William P. Minicozzi II

Singer Professor of Mathematics
Associate Head, Department of Mathematics, MIT
minicozz@mit.edu · 617-253-3299

Appointments & Education

Massachusetts Institute of Technology 2012–
Professor of Mathematics, 2012–
Singer Professor of Mathematics, 2017–
Associate Head, 2018–

Johns Hopkins University 1994–13
Department Chair (2011-12); Krieger-Eisenhower Professor (2007–13);
J.J. Sylvester Professor of Mathematics (2002-07); Professor of Mathematics (2000–13).

Courant Institute, New York University 1994–95

Stanford University, 1994 Ph.D. in Mathematics.

Princeton University, 1990 B.A. in Mathematics. Summa cum laude, Phi Beta Kappa.

Honors

Oswald Veblen Prize in Geometry, American Mathematical Society, 2010

Fellow, American Academy of Arts and Sciences, 2015

Invited address, International Congress of Mathematicians, Madrid 2006

Alfred P. Sloan Research Fellowship, 1998

Fellow of the American Mathematical Society, 2012

MIT School of Science Teaching Award, 2018

MIT Outstanding Veteran Advising Award, 2019

Dean's award for excellence in research, Johns Hopkins University, 2011

Distinguished Lectures:
AMS Invited Address (2026, 2006);
Yamabe Lectures (2024); Barrett Lectures (2018); Ritt Lectures (2017);
Everett Pitcher Lectures (2012); Arkansas Spring Lectures (2010); Spitalfields Lecture (2007)

Institute Service

Chair, MIT Committee on the Undergraduate Program, 2023–

Chair, MIT Committee on Curricula, 2020–23

Associate Head, Department of Mathematics, 2018–

MIT Task Force for the Undergraduate Academic Program, 2024–

MIT Academic Policies and Regulations Team (APART), 2020

Ad Hoc Working Group on the SME Requirements, 2019

MIT Committee on the Undergraduate Program, 2018–19

Chair, Mathematics Education Committee, 2018–

Pure Mathematics Graduate Committee, Co-chair, 2013–17

Pure Mathematics Committee, 2013–

Professional Service

Editorial Boards:

Annals of Mathematics, Associate Editor 2016–26

Journal of the American Mathematical Society, Associate Editor 2012–21

American Journal of Mathematics, 2001–

Cambridge Journal of Mathematics, 2012–

Bulletin of the American Mathematical Society, 2017–24

Analysis & PDE, 2007–

Journal of Geometric Analysis, 2013–

Geometriae Dedicata, 2008–

Journal of Topology and Analysis, 2007–

Advanced Nonlinear Studies, 2021–

Transactions of the American Mathematical Society, 2007–15

Memoirs of the American Mathematical Society, 2007–15

AMS University Lectures book series, 2010–22 (Chair 2011–22)

Fields Institute Scientific Advisory Panel, 2014–18

AMS Oswald Veblen Prize Committee 2021–24

AMS Program Committee for National Meetings 2016–19

AMS Eastern Section Program Committee 2004–06

Selected Publications

- W.P. Minicozzi II, The Willmore functional on Lagrangian tori: Its relation to Area and Existence of Smooth Minimizers, *Jour. Amer. Math. Soc.* Vol. 8, No. 4 (1995) 761-791.
- T.H. Colding and W.P. Minicozzi II, Harmonic functions on manifolds, *Annals of Math.* 146, no. 3 (1997) 725-747.
- T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold, I–IV, *Annals of Math.*, 160 (2004) 27–68, 69–92, 523–572 and 573–615.
- T.H. Colding and W.P. Minicozzi II, Estimates for the extinction time for the Ricci flow on certain 3–manifolds and a question of Perelman, *Jour. Amer. Math. Soc.*, 18 (2005), no. 3, 561–569.
- T.H. Colding and W.P. Minicozzi II, The Calabi–Yau conjectures for embedded surfaces, *Annals of Math.*, 167 (2008), 281–313.
- T.H. Colding and W.P. Minicozzi II, Generic mean curvature flow I; generic singularities, *Annals of Math.*, 175 (2012), 755–833.
- T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold V; Fixed genus, *Annals of Math.*, 181 (2015), no. 1, 1–153.
- T.H. Colding, T. Ilmanen and W.P. Minicozzi II, Rigidity of generic singularities of mean curvature flow, *Publications IHES*, 121 (2015), 363–382.
- T.H. Colding and W.P. Minicozzi II, Uniqueness of blowups and Lojasiewicz inequalities, *Annals of Math.*, 182 (1) (2015), 221–285.
- T.H. Colding and W.P. Minicozzi II, Complexity of parabolic systems, Publ. Math. Inst. Hautes Études Sci. 132 (2020), 83–135.
- T.H. Colding and W.P. Minicozzi II, Singularities of Ricci flow and diffeomorphisms. Publ. Math. Inst. Hautes Études Sci. 142 (2025), 75–152.

