**, 2023
**Andre Aisenstadt Prize**, 2020
**Sloan Research Fellowship**, 2018 – 2022
**Connaught Award**, 2016 – 2018
**NSERC Discovery Grants**, 2016 – 2023, 2023 – 2029
**NSF Grant**, 2014 – 2017
**ETH Medal** for outstanding doctoral thesis, 2013

## Articles and Preprints[1]

1. A compactness theorem for complete Ricci shrinkers (joint with *R. Müller*), 26 pages, **Geom. Funct. Anal.** 21(5):1091–1116, 2011.
2. A renormalized Perelman-functional and a lower bound for the ADM-mass, 6 pages, **J. Geom. Phys.** 61(11):2162–2167, 2011.
3. A mass-decreasing flow in dimension three, 12 pages, **Math. Res. Lett.** 19(4):927–938, 2012.
4. Perelman's lambda-functional and the stability of Ricci-flat metrics, 24 pages, **Calc. Var. PDE** 45(3-4):481–504, 2012.
5. Quantitative stratification and the regularity of mean curvature flow (joint with J. Cheeger and A. Naber), 20 pages, **Geom. Funct. Anal.** 23(3):828–847, 2013.

[1] In mathematics authors are always ordered alphabetically and contributions are always counted equally. Junior collaborators, who have been students or postdocs when we worked together, are listed in italic.

6. The stability inequality for Ricci-flat cones (joint with *S. Hall* and *M. Siepmann*), 23 pages, **J. Geom. Anal.** 24(1):472–494, 2014.
7. Dynamical stability and instability of Ricci-flat metrics (joint with *R. Müller*), 7 pages, **Math. Ann.** 360(1-2):547–553, 2014.
8. Quantitative stratification and the regularity of harmonic map flow (joint with J. Cheeger and A. Naber), 17 pages, **Calc. Var. PDE** 53(1-2):365–381, 2015.
9. On Brendle's estimate for the inscribed radius under mean curvature flow (joint with B. Kleiner), 4 pages, **Int. Math. Res. Not.** 2015(15):6558–6561, 2015.
10. A note on the compactness theorem for 4d Ricci shrinkers (joint with *R. Müller*), 5 pages, **Proc. Amer. Math. Soc.** 143(10):4433–4437, 2015.
11. Uniqueness of the bowl soliton, 14 pages, **Geom. Topol.** 19:2393–2406, 2015.
12. Ancient solutions of the mean curvature flow (joint with *O. Hershkovits*), 12 pages, **Comm. Anal. Geom.** 24(3):593–604, 2016.
13. Mean curvature flow of mean convex hypersurfaces (joint with B. Kleiner), 36 pages, **Comm. Pure Appl. Math.** 70(3):511–546, 2017.
14. Mean curvature flow with surgery (joint with B. Kleiner), 36 pages, **Duke Math. J.** 166(9):1591–1626, 2017.
15. Singularities of mean convex level set flow in general ambient manifolds (joint with *O. Hershkovits*), 19 pages, **Adv. Math.** 329:1137–1155, 2018.
16. Characterizations of the Ricci flow (joint with A. Naber), 34 pages, **J. Eur. Math. Soc.** 20(5):1269–1302, 2018.
17. Ricci curvature and Bochner formulas for martingales (joint with A. Naber), 35 pages, **Comm. Pure Appl. Math.** 71(6):1074–1108, 2018.
18. Low complexity solutions of the Allen-Cahn equation on three-spheres (joint with *M. Ivaki*), 5 pages, **Canad. Math. Bull.** 62(2):287–291, 2019.
19. The moduli space of two-convex embedded tori (joint with R. Buzano and *O. Hershkovits*), 15 pages, **Int. Math. Res. Not.** 2019(2):392–406, 2019.
20. Minimal 2-spheres in 3-spheres (joint with *D. Ketover*), 47 pages, **Duke Math. J.** 168(10):1929–1975, 2019.
21. Diameter and curvature control under mean curvature flow (joint with *P. Gianniotis*), 20 pages, **Amer. J. Math.** 142(6):1877–1896, 2020.
22. Brownian motion on Perelman's almost Ricci-flat manifold (joint with E. Cabezas-Rivas), 23 pages, **J. Reine Angew. Math.** 764:217–239, 2020.
23. A note on the selfsimilarity of limit flows (joint with *B. Choi* and *O. Hershkovits*), 7 pages, **Proc. Amer. Math. Soc.** 149(3):1239–1245, 2021.
24. The moduli space of two-convex embedded spheres (joint with R. Buzano and *O. Hershkovits*), 33 pages, **J. Differential Geom.** 118(2):189–221, 2021.
25. Heat flow on time-dependent manifolds (joint with *B. Choi*, *J. Gao* and *D. Sigal*), 16 pages, **J. Geom. Anal.** 32(1)#11:1–16, 2022.
26. A note on blowup limits in 3d Ricci flow (joint with *B. Choi*), 10 pages, **Math. Res. Lett.** 29(5):1377–1386, 2022.
27. Uniqueness and stability of singular Ricci flows in higher dimensions, 5 pages, **Proc. Amer. Math. Soc.** 150(12):5433–5437, 2022.
28. Hitting estimates on Einstein manifolds and applications (joint with *B. Choi*), 20 pages, **J. Reine Angew. Math.** 793:261–280, 2022.
29. Differential Harnack inequalities on path space (joint with *E. Kopfer* and A. Naber), 47 pages, **Adv. Math.** 410#108714:1–47, 2022.
30. Mean convex mean curvature flow with free boundary (joint with *N. Edelen*, *M. Ivaki* and *J. Zhu*), 51 pages, **Comm. Pure Appl. Math.** 75(4):767–817, 2022.

