

Tobias Holck Colding: Publications

1. T.H. Colding, F. Martín, and W.P. Minicozzi II, Minimal surfaces with rapid area growth, preprint.
2. T.H. Colding and W.P. Minicozzi II, Heat equations in analysis, geometry and probability, preprint.
3. T.H. Colding and W.P. Minicozzi II, Minimal submanifolds confined in space, preprint.
4. T.H. Colding and W.P. Minicozzi II, Liouville theorem for immersed minimal surfaces in any codimension, preprint.
5. T.H. Colding and W.P. Minicozzi II, Distance between minimal surfaces and flows, preprint.
6. T.H. Colding and W.P. Minicozzi II, Deficit functions and the log Sobolev inequality, *Journal of Functional Analysis*, 291 (2026), no. 12, Paper No. 111628.
7. T.H. Colding and W.P. Minicozzi II, *Foundations of analysis*, MIT Press, to appear.
8. T.H. Colding and W.P. Minicozzi II, Connections between geometry and PDE, in *Forward from the Fields Medal. Fields Institute Communications series*, Springer.
9. T.H. Colding and W.P. Minicozzi II, Quantitative uniqueness for mean curvature flow, *Journal of Mathematical Study*, Vol. 58, No. 4, 500-512 December 2025.
10. T.H. Colding and W.P. Minicozzi II, Gradient estimates for scalar curvature, preprint.
11. T.H. Colding and W.P. Minicozzi II, Singularities of Ricci flow and diffeomorphisms, *Publ. Math. Inst. Hautes Études Sci.* 142 (2025), 75-152.
12. 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.
13. T.H. Colding and W.P. Minicozzi II, A strong Frankel theorem for shrinkers, *Compositio Mathematica*, Volume 161, Issue 5, May 2025, 947–958.
14. T.H. Colding, Weak solutions in the sense of Calabi, in "The legacy of Eugenio Calabi (1923-2023)", *Notices of the AMS*, Volume 71, Number 11, 1502-1520, December 2024.

15. T.H. Colding and W.P. Minicozzi II, Eigenvalue lower bounds and splitting for modified Ricci flow, *Advanced Nonlinear Studies*, 24 (2024), no. 1, 178–188.
16. T.H. Colding and W.P. Minicozzi II, Propagation of symmetries for Ricci shrinkers, *Advanced Nonlinear Studies*, 23 (2023), no. 1, ans-2022–0071.
17. T.H. Colding and W.P. Minicozzi II, Jesse Douglas, Biographical Memoirs of the National Academy of Sciences, https://www.nasonline.org/wp-content/uploads/2024/10/Douglas_Jesse.pdf.
18. T.H. Colding and W.P. Minicozzi II, Singularities and diffeomorphisms, *Notices of the International Consortium of Chinese Mathematicians*, Vol. 10, No. 1 (2022), 112–116.
19. T.H. Colding, Evolution of form and shape, *ICM–International Congress of Mathematicians. Vol. II. Plenary lectures*, 826–871, EMS Press, Berlin, [2023], 2023.
20. T.H. Colding and W.P. Minicozzi II, Parabolic frequency on manifolds, *Int. Math. Res. Not. IMRN* 2022, no. 15, 11878–11890.
21. T.H. Colding and W.P. Minicozzi II, In search of stable geometric structures, *Notices of the AMS*, Vol. 66, no. 11 (2019) 1785–1791.
22. T.H. Colding and W.P. Minicozzi II, Regularity of elliptic and parabolic systems, *Annales scientifiques de l’Ecole normale supérieure*, (4) 56 (2023), no. 6, 1883–1921.
23. T.H. Colding and W.P. Minicozzi II, Complexity of parabolic systems, *Publ. Math. Inst. Hautes Etudes Sci.* 132 (2020) 83–135.
24. T.H. Colding and W.P. Minicozzi II, Liouville properties, *ICCM Not.* 7 (2019), no. 1, 16–26.
25. T.H. Colding, D. Gabai, and D. Ketover, Geometric methods in Heegaard theory (with appendix by T.H. Colding and D. Gabai), *Surveys in Differential Geometry*, Vol. 25, No. 1 (2020), 33–70.
26. T.H. Colding and W.P. Minicozzi II, Optimal bounds for ancient caloric functions, *Duke Math. J.* 170 (2021), no. 18, 4171–4182.
27. T.H. Colding and W.P. Minicozzi II, Wandering singularities, *J. Differential Geom.*, 119 (2021) 403 – 420.
28. T.H. Colding and W.P. Minicozzi II, Dynamics of closed singularities, *Annales de l’Institut Fourier*, Tome 69 (2019) no. 7, 2973–3016.
29. 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, Vol. 333, (2020) 57–70.