Research Support

2023– : NSF Grant DMS-2304684
2020–23: NSF Grant DMS-2005345
2017–20: NSF Grant DMS-170270
2012–17: NSF Grant DMS-1206827
2009–12: NSF Grant DMS-0906233
2009–12: NSF FRG Grant DMS-0853501
2004–09: NSF Grant DMS-0405695
2001–04: NSF Grant DMS-0104187
1998–01: NSF Grant DMS-9803144
1990–98: NSF Graduate and Postdoctoral Research Fellowships

Ph.D. Students

Advisor to 24 Ph.D. students:

1. Sirong Zhang: 2004, *Curvature Estimates for Constant Mean Curvature Surfaces in 3-Manifolds.*
2. Brian Dean: 2004, *Some Results On Stable Compact Embedded Minimal Surfaces in 3-manifolds.*
3. Giuseppe Tinaglia: 2005, *Multi-valued graphs in embedded constant mean curvature disks.*
4. Christine Breiner: 2009, *Embedded Minimal Surface of Finite Topology and One End.*
5. Siddique Khan: 2009, *Embedded Minimal Disks with Curvature Blow-up on a Line Segment.*
6. Joel Kramer: 2009, *Embedded Minimal Spheres in 3-Manifolds.*
7. Steve Kleene: 2010, *Singular behavior of minimal surfaces and mean curvature flow.*
8. Longzhi Lin: 2011, *On the existence of closed geodesics and uniqueness of weakly harmonic maps*.
9. Caleb Hussey, 2012: *Classification and analysis of low index mean curvature flow self-shrinkers*.
10. Leili Shahriyari, 2013: *Translating graphs by mean curvature flow*.
11. Matthew McGonagle, 2014: *The Gaussian Isoperimetric Problem and the Self-Shrinkers of Mean Curvature Flow*.
12. John Ross, 2015: *Rigidity Results of Lambda-Hypersurfaces*.
13. Qiang Guang, 2016: *Self-shrinkers and translating solitons of mean curvature flow*.
14. Ryan Chang, 2016: *The* 1*-dimensional lambda curve and the nodal set for biharmonic Steklov problems*.
15. Jonathan Zhu, 2017: *Geometric Variational Problems for Mean Curvature*.
16. Paul Gallagher, 2019: *New Progress Towards Three Open Conjectures in Geometric Analysis*.
17. Ao Sun, 2020: *Singular Behaviour and Long Time Behaviour of Mean Curvature Flow*.
18. Feng Gui, 2023: *Liouville Properties and Dimensionality Bounds for Harmonic and Caloric Functions*
19. Julius Baldauf, 2024: *The Ricci flow on spin manifolds*.
20. Tang-Kai Lee, 2025: *Uniqueness problems in mean curvature flow*.
21. Dain Kim, current.
22. Alex McWeeney, current.
23. Mike Law, current.
24. Jacob Reznikov, current.

Books

- T.H. Colding and W.P. Minicozzi II, Minimal surfaces, Courant Lecture Notes in Mathematics, vol. 4, 1999.
- T.H. Colding and W.P. Minicozzi II, A Course in Minimal Surfaces, AMS Graduate Studies in Mathematics, volume 121, 2011, 313 pages.
- T.H. Colding and W.P. Minicozzi II, Foundations of Analysis, MIT Press, to appear.