31. Ancient low-entropy flows, mean-convex neighborhoods, and uniqueness (joint with *K. Choi* and *O. Hershkovits*), 85 pages, **Acta Math.** 228(2):217–301, 2022.
32. Ancient asymptotically cylindrical flows and applications (joint with *K. Choi*, *O. Hershkovits* and B. White), 103 pages, **Invent. Math.** 229:139–241, 2022.
33. Moving plane method for varifolds and applications (joint with *O. Hershkovits* and B. White), 26 pages, **Amer. J. Math.** 145(4):1051–1076, 2023.
34. A nonexistence result for rotating mean curvature flows in $\mathbb{R}^4$ (joint with *W. Du*), 11 pages, **J. Reine Angew. Math.** 802:275–285, 2023.
35. Classification of noncollapsed translators in $\mathbb{R}^4$ (joint with K. Choi and O. Hershkovits), 136 pages, **Camb. J. Math.** 11(3):563–698, 2023.
36. A nonexistence result for wing-like mean curvature flows in $\mathbb{R}^4$ (joint with K. Choi and O. Hershkovits), 40 pages, **Geom. Topol.** 28(7):3095–3134, 2024.
37. Enhanced profile estimates for ovals and translators (joint with K. Choi and O. Hershkovits), 22 pages, **Adv. Math.** 453#109853:1–22, 2024.
38. On $\kappa$-solutions and canonical neighborhoods in 4d Ricci flow, 9 pages, **J. Reine Angew. Math.** 811:257–265, 2024.
39. Hearing the shape of ancient noncollapsed flows in $\mathbb{R}^4$ (joint with *W. Du*), 40 pages, **Comm. Pure Appl. Math.** 77(1):543–582, 2024.
40. Free boundary minimal disks in convex balls (joint with D. Ketover), 20 pages, **J. Reine Angew. Math.** 828:307–326, 2025.
41. Flows with surgery revisited, 26 pages, **Adv. Math.** 483#110672:1–26, 2025.
42. Ricci limit flows and weak solutions (joint with *B. Choi*), 17 pages, **J. Eur. Math. Soc.** 27(12):5155–5171, 2025.
43. Classification of bubble-sheet ovals in $\mathbb{R}^4$ (joint with *B. Choi*, P. Daskalopoulos, *W. Du* and N. Sesum), 86 pages, **Geom. Topol.** 29:931–1016, 2025.
44. A gradient estimate for the linearized translator equation (joint with K. Choi and O. Hershkovits), 22 pages, **J. Funct. Anal.** 291#111517:1–22, 2026
45. Free boundary flow with surgery, 22 pages, **Geom. Topol.** 30(1):1–22, 2026.
46. On uniqueness and nonuniqueness of ancient ovals (joint with *W. Du*), 41 pages, **Amer. J. Math.** (to appear).
47. The blowdown of ancient noncollapsed mean curvature flows (joint with *W. Du*), 26 pages, **Peking Math. J.** (to appear).
48. Revisiting ancient noncollapsed flows in $\mathbb{R}^3$ (joint with K. Choi), 7 pages, **Amer. J. Math.** (to appear).
49. Classification of ancient noncollapsed flows in $\mathbb{R}^4$ (joint with K. Choi), 54 pages, **preprint**.
50. The linearized translator equation and applications (joint with K. Choi and O. Hershkovits), 66 pages, **preprint**.
51. Free boundary flow through cylindrical singularities (joint with *Y. Bao*), 20 pages, **preprint**.
52. Quantitative avoidance for free boundary flows and applications (joint with *Y. Bao*), 11 pages, **preprint**.
53. Ancient cylindrical flows with fast or slow convergence (joint with K. Choi), 13 pages, **preprint**.

## Conference Reports

1. A mass-decreasing flow in dimension three, *Oberwolfach Rep.* 9(2):1583–1586, 2012.
2. Singularities in 4d Ricci flow, *Oberwolfach Rep.* 9(2):1668–1671, 2012.
3. Quantitative stratification and the regularity of mean curvature flow, *Oberwolfach Rep.* 9(3):2258–2260, 2012.
4. Mean curvature flow of mean convex hypersurfaces, *Oberwolfach Rep.* 10(3):1963–1965, 2013.
5. Lectures on mean curvature flow, *Summer schools at KIAS Seoul and SNS Pisa*, 2014.

