Brian White

Stanford University
Mathematics Department
Stanford, CA 94305

Email: bcwhite@stanford.edu

Research Interests:

Geometric Analysis, especially Minimal Surfaces and Mean Curvature Flow

Employment:

2013 –2016	Chair, Stanford Mathematics Department
1992 –	Professor, Stanford University
1985 – 1992	Associate Professor, Stanford University
1983 – 1985	Assistant Professor, Stanford University
1981 – 1983	NSF Postdoctoral Research Fellow, Courant Institute, NYU

Education:

1982	Ph.D	Mathematics, Princeton University. Thesis title: "Singularity Structure and Generic Regularity of Two-Dimensional Area-Minimizing Surfaces" Thesis advisor: Professor F. J. Almgren, Jr
1981	M.S	Princeton University.
1977	B.S./M.S.	Yale University.

Honors and Awards:

1983 –	National Science Foundation support since 1983
2016	Simons Fellow in Mathematics
2014	Endowed chair (Robert Grimett Professor of Mathematics)
2013	Fellow of the American Mathematical Society
2010	Invited AMS-MAA speaker (one of three) at the 2010 annual joint meeting of the American Mathematical Society and the Mathematical Association of America
2002	Invited speaker at the 2002 International Congress of Mathematicians in Beijing
1999	Guggenheim Fellowship
1993	Bing Teaching Award (Stanford University)
1986 – 1991	NSF Presidential Young Investigator Award
1985	Alfred P. Sloan Fellowship
1981 – 1983	National Science Foundation postdoctoral fellowship
1977 – 1980	National Science Foundation Graduate Fellowship
1977	Award for highest ranking Yale senior in sciences
1975	7th highest score on Putnam Mathematics Competition (open to all US and Canadian undergraduates)

Invited Lectures:

2019 July	Partial Differential Equations Workshop (Oberwolfach)
2019 June	Geometric Analysis and General Relativity. A conference in honour of G. Huiskens 60th Birthday (Zurich)
2018 Nov	Texas Geometry and Topology Conference (Rice University)

2018 Jul	Calculus of Variations Workshop (Oberwolfach)
2018 May	Lehigh University Geometry and Topology Conference
2018 Mar	Geometry Day (University of Chicago and Northwestern University)
2018 Jan	Minimal Surfaces and Related Topics conference in Granada, Spain
2017 Oct	Bay Area Differential Geometry Seminar (Berkeley, CA)
2017 Sep	Fourth Taiwan International Conference on Geometry (Taipei)
2017 Jul	Conference on Geometric Analysis (University of British Columbia, Vancouver)
2016 Sep	Clay Research Conference on Mean Curvature Flow
2016 Jul	Plenary lecture at the XIX Escola de Geometria Diferencial, Rio de Janeiro
2016 Jul	Calculus of Variations meeting in Oberwolfach.
2016 Jan	23rd Southern California Geometric Analysis Seminar, UC Irvine
2015 Dec	Invited lecture at Bay Area Differential Geometry Seminar
2015 Aug	Partial Differential Equations meeting in Oberwolfach.
2015 Jul	"Advances in Geometric Analysis" meeting at the University of Warwick.
2015 Mar	Conference in geometric analysis in Frankfurt.
2014 Dec	Workshop on Uniqueness in Analysis and Geometry (MIT).
2014 Jul	Calculus of Variations Meeting (Oberwolfach)
2014 Jul	Geometric Analysis Conference (Lisbon)
2013 Aug	Conference on Minimal Submanifolds and Related Topics (Hannover, Germany)
2013 Jul	Four-lecture minicourse at the IAS/Park City Math Institute Summer Session
2018 Jun	Variational Problems and Geometric PDE conference (Granada, Spain). My lecture was part of a minicourse of three lectures about the recent work of David Hoffman, Martin Traizet, and me about genus g helicoids.
2013 May	Two invited lectures at the 2013 Jim Simons Conference at CUNY
2013 Apr	Geomfest/Calabifest (Maryland)
2012 Sep	International Conference of Geometric Analysis (Seillac, France)
2012 Jul	XVII Escola de Geometria Diferencial (Manaus, Brazil)
2012 Jul	Geometric Measure Theory Conference (Potsdam)
2012 Apr	Conference in Memory of Robert Osserman (Stanford)
2012 Mar	Workshop on Geometric Analysis (Goethe-Universität, Frankfurt)
2011 Aug	Workshop in Partial Differential Equations (Oberwolfach, Germany)
2011 Jul	Taiwan International Conference on Geometry (Taipei)
2011 Jun	International Centre for Mathematical Sciences Geometric Analysis Conference (Edinburgh)
2011 Apr	Herbert Federer Memorial Conference at Brown University
2011 Apr	International Conference on Surface Theory (Seville, Spain)
2010 Oct	Pacific Northwest Geometry Seminar (Eugene, Oregon)
2010 July	Calculus of Variations Conference (Oberwolfach, Germany)
2010 May	Lecture at Columbia University
2010 Apr	International Congress on Algebraic, Geometric and Analytic Aspects of Surface Theory (Buzios, Brazil)
2010 Jan	One of the three invited AMS-MAA address at the annual meeting of the American Mathematical Society (January 15, 2010)
2009 May	Harvard-MIT-Brandeis Mathematics Colloquium