Full Article Publication List

1. W.P. Minicozzi II, The Willmore functional on Lagrangian tori: Its relation to Area and Existence of Smooth Minimizers, *Jour. Amer. Math. Soc.* Vol. 8, No. 4 (1995) 761-791.

2. J. Cheeger, T.H. Colding, and W.P. Minicozzi II, Linear Growth Harmonic Functions on Complete Manifolds with Nonnegative Ricci Curvature, *GAFA* V. 5, No. 6 (1995) 948-954.

3. T.H. Colding and W.P. Minicozzi II, On Function Theory on Spaces with a lower Ricci curvature bound, *Math. Res. Lett.* 3 (1996) 241-246.

4. T.H. Colding and W.P. Minicozzi II, Generalized Liouville properties of manifolds, *Math. Res. Lett.* 3 (1996) 723-729.

5. T.H. Colding and W.P. Minicozzi II, Harmonic functions with polynomial growth, *J. Diff. Geom.* v. 46, no. 1 (1997) 1-77.

6. T.H. Colding and W.P. Minicozzi II, Large scale behavior of kernels of Schrödinger operators, *Amer. J. Math.* 119 (1997) 1355-1398.

7. T.H. Colding and W.P. Minicozzi II, Harmonic functions on manifolds, *Annals of Math.* 146, no. 3 (1997) 725-747.

8. W.P. Minicozzi II and C.D. Sogge, Negative results for Nikodym maximal functions and related oscillatory integrals in curved space, *Math. Res. Lett.* 4 (1997) 221-237.

9. T.H. Colding and W.P. Minicozzi II, Weyl type bounds for harmonic functions, *Inventiones Math.* 131 (1998) 257-298.

10. T.H. Colding and W.P. Minicozzi II, Liouville theorems for harmonic sections and applications *Comm. Pure Appl. Math.* 52 (1998) 113-138.

11. T.H. Colding and W.P. Minicozzi II, Convergence of embedded minimal surfaces without area bounds in three manifolds, *C.R. Acad. Sci. Paris* t. 327, Série I, (1998) 765-770.

12. T.H. Colding and W.P. Minicozzi II, Minimal surfaces, Courant Lecture Notes in Mathematics, vol. 4, 1999.

13. T.H. Colding and W.P. Minicozzi II, Examples of embedded minimal tori without area bounds, *Int. Math. Res. Not.* vol. 99, no. 20 (1999) 1097–1100.

14. T.H. Colding and W.P. Minicozzi II, Removable singularities for minimal limit laminations, *C.R. Acad. Sci. Paris* t. 331, Série I, (2000) 465-468.

15. T.H. Colding and W.P. Minicozzi II, Embedded minimal surfaces without area bounds in 3-manifolds, *Geometry and Topology: Aarhus* v. 258 Contemporary Mathematics (AMS), (2000) 107–120.

16. T.H. Colding and W.P. Minicozzi II, Complete properly embedded minimal surfaces in $\mathbf{R}^3$ *Duke Math. Jour.* vol. 107, no. 2 (2001) 421–426.

17. T.H. Colding and W.P. Minicozzi II, Minimal annuli with and without slits, *Jour. Symp. Geom.* vol. 1, issue 1 (2001) 47–62.

18. T.H. Colding and W.P. Minicozzi II, Estimates for parametric elliptic integrands *Int. Math. Res. Not.* n. 6 (2002) 291–297.

19. T.H. Colding and W.P. Minicozzi II, Multi-valued minimal graphs and properness of disks, *Int. Math. Res. Not.*, no. 21 (2002) 1111–1127.

20. T.H. Colding and W.P. Minicozzi II, On the structure of embedded minimal annuli, *Int. Math. Res. Not.*, no. 29 (2002) 1539–1552.