6. Weak solutions for the Ricci flow, *Oberwolfach Rep.* 2015.
7. The moduli space of 2-convex embedded spheres, *Oberwolfach Rep.* 13(2):1604–1606, 2016.
8. Ricci curvature and martingales, *Oberwolfach Rep.* 13(3):1977–1979, 2016.
9. Minimal two-spheres in three-spheres, *Oberwolfach Rep.* 14(2):1939–1942, 2017.
10. Applications of mean curvature flow, *Oberwolfach Rep.* 14(3):2178–2180, 2017.
11. The bounded diameter conjecture for two-convex mean curvature flow, *Oberwolfach Rep.* 15(2):1662–1664, 2018.
12. Differential Harnack inequalities on path space, *Oberwolfach Rep.* 16(4):3360–3362, 2019.
13. Some recent applications of mean curvature flow with surgery, *book chapter in: Mean curvature flow – Proceedings of the John H. Barrett Memorial Lectures*, De Gruyter, 2020.
14. Mean curvature flow through neck-singularities (Aisenstadt prize lecture), *CRM Bulletin*, 2021.
15. Classification of noncollapsed translators in $\mathbb{R}^4$, *Oberwolfach Rep.* 19(2):1585–1588, 2022.
16. Free boundary flow with surgery and applications, *Oberwolfach Rep.* 20(3):1794–1796, 2023.
17. Ancient low-entropy flows, mean-convex neighborhoods, and uniqueness, *Proceedings of the ICBS*, 2023.
18. Lectures on mean curvature flow of surfaces, *Summer schools at UT Austin and CRM*, 2024.
19. Classification of ancient noncollapsed flows in $\mathbb{R}^4$, *Oberwolfach Rep.* 2025.
20. Lectures on curve shortening flow, *expository notes*, 2026.
21. Mean curvature flow through singularities, *Proceedings of the ICM*, Vol 4, 160–178, 2026.

## Invited Talks

167. Conference on Ricci Curvature and Optimal Transport, **Lake Como**, Sep 15 – 22, 2027
166. Workshop on Stochastics and Geometry, **BIRS Banff**, Sep 5 – 10, 2027
165. Conference on Differential Geometry, **Oberwolfach**, Jul 4 – 7, 2027
164. Conference on Applications of Geometric Flows, **Mittag-Leffler Institute**, Jun 7 – 11, 2027
163. Workshop on Geometric and Variational Problems, **IMAG Granada**, May 30 – June 4, 2027
162. Winter School on Geometric Analysis, **UC Irvine**, Feb 8 – 12, 2027
161. Conference on Differential Geometry, **Lehigh University**, Nov 6 – 8, 2026
160. Workshop on Geometric Flows, **BIRS Banff**, Aug 2 – 7, 2026
159. International Congress of Mathematicians, **Philadelphia**, July 23 – 30, 2026
158. Workshop on Geometric Analysis, **Valencia**, Apr 20 – 23, 2026
157. Colloquium, **University of Toronto**, Mar 11, 2026
156. CMS Winter Meeting (2 talks), **Toronto**, Dec 5 – 8, 2025
155. Geometry Seminar, **University of Toronto**, Sep 22, 2025
154. Conference on Differential Geometry, **Oberwolfach**, Jun 30 – Jul 4, 2025
153. Geometric Analysis Conference, **Rutgers University**, May 19 – 20, 2025
152. Colloquium, **University of Waterloo**, Sep 23, 2024
151. Workshop on Stochastics and Geometry, **BIRS Banff**, Sep 8 – 13, 2024
150. Workshop on Minimal Surfaces and Mean Curvature flow, **BICMR**, Jul 8 – 12, 2024
149. Analysis seminar, **Tokyo Institute of Technology**, Jul 3, 2024
148. Workshop on Geometric Flows, **CRM Montreal**, Jun 25 – 29, 2024
147. Summer School on Geometric Analysis (5 lectures), **CRM Montreal**, Jun 10 – 14, 2024
146. Coxeter-James Prize Lecture, **Montreal**, Dec 3, 2023
145. CMS Winter Meeting, **Montreal**, Dec 1 – 4, 2023
144. International GMT seminar, **Cambridge-Pisa-Taiwan-Tokyo**, Nov 15, 2023
143. Workshop on Analysis and Geometry, **BIRS Okanagan**, Aug 6 – Aug 11, 2023
142. Conference on Partial Differential Equations, **Oberwolfach**, Jul 23 – 29, 2023
141. Geometric analysis conference, **Rutgers University**, May 15 – 16, 2023
140. Geometric PDE workshop, **University of Warwick**, Dec 12 – 16, 2022