30. T.H. Colding and W.P. Minicozzi II, Arnold-Thom gradient conjecture for the arrival time, *Comm. Pure and Appl. Math*, 72 (2019), no. 7, 1548–1577.
31. 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.
32. 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.
33. T.H. Colding and W.P. Minicozzi II, Level Set Method for motion by mean curvature, *Notices of the AMS*, (2016) Vol. 63, No. 10, 1148–1153.
34. T.H. Colding and W.P. Minicozzi II, Committee ranking, preprint.
35. T.H. Colding, D. Gabai and D. Ketover, On the classification of Heegaard splittings, *Duke Math. J.*, Vol. 167, No. 15 (2018) 2833–2856.
36. T.H. Colding and W.P. Minicozzi II, Differentiability of the arrival time, *Comm. Pure and Appl. Math*, Vol. LXIX, (2016) 2349–2363.
37. T.H. Colding and D. Gabai, Effective Finiteness of irreducible Heegaard splittings of non Haken 3-manifolds, *Duke Math. J.*, Vol. 167, No. 15 (2018) 2793–2832.
38. T.H. Colding and W.P. Minicozzi II, The singular set of mean curvature flow with generic singularities, *Inventiones Math.*, 204 (2) (2016), 443–471.
39. T.H. Colding and W.P. Minicozzi II, Łojasiewicz 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.
40. T.H. Colding and W.P. Minicozzi II, Uniqueness of blowups and Łojasiewicz inequalities, *Annals of Math.* 182 (1) (2015), 221–285.
41. T.H. Colding, T. Ilmanen and W.P. Minicozzi II, Rigidity of generic singularities of mean curvature flow, *Publ. Math. Inst. Hautes Etudes Sci.* 121 (2015), 363–382.
42. T.H. Colding and W.P. Minicozzi II, Ricci curvature and monotonicity for harmonic functions, *Calculus of Variations and Partial Differential Equations*, (2014), Volume 49, Issue 3-4, 1045–1059.
43. T.H. Colding, W.P. Minicozzi, and E.K. Pedersen, Mean curvature flow. *Bull. Amer. Math. Soc. (N.S.)* 52 (2015), no. 2, 297–333.
44. T.H. Colding and W.P. Minicozzi II, On uniqueness of tangent cones for Einstein manifolds, *Inventiones Math.*, 196 (2014), no. 3, 515–588.

45. T.H. Colding and W.P. Minicozzi II, Monotonicity and its analytic and geometric implications, *Proc. Natl. Acad. Sci. USA*, 110 (2013) no. 48 19233–19236.
46. T.H. Colding, T. Ilmanen, W.P. Minicozzi II and B. White, The round sphere minimizes entropy among closed self-shrinkers, *J. Differential Geom.* Volume 95, Number 1 (2013), 53–69.
47. T.H. Colding, New monotonicity formulas for Ricci curvature and applications; I, *Acta Mathematica*, (2012) Volume 209, Issue 2, 229–263.
48. T.H. Colding and A. Naber, Lower Ricci Curvature, Branching, and Bi-Lipschitz Structure of Uniform Reifenberg Spaces, *Advances in Mathematics* Volume 249, 20 (2013), 348–358.
49. T.H. Colding and A. Naber, Characterization of Tangent Cones of Noncollapsed Limits with Lower Ricci Bounds and Applications, *GAFA*, (2013) Volume 23, Issue 1, 134–148.
50. T.H. Colding and A. Naber, Sharp Hölder continuity of tangent cones for spaces with a lower Ricci curvature bound and applications, *Ann. of Math. (2)* 176 (2012), 1173–1229.
51. T.H. Colding and W.P. Minicozzi II, Generic mean curvature flow I; generic singularities, *Ann. of Math. (2)* 175 (2012), 755–833.
52. T.H. Colding and W.P. Minicozzi II, Smooth compactness of self-shrinkers. *Comment. Math. Helv.* 87 (2012), no. 2, 463–475.
53. T.H. Colding and W.P. Minicozzi II, Minimal surfaces and mean curvature flow. *Surveys in geometric analysis and relativity*, 73–143, *Adv. Lect. Math. (ALM)*, 20, Int. Press, Somerville, MA, 2011.
54. T.H. Colding and W.P. Minicozzi II, Lower bounds for nodal sets of eigenfunctions. *Comm. Math. Phys.* 306 (2011), no. 3, 777–784.
55. T.H. Colding and W.P. Minicozzi II, A course in minimal surfaces. *Graduate Studies in Mathematics*, 121. American Mathematical Society, Providence, RI, 2011.
56. T.H. Colding and W.P. Minicozzi II, Width and finite extinction time of Ricci flow. *Geom. & Topol.* 12 (2008), no. 5, 2537–2586.
57. T.H. Colding and W.P. Minicozzi II, Width and mean curvature flow. *Geom. & Topol.* 12 (2008), no. 5, 2517–2535.
58. T.H. Colding, C. De Lellis and W.P. Minicozzi II, Three circles theorems for Schrödinger operators on cylindrical ends and geometric applications. *Comm. Pure Appl. Math.* 61 (2008), no. 11, 1540–1602.