21. T.H. Colding and W.P. Minicozzi II, Disks that are double spiral staircases, *Notices of the AMS*, Vol. 50, no. 3, March (2003) 327–339.

22. T.H. Colding and W.P. Minicozzi II, Volumes for eigensections, *Geom. Ded.*, vol. 102 (2003) 19–24.

23. T.H. Colding and W.P. Minicozzi II, Embedded minimal disks, Minimal surfaces (MSRI, 2001), ed. D. Hoffman, Clay Mathematics Proceedings, AMS, Providence (2004), 405–438.

24. T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold I; Estimates off the axis for disks, *Annals of Math.*, 160 (2004) 27–68.

25. T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold II; Multi-valued graphs in disks, *Annals of Math.*, 160 (2004) 69–92.

26. T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold III; Planar domains, *Annals of Math.*, 160 (2004) 523–572.

27. T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold IV; Locally simply connected, *Annals of Math.*, 160 (2004) 573–615.

28. T.H. Colding and W.P. Minicozzi II, Embedded minimal disks: Proper versus nonproper - global versus local, *Transactions of the AMS*, 356 (2004) 283-289.

29. T.H. Colding and W.P. Minicozzi II, Sharp estimates for mean curvature flow of graphs, J. Reine Angew. Math. 574 (2004), 187–195.

30. T.H. Colding and W.P. Minicozzi II, An excursion into geometric analysis, *Surv. Differ. Geom.*, IX, Int. Press, Somerville, MA, (2004), 83–146, math.DG/0309021.

31. T.H. Colding and W.P. Minicozzi II, Estimates for the extinction time for the Ricci flow on certain 3–manifolds and a question of Perelman, *JAMS*, 18 (2005), no. 3, 561–569.

32. T.H. Colding and W.P. Minicozzi II, Minimal submanifolds, *Bulletin of the London Math. Soc.*, 38 (2006), no. 3, 353–395.

33. T.H. Colding and W.P. Minicozzi II, Minimal submanifolds: Encyclopedia Entry, *Encyclopedia of Math. Phys.*, math.DG/0511469.

34. T.H. Colding and W.P. Minicozzi II, Shapes of embedded minimal surfaces, *Proc. Nat. Acad. Sciences*, July 25, 2006, vol. 103, no. 30, 11106-11111.

35. W.P. Minicozzi II, Embedded minimal surfaces, *Proceedings of the International Congress of Mathematicians, Madrid 2006*, vol. 2, 853–877.

36. T.H. Colding and W.P. Minicozzi II, The Calabi–Yau conjectures for embedded surfaces, *Annals of Math.*, 167 (2008), 281–313.

37. T.H. Colding, C. De Lellis, and W.P. Minicozzi II, A three circles theorem for Schrödinger operators on manifolds with cylindrical ends and applications, *CPAM*, 61 (2008), no. 11, 1540–1602.

38. T.H. Colding and W.P. Minicozzi II, Width and mean curvature flow, *Geom. Topol.* 12 (2008), no. 5, 2517–2535.

39. T.H. Colding and W.P. Minicozzi II, Width and finite extinction time of Ricci flow, *Geom. Topol.* 12 (2008), no. 5, 2537–2586.

40. T.H. Colding and W.P. Minicozzi II, Lower bounds for nodal sets of eigenfunctions, *Comm. Math. Phys.*, 306 (2011), 777–784.

41. W.P. Minicozzi II, The Work of Schoen and Yau on Manifolds with Positive Scalar Curvature, *Geometry and Analysis*, Editor Lizhen Ji, Advanced Lectures in Mathematics, Volume 17, Higher Education Press, 185–190 (2011).

42. T.H. Colding and W.P. Minicozzi II, Minimal surfaces and mean curvature flow, *Surveys in Geometric Analysis and Relativity: Celebrating Richard Schoen's 60th birthday*, Editors H. Bray and W.P. Minicozzi II, Advanced Lectures in Mathematics, Volume 19, Higher Education Press, 2011.

43. T.H. Colding and W.P. Minicozzi II, Generic mean curvature flow I; generic singularities, *Annals of Math.*, 175 (2012), 755–833.