139. CMS Winter Meeting, **Toronto**, Dec 2 – 5, 2022
138. Geometry Seminar, **Stanford University**, Nov 2, 2022
137. Differential Geometry Seminar, **UC Berkeley**, Oct 31, 2022
136. Conference on 40 years of Ricci flow, **Simons Center**, Jul 11 – 15, 2022
135. Conference on Geometry, **Oberwolfach**, Jun 12 – 18, 2022
134. Geometric Analysis Seminar, **TU Vienna**, Jun 9, 2022
133. Colloquium, **Peking University**, Mar 1, 2022
132. Conference on Singularities in Geometric Flows, **MATRIX Institute**, Jan 10 – 14, 2022
131. Geometry Seminar, **University of Toronto**, Nov 22, 2021
130. Geometric Analysis Seminar, **UC San Diego**, Nov 3, 2021
129. Probability Seminar, **University of Toronto**, Nov 1, 2021
128. PDE and Applications Seminar, **Beijing-Berkeley-Florida-Incheon-Utah-Zurich**, Oct 14, 2021
127. Analysis & Applied Math Seminar, **University of Toronto**, Oct 8, 2021
126. Differential Geometry & Geometric Analysis Seminar **Princeton University**, Sep 8, 2021
125. Geometric Analysis Seminar, **Chemnitz-Freiburg-Pittsburgh-Salzburg**, Aug 3, 2021
124. Xiamen Centennial Conference, **Xiamen University**, Jun 14 – 18, 2021
123. CMS 75th Anniversary Meeting, **Ottawa**, Jun 7 – 11, 2021
122. Research School on PDE (5 lectures), **UT Austin**, May 17 – 21, 2021
121. B.O.W.L. Seminar, **Brussels-Oxford-Warwick-London**, May 4, 2021
120. Workshop on Stochastics and Geometry, **BIRS Banff**, Mar 7 – 12, 2021
119. Aisenstadt Prize Lecture, **CRM Montreal**, Jan 22, 2021
118. Geometric Analysis Seminar, **University of Chicago**, Oct 27, 2020
117. Geometric Analysis Seminar, **Rutgers University**, Oct 20, 2020
116. Geometry & Analysis Seminar, **Columbia University**, Jan 31, 2020
115. Geometry Seminar, **Stanford University**, Jan 15, 2020
114. CMS Winter Meeting, **Toronto**, Dec 6 – 9, 2019
113. Conference on Heat Kernels and Stochastic Processes, **Oberwolfach**, Nov 17 – 23, 2019
112. Colloquium, **University of Illinois at Chicago**, Oct 18, 2019
111. Differential Geometry & Geometric Analysis Seminar, **Princeton University**, Sep 11, 2019
110. Workshop on Curvature and Global Shape, **University of Münster**, Jul 28 – Aug 3, 2019
109. Geometry & Topology Conference, **Lehigh University**, Jun 20 – 22, 2019
108. Geometric Analysis Seminar, **MIT**, Apr. 24, 2019
107. Analysis & Applied Math Seminar, **University of Toronto**, Mar 8, 2019
106. Southern California Geometric Analysis Seminar, **UC San Diego**, Jan 26 – 27, 2019
105. Colloquium, **CMSA Harvard**, Nov 28, 2018
104. Conference on Geometric Analysis, **Rutgers University**, Nov 15 – 16, 2018
103. Minischool on Geometric Analysis (2 lectures), **Rutgers University**, Nov 14, 2018
102. Colloquium, **University of Toronto**, Sep 19, 2018
101. Conference on Differential Geometry, **University of Miami**, Jul 26 – 29, 2018
100. Conference on Geometry, **Oberwolfach**, Jun 10 – 16, 2018
99. Conference on Mean Curvature Flow, **UT Knoxville**, May 29 – Jun 1, 2018
98. Conference on Geometric Analysis, **Tsing Hua University**, May 21 – 25, 2018
97. Conference on Geometry & Analysis on Manifolds, **UC Santa Barbara**, May 4 – 6, 2018
96. Geometry & Analysis Seminar, **Columbia University**, Apr 6, 2018
95. Canadian Geometry & Topology Meeting, **Fields Institute**, Mar 14 – 16, 2018
94. CMS Winter Meeting, **University of Waterloo**, Dec 8 – 11, 2017
93. Geometric Analysis Seminar, **University of Chicago**, Oct 31, 2017
92. Analysis Seminar, **Western University**, Oct 17, 2017
91. Geometric Analysis Colloquium, **Fields Institute**, Sep 27, 2017