2009 Apr	Opening Colloquium for the "Geometric Partial Differential Equations" SFB (Freiburg, Germany)
2009 Apr	Lecture at the University of Granada (Spain)
2009 Feb	Lecture at Johns Hopkins University
2008 Dec	Lecture at the Joint Berkeley-Santa Cruz-Stanford Geometry Seminar
2007 Aug	International Congress on Minimal and Constant Mean Curvature Surfaces (Buzios, Brazil)
2007 May	Third Symposium of Analysis and Partial Differential Equations (Purdue)
2006 Jun	Geometric Flows Workshop (Zürich)
2006 Mar	Plenary address at the IX Southeast Geometry Seminar (Birmingham, Alabama)
2006 Mar	Workshop on Geometric Flows, Harvard University
2005 Nov	Workshop on Recent Results in Nonlinear Elliptic Equations and Their Interactions with Geometry, Math Sciences Research Institute, Berkeley, CA
2005 Jun	International Conference on Calculus of Variations and Nonlinear Partial Differential Equations (Hangzhou, China)
2005 Feb	12th Annual Southern California Geometric Analysis Seminar (UCSD)
2004 Oct	Texas Geometry and Topology Conference (Texas A & M)
2004 Jul	workshop on Geometric Evolution Equations (Banff International Research Station)
2004 Apr	Pacific Northwest Geometry Seminar (Salt Lake City, Utah)
2003 Dec	Workshop on Geometric Analysis (Mathematical Sciences Research Institute in Berkeley)
2003 Aug	Conference on Geometric Evolution Equations (Hamilton Island, Australia)
2003 May	Tromba Celebration Conference (Santa Cruz, California)
2003 Mar	Two invited lectures at the March 2003 Hokkaido conference of Variational Problems and Geometric Measure Theory (Hokkaido, Japan)
2002 Sep	First Annual Yamabe Memorial Symposium at the University of Minnesota
2002 Aug	International Congress of Mathematicians (Beijing)
2002 Apr	Gilbarg Memorial Conference (Stanford)
2001 Jun	Three invited lectures in the Math. Sciences Research Institute Symposium on Minimal Surfaces
2001 Jan	Rutgers University Annual D'Atri Memorial Lectures
2000 Dec	Plenary address at the 2000 annual meeting of the Australian Mathematical Society
1995 Jul	Plenary address at the 1995 summer meeting of the American Mathematical Society
1993 Dec	Second annual Bernard Society Lecture at Davidson College
1993 Aug	Lecture Series in Special Postgraduate Summer School in Calculus of Variations in Trento, Italy
1993 Mar	Texas A & M Frontiers of Mathematics lecture series
1990 Jul	Hour-long address at the 90th summer meeting of the American Mathematical Society.
1982 Jun	Felix Klein Colloquium (Dusseldorf)

Papers:

1. "Moving plane method for varifolds and applications", with Robert Haslhofer and Or Hershkovits, 20 pages. Preprint on ArXiv.
2. "Ancient asymptotically cylindrical flows and applications, with Kyeongsu Choi, Robert Haslhofer, and Or Hershkovits, 78 pages. Preprint on ArXiv.
3. "Nguyen's Tridents and the Classification of Semigraphical Translators for Mean Curvature Flow", with David Hoffman and Francisco Martín, 26 pages. Preprint on ArXiv.
4. "Avoidance for Set-Theoretic Solutions of Mean-Curvature-Type Flows", with Or Hershkovits, 18 pages. Preprint on ArXiv.
5. "Scherk-like Translators for Mean Curvature Flow", with David Hoffman and Francisco Martin, 41 pages. Preprint on ArXiv.
6. "Generic Transversality of Minimal Submanifolds", 17 pages. Preprint on ArXiv.
7. "Mean Curvature Flow with Boundary", 30 pages. Preprint on ArXiv.
8. "Notes on Translating Solitons for Mean Curvature Flow", with David Hoffman, Tom Ilmanen, and Francisco Martin, 18 pages. Preprint on ArXiv.
9. "Graphical Translators for Mean Curvature Flow", with David Hoffman, Tom Ilmanen, and Francisco Martin, 29 pages, Calculus of Variations and P.D.E. **58** (2019).
10. "Sharp Entropy Bounds for Self-Shrinkers in Mean Curvature Flow", with Or Hershkovits, Geometry and Topology **23** (2019), 1611–1619.
11. "Limiting behavior of sequences of properly embedded minimal disks", with David Hoffman, 32 pages. To appear in J. Diff. Geometry. Preprint on ArXiv.
12. "Non-fattening of mean curvature flow at singularities of mean convex type", with Or Hershkovits, 17 pages. To appear in Comm. Pure Appl. Math. Preprint on ArXiv.
13. "A local regularity theorem for mean curvature flow with triple edges", with Felix Schulze, J. Reine Ang. Math. (25 pages, to appear). Preprint on ArXiv.
14. "On the Compactness Theorem for Embedded Minimal Surfaces in 3-manifolds with Locally Bounded Area and Genus", Comm. Anal. Geom. **26** (2018), no. 3, 659–678.
15. "On the Bumpy Metrics Theorem for Minimal Submanifolds", American Journal of Mathematics **139** (2017), 1149–1155. Preprint on ArXiv.
16. "Helicoidal minimal surfaces of prescribed genus", with David Hoffman and Martin Traizet, Acta Mathematica **216** (2016), no. 2, 217–323.
17. "Introduction to Minimal Surface Theory", IAS/Park City Mathematics Series, volume 22, 2016, 402–456. American Mathematical Society and The Institute for Advanced Study.
18. "Controlling area blow-up in minimal or bounded mean curvature varieties", J. Differential Geom. **102** (2016), 501–535.
19. "Curvatures of embedded minimal disks blow up on subsets of C^1 curves", J. Differential Geom. **100** (2015), 389–394.
20. "Sharp Lower Bounds on Density of Area-Minimizing Cones", with Tom Ilmanen, Cambridge J. Math. **3** (2015), 1–18.

21. "Subsequent Singularities in Mean-Convex Mean Curvature Flow", Calculus of Variations and P.D.E. **54** (2015), 1457–1468.
22. "Properly embedded, area-minimizing surfaces in hyperbolic 3-space", with Francisco Martin, J. Differential Geom. **97** (2014), 515–544.
23. "The round sphere minimizes entropy among closed self-shrinkers", with Tobias Colding, Tom Ilmanen, and William Minicozzi, J. Differential Geom. **95** (2013), 53–69.
24. "Topological change in mean convex mean curvature flow", Invent. Math. **191**(2013), no. 3, 501–525.
25. "Sequences of embedded minimal disks whose curvatures blow up on a prescribed subset of a line", with David Hoffman, Communications in Analysis and Geometry **19** (2011), no. 3, 487–502.
26. "Axial minimal surfaces in $\mathbf{S}^2 \times \mathbf{R}$ are helicoidal", with David Hoffman, J. Differential Geometry **87** (2011), 515–523.
27. "The Maximum Principle for Minimal Varieties of Arbitrary Codimension", Communications in Analysis and Geometry **18** (2010), no. 3, 421432.
28. "Which ambient spaces admit isoperimetric inequalities for submanifolds?", J. Differential Geom. **83** (2009), 213–228.
29. "The geometry of genus-one helicoids", with David Hoffman, Comment. Math. Helv. **84** (2009), 547–569.
30. "Currents and flat chains associated to varifolds, with an application to mean curvature flow", Duke Math. J. **148** (2009), no. 1, 41–62.
31. "On the number of minimal surfaces with a given boundary", with David Hoffman, Astérisque No. **322** (2008), 207–224.
32. "Genus-one helicoids from a variational point of view", with David Hoffman, Comm. Math. Helv. **83** (2008), 67–813.
33. "A local regularity theorem for mean curvature flow", Ann. of Math. **161** (2005), 1487–1519.
34. "The nature of singularities in mean curvature flow of mean-convex sets", J. Amer. Math. Soc. **16** (2003), 123–138.
35. "Evolution of curves and surfaces by mean curvature", Proceedings of the International Congress of Mathematicians, Vol. I (Beijing, 2002), 525–538, Higher Ed. Press, Beijing, 2002.
36. "Embeddedness of minimal surfaces with total boundary curvature at most 4π", Ann. of Math. **155** (2002), 209–234.
37. "The size of the singular set in mean curvature flow of mean-convex surfaces", J. Amer. Math. Soc. **13** (2000), 665–695.
38. "Rectifiability of flat chains", Ann. of Math. **150** (1999), 165–184.
39. "The deformation theorem for flat chains", Acta Math. **183** (1999), 255–271.
40. "A new proof of Federer's structure theorem for k-dimensional sets in $\mathbf{R}^n$", J. Amer. Math. Soc. **11**(1998), 693–701.