44. T.H. Colding and W.P. Minicozzi II, Smooth compactness of self-shrinkers, *Comm. Math. Helv.*, 87 (2012), no. 2, 463–475.

45. T.H. Colding, T. Ilmanen, W.P. Minicozzi II and B. White, The round sphere minimizes entropy among closed self-shrinkers, *J. Differential Geom.* 95 (2013), no. 1, 53–69.

46. T.H. Colding and W.P. Minicozzi II, Monotonicity - analytic and geometric implications, *Proceedings of the National Academy of Science*, November 26, 2013 vol. 110 no. 48 19233–19236.

47. T.H. Colding and W.P. Minicozzi II, On uniqueness of tangent cones for Einstein manifolds, *Inventiones Math.*, 196 (2014), 515–588.

48. T.H. Colding and W.P. Minicozzi II, Ricci curvature and monotonicity for harmonic functions, *Calc. Var. Partial Differential Equations*, 49 (2014), no. 3-4, 1045–1059.

49. T.H. Colding and W.P. Minicozzi II, The space of embedded minimal surfaces of fixed genus in a 3-manifold V; Fixed genus, *Annals of Math.*, 181 (2015), no. 1, 1–153.

50. T.H. Colding, E. K. Pedersen, and W.P. Minicozzi II, Mean curvature flow, *Bull. Amer. Math. Soc.*, 52 (2015), no. 2, 297–333.

51. T.H. Colding, T. Ilmanen and W.P. Minicozzi II, Rigidity of generic singularities of mean curvature flow, *Publications IHES*, 121 (2015), 363–382.

52. T.H. Colding and W.P. Minicozzi II, Uniqueness of blowups and Lojasiewicz inequalities, *Annals of Math.*, 182 (1) (2015), 221–285.

53. T.H. Colding and W.P. Minicozzi II, Lojasiewicz inequalities and applications, Surveys in Differential Geometry, Vol. 19 Regularity and evolution of nonlinear equations Essays dedicated to Richard Hamilton, Leon Simon, and Karen Uhlenbeck, International Press (2015), 63–82.

54. T.H. Colding and W.P. Minicozzi II, The singular set of mean curvature flow with generic singularities, *Inventiones Math.*, 204 (2016), no. 2, 443–471.

55. T.H. Colding and W.P. Minicozzi II, Differentiability of the arrival time, Comm. Pure and Appl. Math, Vol. LXIX, (2016) 2349–2363.

56. T.H. Colding and W.P. Minicozzi II, Level set method for motion by mean curvature, *Notices of the AMS*, 63 (2016), no. 10, 1148–1153.

57. W.P. Minicozzi II, Lecture notes on mean curvature flow: barriers and singular perturbations [book review of MR3155251]. *Bull. Amer. Math. Soc.* (N.S.) 54 (2017), no. 3.

58. T.H. Colding and W.P. Minicozzi II, Regularity of the level set flow, Comm. Pure and Appl. Math, Vol. 71, Issue 4 (2018) 814–824.

59. T.H. Colding and W.P. Minicozzi II, Sharp frequency bounds for eigenfunctions of the Ornstein-Uhlenbeck operator, Calculus of Variations and Partial Differential Equations, 57 (2018) no. 5, Art. 138.

60. H. L. Bray, W.P. Minicozzi II, M. Eichmair, L-H Huang, S.T. Yau, K. Uhlenbeck, R. Kusner, F. Coda Marques, C. Mese and A. Fraser, *The mathematics of Richard Schoen*, Notices Amer. Math. Soc. 65 (2018), no. 11, 1349–1376.

61. W.P. Minicozzi II, *Commentary on "Nonunique tangent maps at isolated singularities of harmonic maps" by Brian White*, Bull. Amer. Math. Soc. (N.S.) 55 (2018), no. 3, 359–362.

62. T.H. Colding and W.P. Minicozzi II, Arnold-Thom gradient conjecture for the arrival time, Comm. Pure Appl. Math. 72 (2019), no. 7, 1548–1577.