90. Metric Measure Spaces and Ricci Curvature (3 lectures), **MPI Bonn**, Sep 11 – 15, 2017
89. Conference on Partial Differential Equations, **Oberwolfach**, Jul 30 – Aug 5, 2017
88. Conference on Differential Geometry, **Oberwolfach**, Jul 2 – 8, 2017
87. Workshop on Advances in Geometric Analysis, **ETH Zürich**, Jun 5 – 9, 2017
86. Geometry Seminar, **Stanford University**, Feb 22, 2017
85. Differential Geometry Seminar, **UC Irvine**, Feb 21, 2017
84. CMS Winter Meeting, **Niagara Falls**, Dec 2 – 5, 2016
83. Probability Seminar, **Fields Institute**, Nov 11, 2016
82. Differential Geometry Seminar, **Harvard**, Nov 1, 2016
81. The Riemann Conference, **University of Münster**, Oct 4 – 7, 2016
80. Geometry & Topology Seminar, **UQAM Montreal**, Sep 16, 2016
79. Conference on Calculus of Variations, **Oberwolfach**, Jul 10 – 16, 2016
78. Workshop on Geometric Analysis, Metric Geometry & Topology, **Grenoble**, Jun 27 – Jul 1, 2016
77. Conference on Geometry, **Oberwolfach**, Jun 5 – 11, 2016
76. Conference on Nonlinear Evolution Problems, **Oberwolfach**, May 29 – Jun 4, 2016
75. Geometry Seminar, **MSRI Berkeley**, Apr 13, 2016
74. Geometry & Topology Seminar, **University of Toronto**, Mar 28, 2016
73. Geometry and Topology Seminar, **Waterloo**, Mar 4, 2016
72. Conference on Geometric Flows, **QM London**, Jan 5 – 8, 2016
71. Frankfurt-Mainz-Darmstadt Seminar, **Uni Frankfurt**, Dec 11, 2015
70. Differential Geometry Seminar, **MPI Bonn**, Dec 10, 2015
69. Hausdorff Colloquium, **HIM Bonn**, Dec 9, 2015
68. CMS Winter Meeting, **Montreal**, Dec 4 – 7, 2015
67. Colloquium, **McMaster University**, Nov 27, 2015
66. AMS Sectional Meeting, **Rutgers University**, Nov 14 – 15, 2015
65. Analysis & Applied Math Seminar, **University of Toronto**, Nov 13, 2015
64. AMS Sectional Meeting, **California State University**, Oct 24 – 25, 2015
63. Geometry & Topology Seminar, **University of Toronto**, Oct 5, 2015
62. Conference on Differential Geometry, **Oberwolfach**, Jun 28 – Jul 4, 2015
61. Conference on Geometric Analysis and Measure Theory, **MPI Leipzig**, Jun 15 – 17, 2015
60. Workshop on Ricci Curvature, **Northwestern University**, May 28 – 31, 2015
59. Geometry Seminar, **Stanford University**, Apr 29, 2015
58. Differential Geometry Seminar, **UC Berkeley**, Apr 27, 2015
57. Workshop on Geometric Flows, **BIRS Banff**, Apr 12 – 17, 2015
56. Geometric Analysis Seminar, **Rutgers University**, Mar 31, 2015
55. Symposium on Geometric Analysis, **CUNY and Rutgers University**, Mar 27 – 29, 2015
54. Colloquium, **University of Washington**, Jan 20, 2015
53. Colloquium, **University of Toronto**, Jan 12, 2015
52. Colloquium, **UC Irvine**, Jan 5, 2015
51. Colloquium, **HIM Bonn**, Dec 9, 2014
50. Colloquium, **SUNY Binghamton**, Dec 4, 2014
49. Colloquium, **ETH Zürich**, Dec 1, 2014
48. Geometry and Topology Seminar, **Stony Brook**, Nov 4, 2014
47. Colloquium, **UC Santa Cruz**, Oct 28, 2014
46. Geometric Analysis Colloquium, **Fields Institute Toronto**, Oct 17 – 18, 2014
45. Summer School on Geometric Evolution Problems (6 lectures), **SNS Pisa**, Jun 23 – 28, 2014
44. Conference on Geometric Analysis, **Roscoff**, Jun 16 – 20, 2014
43. Summer School on Mean Curvature Flow (6 lectures), **KIAS Seoul**, May 12 – Jun 1, 2014
42. Geometry Festival, **Stony Brook**, Apr 11 – 13, 2014