59. T.H. Colding and W.P. Minicozzi II, The Calabi–Yau conjectures for embedded surfaces. *Ann. of Math.* (2) 167 (2008), no. 1, 211–243.
60. T.H. Colding and W.P. Minicozzi II, Shapes of embedded minimal surfaces. *Proc. Natl. Acad. Sci. USA* 103 (2006), no. 30, 11106–11111.
61. T.H. Colding and W.P. Minicozzi II, Minimal submanifolds : Encyclopedia of Mathematical Physics, Elsevier Inc. (2008) 420–432.
62. T.H. Colding and N. Hingston, Geodesic laminations with closed ends on surfaces and Morse index; Kupka-Smale metrics. *Comment. Math. Helv.* 81 (2006), no. 3, 495–522.
63. T.H. Colding and W.P. Minicozzi II, Minimal submanifolds. *Bull. London Math. Soc.* 38 (2006), no. 3, 353–395.
64. T.H. Colding and W.P. Minicozzi II, Embedded minimal disks. *Global theory of minimal surfaces*, 405–438, *Clay Math. Proc.*, 2, Amer. Math. Soc., Providence, RI, 2005.
65. 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. *J. Amer. Math. Soc.* 18 (2005), no. 3, 561–569.
66. T.H. Colding and C. De Lellis, Singular limit laminations, Morse index, and positive scalar curvature. *Topology* 44 (2005), no. 1, 25–45.
67. T.H. Colding and W.P. Minicozzi II, An excursion into geometric analysis. *Surveys in differential geometry. Vol. IX*, 83–146, *Surv. Differ. Geom.*, IX, Int. Press, Somerville, MA, 2004.
68. 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.* (2015) vol. 181, no. 1, 1–153.
69. 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.* (2) 160 (2004), no. 2, 573–615.
70. 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.* (2) 160 (2004), no. 2, 523–572.
71. 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.* (2) 160 (2004), no. 1, 69–92.
72. 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.* (2) 160 (2004), no. 1, 27–68.

73. T.H. Colding and W.P. Minicozzi II, Sharp estimates for mean curvature flow of graphs. *J. Reine Angew. Math.* 574 (2004), 187–195.
74. T.H. Colding and W.P. Minicozzi II, Embedded minimal disks: proper versus nonproper – global versus local. *Trans. Amer. Math. Soc.* 356 (2004), no. 1, 283–289.
75. T.H. Colding and C. De Lellis, The min-max construction of minimal surfaces. *Surveys in differential geometry*, Vol. VIII (Boston, MA, 2002), 75–107, *Surv. Differ. Geom.*, VIII, Int. Press, Somerville, MA, 2003.
76. T.H. Colding and B. Kleiner, Singularity structure in mean curvature flow of mean-convex sets. *Electron. Res. Announc. Amer. Math. Soc.* 9 (2003), 121–124.
77. T.H. Colding and W.P. Minicozzi II, Volumes for eigensections. *Geom. Dedicata* 102 (2003), 19–24.
78. T.H. Colding and N. Hingston, Metrics without Morse index bounds. *Duke Math. J.* 119 (2003), no. 2, 345–365.
79. T.H. Colding and W.P. Minicozzi II, Disks that are double spiral staircases. *Notices Amer. Math. Soc.* 50 (2003), no. 3, 327–339.
80. J. Cheeger, T.H. Colding and G. Tian, On the singularities of spaces with bounded Ricci curvature. *Geom. Funct. Anal.* 12 (2002), no. 5, 873–914.
81. T.H. Colding and W.P. Minicozzi II, On the structure of embedded minimal annuli. *Int. Math. Res. Not.* 2002, no. 29, 1539–1552.
82. T.H. Colding and W.P. Minicozzi II, Multivalued minimal graphs and properness of disks. *Int. Math. Res. Not.* 2002, no. 21, 1111–1127.
83. T.H. Colding and W.P. Minicozzi II, Estimates for parametric elliptic integrands. *Int. Math. Res. Not.* 2002, no. 6, 291–297.
84. T.H. Colding and W.P. Minicozzi II, Minimal annuli with and without slits. *J. Symplectic Geom.* 1 (2001), no. 1, 47–61.
85. T.H. Colding and W.P. Minicozzi II, Complete properly embedded minimal surfaces in $\mathbf{R}^3$. *Duke Math. J.* 107 (2001), no. 2, 421–426.
86. J. Cheeger and T.H. Colding, On the structure of spaces with Ricci curvature bounded below. III. *J. Differential Geom.* 54 (2000), no. 1, 37–74.
87. J. Cheeger and T.H. Colding, On the structure of spaces with Ricci curvature bounded below. II. *J. Differential Geom.* 54 (2000), no. 1, 13–35.
88. T.H. Colding and W.P. Minicozzi II, Removable singularities for minimal limit laminations. *C. R. Acad. Sci. Paris Ser. I Math.* 331 (2000), no. 6, 465–468.