63. T.H. Colding and W.P. Minicozzi II, Liouville properties, Liouville properties. ICCM Not. 7 (2019), no. 1, 16–26.

64. T.H. Colding and W.P. Minicozzi II, In search of stable geometric structures. Notices Amer. Math. Soc. 66 (2019), no. 11, 1785–1791.

65. T.H. Colding and W.P. Minicozzi II, Analytical properties for degenerate equations. Geometric Analysis, In Honor of Gang Tian's 60th Birthday, Progress in Mathematics series by Birkhauser. Editors: Jingyi Chen, Peng Lu, Zhiqin Lu, and Zhou Zhang, to appear.

66. T.H. Colding and W.P. Minicozzi II, Dynamics of closed singularities, Ann. Inst. Fourier (Grenoble) 69 (2019), no. 7, 2973–3016.

67. W.P. Minicozzi II, F. Shahidi, Freydoon; V. Shokurov and C. Sogge, In memoriam: Jean Bourgain and Elias M. Stein. Amer. J. Math. 141 (2019), no. 4, ii.

68. T.H. Colding and W.P. Minicozzi II, Complexity of parabolic systems, Publ. Math. Inst. Hautes Études Sci. 132 (2020), 83–135.

69. T.H. Colding and W.P. Minicozzi II, Wandering singularities, J. Differential Geom. 119 (2021), no. 3, 403–420.

70. T.H. Colding and W.P. Minicozzi II, Optimal bounds for ancient caloric functions, Duke Math. J. 170 (2021), no. 18, 4171–4182.

71. T.H. Colding and W.P. Minicozzi II, Int. Math. Res. Not. IMRN 2022, no. 15, 11878–11890.

72. T.H. Colding and W.P. Minicozzi II, Singularities and diffeomorphisms. ICCM Not. 10 (2022), no. 1, 112–116.

73. T.H. Colding and W.P. Minicozzi II, Regularity of elliptic and parabolic systems, Ann. Sci. Éc. Norm. Supér. (4) 56 (2023), no. 6, 1883–1921.

74. G. Lu, X. Ma, W.P. Minicozzi II, W. Sheng, Preface for the special issue on "geometric partial differential equations and applications". Adv. Nonlinear Stud. 23 (2023), no. 1, Paper No. 20233000, 1 p. 35–06

75. T.H. Colding and W.P. Minicozzi II, Propagation of symmetries for Ricci shrinkers. Adv. Nonlinear Stud. 23 (2023), no. 1, Paper No. 20220071, 8 pp.

76. T.H. Colding and W.P. Minicozzi II, Eigenvalue lower bounds and splitting for modified Ricci flow. Adv. Nonlinear Stud. 24 (2024), no. 1, 178–188.

77. T.H. Colding and W.P. Minicozzi II, Proceedings of the National Academy of Science, Memorium: Jesse Douglas.

78. T.H. Colding and W.P. Minicozzi II, A strong Frankel theorem for shrinkers. Compos. Math. 161 (2025), no. 5, 947–958.

79. T.H. Colding and W.P. Minicozzi II, Minimal submanifolds. Encyclopedia of mathematical physics. Vol. 1. Condensed matter and statistical physics & classical and quantum gravity, 402–417, Academic Press, Amsterdam, [2025].

80. T.H. Colding and W.P. Minicozzi II, Singularities of Ricci flow and diffeomorphisms. Publ. Math. Inst. Hautes Études Sci. 142 (2025), 75–152.

81. T.H. Colding and W.P. Minicozzi II, Quantitative uniqueness for mean curvature flow. J. Math. Study 58 (2025), no. 4, 500–512.

82. T.H. Colding and W.P. Minicozzi II, Connections between geometry and PDE, Fields Institute Proceedings (2025).

83. T.H. Colding and W.P. Minicozzi II, Gradient estimates for scalar curvature, arXiv:2501.17947, submitted.

84. T.H. Colding and W.P. Minicozzi II, Deficit functions and the log Sobolev inequality, arXiv:2509.22941, submitted.