41. Analysis Seminar, **Fordham University**, Mar 26, 2014
40. Geometry & Topology Seminar, **Duke University**, Feb 25, 2014
39. Workshop on Geometric Variational Problems, **BIRS Banff**, Dec 15 – 20, 2013
38. Differential Geometry Seminar, **CUNY**, Dec 3, 2013
37. Differential Geometry & Geometric Analysis Seminar, **Princeton University**, Nov 8, 2013
36. Nonlinear Analysis Seminar, **Rutgers University**, Nov 5, 2013
35. Geometric Analysis and Topology Seminar, **Courant Institute**, Sep 27, 2013
34. Geometry & Analysis Seminar, **Columbia University**, Sep 19, 2013
33. Workshop on Curvature and Global Shape, **University of Münster**, Jul 21 – 27, 2013
32. Conference on Differential Geometry, **Oberwolfach**, Jun 30 – Jul 6, 2013
31. Workshop on Minimal Surfaces and 3-Manifold Topology, **MIT**, Apr 26 – 28, 2013
30. Colloquium, **McMaster University**, Mar 8, 2013
29. Geometry and Topology Seminar, **McMaster University**, Mar 7, 2013
28. Geometry Seminar, **Stanford University**, Feb 6, 2013
27. Analysis Seminar, **Johns Hopkins University**, Nov 26, 2012
26. Conference on Calculus of Variations, **Oberwolfach**, Jul 22 – 28, 2012
25. Geometric Analysis and Gravitation Seminar, **AEI Potsdam**, Jul 6, 2012
24. Analysis Seminar, **University of Warwick**, May 31, 2012
23. Conference on Geometry, **Oberwolfach**, May 20 – 26, 2012
22. Conference on Nonlinear Evolution Problems, **Oberwolfach**, May 13 – 19, 2012
21. Geometry and Analysis Seminar, **Imperial College**, Feb 2, 2012
20. Analysis Seminar, **University of Warwick**, Jan 31, 2012
19. Trimester Seminar, **HIM Bonn**, Nov 17, 2011
18. Geometry Seminar, **Stanford University**, Oct 26, 2011
17. Geometry & Topology Seminar, **Duke University**, Oct 20, 2011
16. Differential Geometry Seminar, **CUNY**, Oct 18, 2011
15. Analysis Seminar, **Cornell University**, Oct 17, 2011
14. Geometric Analysis and Topology Seminar, **Courant Institute**, Oct 14, 2011
13. Geometry & Analysis Seminar, **Columbia University**, Oct 13, 2011
12. Nonlinear Analysis Seminar, **Rutgers University**, Oct 11, 2011
11. Geometric Analysis Seminar, **MIT**, Oct 5, 2011
10. Trimester Seminar, **HIM Bonn**, Sep 22, 2011
9. Geometric Analysis and Gravitation Seminar, **AEI Potsdam**, Sep 13, 2011
8. Workshop on Curvature and Global Shape, **University of Münster**, Jul 25 – 30, 2011
7. Oberseminar in PDEs, **University of Konstanz**, Jun 9, 2011
6. Oberseminar in Differential Geometry, **University of Münster**, May 9, 2011
5. Workshop on Geometric Flows in Mathematics and Physics, **BIRS Banff**, Apr 17 – 22, 2011
4. Conference on Ricci Solitons, **SNS Pisa**, Apr 4 – 8, 2011
3. Geometry Seminar, **UC San Diego**, Jan 24, 2011
2. Analysis Seminar, **ETH Zürich**, May 18, 2010
1. Calculus of Variations Seminar, **SNS Pisa**, Nov 25, 2009

## Teaching Experience

at UofT:

- MAT1061 - Partial Differential Equations II (winter 16, 21, 26)
- MATC37 - Real Analysis (winter 17, 18, 19, 25, 26, 27)
- MATC63 - Differential Geometry (winter 24, 25, 26, 27)
- MATC46 - Differential Equations II (winter 24)

- MAT1300 - Differential Topology (fall 23)
- MATD46 - Partial Differential Equations (winter 20, 21, 22)
- MAT1502 - Brownian motion on manifolds (fall 18)
- MATA36 - Calculus II for Physical Sciences (winter 18)
- MAT1062 - Mean Curvature Flow (fall 17)
- MAT1000/MAT457 - Real Analysis I (fall 16)
- MATA32 - Calculus I for Management (fall 15)

at NYU: Discrete Mathematics (spring 15), Introduction to Mathematical Analysis (fall 14), Differential Geometry II (spring 14), Calculus I and II (fall 12, fall 13), Abstract Algebra (spring 13).

at ETH: Teaching Assistant for Analysis I and II (fall 04, spring 07, fall 08, fall 10), Linear Algebra I and II (spring 05, fall 05, spring 06, fall 06), Differential Geometry II (spring 11), Quantum Mechanics II (spring 08); Organizer of a Seminar in Geometric Analysis (fall 09); Instructor for Summer Courses on Analysis and Linear Algebra (summer 05, 06, 09).