89. T.H. Colding and W.P. Minicozzi II, Embedded minimal surfaces without area bounds in 3-manifolds. *Geometry and topology: Aarhus (1998)*, 107–120, *Contemp. Math.*, 258, Amer. Math. Soc., Providence, RI, 2000.
90. T.H. Colding and W.P. Minicozzi II, Examples of embedded minimal tori without area bounds. *Internat. Math. Res. Notices* 1999, no. 20, 1097–1100.
91. T.H. Colding and W.P. Minicozzi II, *Minimal surfaces. Courant Lecture Notes in Mathematics*, 4. New York University, Courant Institute of Mathematical Sciences, New York, 1999.
92. T.H. Colding and W.P. Minicozzi II, Convergence of embedded minimal surfaces without area bounds in three-manifolds. *C. R. Acad. Sci. Paris Ser. I Math.* 327 (1998), no. 8, 765–770.
93. T.H. Colding, Spaces with Ricci curvature bounds. *Proceedings of the International Congress of Mathematicians, Vol. II (Berlin, 1998). Doc. Math.* 1998, Extra Vol. II, 299–308.
94. T.H. Colding and W.P. Minicozzi II, Weyl type bounds for harmonic functions. *Invent. Math.* 131 (1998), no. 2, 257–298.
95. T.H. Colding and W.P. Minicozzi II, Liouville theorems for harmonic sections and applications. *Comm. Pure Appl. Math.* 51 (1998), no. 2, 113–138.
96. T.H. Colding and W.P. Minicozzi II, Harmonic functions on manifolds. *Ann. of Math. (2)* 146 (1997), no. 3, 725–747.
97. J. Cheeger and T.H. Colding, On the structure of spaces with Ricci curvature bounded below. I. *J. Differential Geom.* 46 (1997), no. 3, 406–480.
98. T.H. Colding and W.P. Minicozzi II, Large scale behavior of kernels of Schrödinger operators. *Amer. J. Math.* 119 (1997), no. 6, 1355–1398.
99. T.H. Colding and W.P. Minicozzi II, Harmonic functions with polynomial growth. *J. Differential Geom.* 46 (1997), no. 1, 1–77.
100. T.H. Colding, Ricci curvature and volume convergence. *Ann. of Math. (2)* 145 (1997), no. 3, 477–501.
101. T.H. Colding, *Aspects of Ricci curvature. Comparison geometry (Berkeley, CA, 1993–94)*, 83–98, *Math. Sci. Res. Inst. Publ.*, 30, Cambridge Univ. Press, Cambridge, 1997.
102. J. Cheeger, T.H. Colding and G. Tian, Constraints on singularities under Ricci curvature bounds. *C. R. Acad. Sci. Paris Ser. I Math.* 324 (1997), no. 6, 645–649.

103. T.H. Colding and W.P. Minicozzi II, Generalized Liouville properties of manifolds. *Math. Res. Lett.* 3 (1996), no. 6, 723–729.
104. J. Cheeger and T.H. Colding, Lower bounds on Ricci curvature and the almost rigidity of warped products. *Ann. of Math. (2)* 144 (1996), no. 1, 189–237.
105. T.H. Colding and W.P. Minicozzi II, On function theory on spaces with a lower Ricci curvature bound. *Math. Res. Lett.* 3 (1996), no. 2, 241–246.
106. T.H. Colding, Large manifolds with positive Ricci curvature. *Invent. Math.* 124 (1996), no. 1-3, 193–214.
107. T.H. Colding, Shape of manifolds with positive Ricci curvature. *Invent. Math.* 124 (1996), no. 1-3, 175–191.
108. J. Cheeger, T.H. Colding, and W.P. Minicozzi II, Linear growth harmonic functions on complete manifolds with nonnegative Ricci curvature. *Geom. Funct. Anal.* 5 (1995), no. 6, 948–954.
109. T.H. Colding, Stability and Ricci curvature. *C. R. Acad. Sci. Paris Ser. I Math.* 320 (1995), no. 11, 1343–1347.
110. J. Cheeger and T.H. Colding, Almost rigidity of warped products and the structure of spaces with Ricci curvature bounded below. *C. R. Acad. Sci. Paris Ser. I Math.* 320 (1995), no. 3, 353–357.
111. M. Cai, T.H. Colding and D. Yang, A gap theorem for ends of complete manifolds. *Proc. Amer. Math. Soc.* 123 (1995), no. 1, 247–250.