## Supervision

- Xinfang Zhang (PhD), "Geometric measure theory" (joint with Y. Liokumovich), 2026 – now.
- Ali Feizmohammadi (postdoc), "Inverse problems" (joint with S. Alexakis), 2026 – now.
- Arghya Rakshit (postdoc), "PDEs and optimal transport" (joint with R. McCann), 2025 – now.
- Shahaboddin Shaabani (postdoc), "Harmonic analysis" (joint with A. Burchard), 2025 – now.
- Lorenzo Sarnataro (Brauer postdoc), "Minimal surfaces and min-max theory", 2024 – now.
- Argam Ohanyan (Schrödinger postdoc), "Metric geometry and general relativity" (joint with R. McCann), 2024 – now.
- Yueheng Bao (PhD), "Mean curvature flow with free boundary", 2023 – now.
- Steven Buchanan (visiting PhD), "Ancient solutions of the Ricci flow", 2025 – 2026 [now PhD student at ANU]
- Renato Velozo Ruiz (postdoc), "Dispersive PDEs" (joint with S. Aretakis), 2023 – 2025 [now postdoc at Imperial]
- Krzysztof Ciosmak (Fields-Ontario postdoc), "Functional analysis and optimal transport" (joint with R. McCann), 2022 – 2025 [now assistant professor at BIMSA]
- Akashdeep Dey (postdoc), "Min-max theory" (joint with Y. Liokumovich), 2022 – 2025 [now assistant professor at CMI]
- Artur Kravtsov (MSc), "Mean curvature flow of hypersurfaces", 2023 – 2024 [now PhD student at UofT]
- Mathias Braun (postdoc), "Metric measure spaces" (joint with R. McCann), 2022 – 2024 [now Bernoulli Instructor at EPFL]
- Wenkui Du (PhD), "Singularity analysis in mean curvature flow", 2018 – 2023 [now Moore Instructor at MIT]
- Christopher Kennedy (PhD), "Nonlinear evolution equations" (joint with C. Sulem), 2017 – 2023 [now postdoc at Queen's University]
- Jiayin Pan (postdoc), "Ricci curvature and fundamental group" (joint with V. Kapovitch), 2021 – 2022 [now assistant professor at UC Santa Cruz]
- Gong Chen (Fields-Ontario postdoc), "Analysis and PDEs" (joint with M. Goldstein), 2020 – 2021 [now assistant professor at Georgia Tech]
- Zhichao Wang (postdoc), "Free boundary minimal surfaces" (joint with Y. Liokumovich), 2020 – 2021 [next postdoc at UBC, now assistant professor at Fudan University]
- Xinze Li (BSc), "Minimal surfaces", 2021 [now PhD student at UofT]

- Beomjun Choi (postdoc), "Geometric Flows" (joint with R. McCann), 2019 – 2021 [next assistant professor at POSTECH, now associate professor at KAIST]
- Salim Deaibes (BSc), "Mean curvature flow and minimal surfaces", 2019 – 2021 [now Personal Trainer at GoodLife Fitness]
- Christian Ketterer (postdoc), "Ricci curvature and metric measure spaces" (joint with V. Kapovitch), 2017 – 2021 [next postdoc at KIT, now assistant professor at Maynooth University]
- Mohammad Ivaki (Marsden postdoc), "Geometric flows and convex geometry" (joint with A. Burchard), 2017 – 2020 [now associate professor at TU Vienna]
- Hussain Kadhem (BSc), "Curve shortening flow", 2020 [next MSc student at Oxford, now PhD student at UC Berkeley]
- Daniel Stern (postdoc), "Nonlinear partial differential equations" (joint with Y. Liokumovich), 2019 – 2020 [next NSF postdoc at U Chicago, now assistant professor at Cornell University]
- Xincheng Zhang (MSc), "Stochastic analysis on manifolds", 2019 [then PhD student at UofT, now postdoc at Caltech]
- Cameron Martin (BSc), "The Feynman-Kac formula on manifolds", 2019 [now PhD student at UofT]
- Jianhui Gao (BSc), "Approximation schemes for the reaction-diffusion equation", 2018 [next MSc in biostatistics, now PhD student in statistics at UofT]
- Anmol Bhullar (BSc), "Curve shortening flow", 2018 [now Operations Coordinator at Mittson Systems]
- Panagiotis Gianniotis (Fields-Ontario postdoc), "Ricci flow and Mean Curvature Flow", 2017 – 2018 [now assistant professor at Uni Athens]
- Eva Kopfer (visiting PhD), "The Harnack inequality on path space", 2017 [next postdoc at U Bonn, now Privatdozent at U Bonn]
- Ilyas Khan (visiting PhD), "Lagrangian mean curvature flow", 2017 [then postdocs at Oxford, Duke and SLMath]
- Siyuan Lu (visiting PhD), "Fully nonlinear geometric PDEs", 2017 [then postdoc at Rutgers, now associate professor at McMaster]
- Keegan Dasilva Barbosa (MSc), "Singularity models for mean curvature flow", 2017 [next Phd student at UofT, then Simons postdoc at Fields, now Data Scientist at Enable]
- Nicolau Sarquis Aiex (postdoc), "Min-max theory" (joint with A. Nabutovsky), 2016 – 2017 [next postdocs at UBC, Aukland, and NTNU]
- Or Hershkovits (PhD), "Mean Curvature flow: smoothing, regularity and isoperimetric properties" (joint with with B. Kleiner), 2013 – 2016 [next Szegö postdoc at Stanford, then tenure-track at Hebrew University, now associate professor at University of Maryland]
- Daniel Sigal (MSc), "Approximation schemes for the heat equation on time-dependent backgrounds", 2016 [next med school at Western, then residency at UofT, now medical doctor]
- Mona Sayehban (MSc), "Mean curvature flow of entire graphs", 2016 [now data analyst at Commonwealth of Massachusetts]
- postdoc collaborators from other universities: Kyeongsu Choi (MIT) [now full professor at KIAS], Nick Edelen (MIT) [now associate professor at Notre Dame], Dan Ketover (Princeton) [now associate professor at Rutgers], Jonathan Zhu (Princeton) [now assistant professor at University of Washington]
- supervisory committee: Justin Ko, Andrew Colinet, Ahmed Ellithy, Bruno Staffa, Afiny Akdemir, Alexander Kroitor, Heyang Song
- external reviewer: Tim Carson (Austin Texas), Stephen Lynch (U Tübingen)

## Service

- Editor for Calc. Var. PDE, 2024 – now
- Graduate committee member, 2016/17, 2018/19, 2019/20, 2026/27

- NSERC Mathematics and Statistics Evaluation Group member, 2023 – 2026
- Promotion committee member at UTSC, 2025/26
- Merit committee member at UTSC, 2020, 2025
- Faculty search committee member, 2017/18, 2018/19, 2020/21, 2023/24, 2024/25, 2025/26
- Organizer of the Geometric Analysis Colloquium, Fields Institute, 2015 – now
- Banting fellowship committee member at UTSC, 2019, 2024
- Organizer of a Special Session on Geometric PDEs (joint with T. Collins), CMS Winter Meeting, Montreal, Dec 1–4, 2023
- Organizer of a Workshop on Ricci Curvature (joint with N. Gigli, J. Maas, K.-T. Sturm), Fields Institute, Nov 13–19, 2022
- Planning and Promotion committee member, 2021/22
- Postdoc search committee member, 2015/16, 2016/17, 2021/22
- Organizer of the Fluids Seminar, University of Toronto, 2020 – 2022
- Organizer of a Workshop on Geometric Flows (joint with R. Bamler, J. Streets, G. Tian), BIRS, Nov 7–12, 2021
- Organizer of a Special Session on Geometric Analysis (joint with A. Naber), CMS 75th Anniversary Meeting, Ottawa (online), June 7–11, 2021
- Organizer of the Geometry and Topology Seminar, University of Toronto, 2016 – 2020
- Graduate committee member, 2016/17, 2018/19, 2019/20
- Teaching search committee member, 2018
- Organizer of a Workshop/School on Geometric Analysis (joint with R. Jain, C. Ketterer, C. Sormani), McGill University, Jul 23–27, 2018
- Colloquium committee member, 2017/18
- Organizer of a Major Thematic Program on Geometric Analysis (joint with S. Alexakis, W. Craig, S. Karigiannis, A. Naber, M. Wang), Fields Institute, Jul – Dec, 2017
- Organizer of a Workshop & Minischool on Mean curvature flow and Ricci flow (joint with J. Lott, A. Naber), Fields Institute, Nov 4–10, 2017
- Organizer of a Summer School on Geometric Analysis (joint with W. Craig), Fields Institute, Jul 10–21, 2017
- Organizer of the Analysis and Applied Math Seminar, University of Toronto, 2015 – 2016
- Panelist for the US National Science Foundation, 2015
- Organizer of the Geometric Analysis and Topology Seminar, NYU, 2012 – 2015
- Organizer of a Workshop on Geometric Flows, HIM Bonn, Nov 22 – 25, 2011
- Organizer of the Zürich Graduate Colloquium, ETH and Uni Zürich, 2010 – 2012

- Written many recommendation letters, in particular for applications for grad-school, postdoc applications, tenure-track applications, promotion to tenure, fellowships and awards.

- Reviewer of grant proposals for NSERC, ERC, DFG, ANID

- Reviewer for AMS Graduate Studies in Mathematics and for MathSciNet

- Referee for many journals (many of them on multiple occasions) including Acta Mathematica, Advances in Mathematics, Annals of Mathematics, Annals of PDE, American Journal of Mathematics, Annali SNS, ARMA, Bulletin of the AMS, Calculus of Variations and PDE, Communications in Analysis and Geometry, Communications on Pure and Applied Mathematics, Compositio Mathematica, Crelle, Duke Mathematical Journal, GAFA, Geometry & Topology,

IMRN, Inventiones Mathematicae, Journal of Differential Geometry, JAMS, JEMS, JFA, Journal of Geometric Analysis, Manuscripta Mathematica, Mathematical Research Letters, Mathematische Zeitschrift, Pacific J. Math., Proceedings of the AMS, Publ. IHES, Transactions of the AMS.