41. "Soap-films bounded by non-closed curves", with Jordan Drachman, J. Geom. Anal. **8** (1998), 239–250.
42. "The mathematics of F. J. Almgren, Jr.", J. Geom. Anal. **8** (1998), 681–702. Shorter version in: Notices of the Amer. Math. Soc. **44(10)** (December, 1997), 1451–1456.
43. "Classical area minimizing surfaces with real analytic boundaries", Acta Math. **179** (1997), 295–305.
44. "Stratification of minimal surfaces, mean curvature flows, and harmonic maps", J. Reine Ang. Math. **488** (1997), 1–35.
45. "Half of enneper's surface minimizes area", pp. 361–368, in "Geometric analysis and the calculus of variations for Stefan Hildebrandt", (ed. J. Jost, International Press 1996)
46. "Existence of least-energy configurations of immiscible fluids", J. Geom. Analysis. **6** (1996), 151–161.
47. "The topology of hypersurfaces moving by mean curvature", Communications in analysis and geometry **3** (1995), 317–333.
48. "Some questions of De Giorgi about mean curvature flow of triply periodic surfaces", pp. 210–213 in *Motion by Mean Curvature*, ed. by B. Buttazzo and A. Visintin (de Gruyter 1994).
49. "Partial regularity of mean-convex hypersurfaces flowing by mean curvature", International Math. Res. Notices **4** (1994), 185–192.
50. "The bridge principle for unstable and for singular minimal surfaces", Comm. Analysis and Geom. **2** (1994), 513–532.
51. "The bridge principle for stable minimal surfaces", Calculus of Variations and P. D. E. **2** (1994), 405–425.
52. "A strong minimax property of nondegenerate minimal submanifolds", J. Reine Angew. Math. **457** (1994), 203–218.
53. "The structure of branch points in area minimizing surfaces and in pseudoholomorphic curves", with Mario Micallef, Annals of Math. **139** (1994), 35–85.
54. "The Space of Minimal Annuli Bounded by an Extremal Pair of Planar Curves", with William Hamilton Meeks, III, Comm. in Analysis and Geometry **1**, 415–437 (1993).
55. "Nonunique tangent maps at isolated singularities of harmonic maps", Bulletin Amer. Math. Soc. **26** (1992), 125–129.
56. "On the topological type of minimal submanifolds", Topology **31** (1992), 445–448.
57. "The space of minimal submanifolds for varying riemannian metrics", Indiana U. Math. J. **40** (1991), 161–200.
58. "Existence of smooth embedded surfaces of prescribed topological type that minimize parametric even elliptic functionals on three-manifolds", J. Differential Geometry **33** (1991), 413–443.
59. "Minimal Surfaces Bounded by Convex Curves in Parallel Planes", with William Hamilton Meeks, III, Comment. Math. Helv. **66** (1991), 263–278.
60. "A rigidity theorem for properly embedded minimal surfaces in $\mathbf{R}^3$", with Hyeong-In Choi and William Hamilton Meeks, III, J. Diff. Geometry **32** (1990), 65–76.

61. "Some Recent Developments in Differential Geometry", Math. Intelligencer **11** (Autumn, 1989), 41–47.
62. "The rate of convergence of a harmonic map at a singular point", with Robert Gulliver, Math. Ann. **283** (1989), 539–549.
63. "Every three-sphere of positive Ricci curvature contains a minimal embedded torus", Bull. Amer. Math. Soc. **21** (1989), 71–75.
64. "A new proof of the compactness theorem for integral currents", Comm. Math. Helv. **64** (1989), 207–220.
65. "New applications of mapping degrees to minimal surface theory", J. Differential Geometry **29** (1989), 143–162.
66. "A strong maximum principle for varifolds that are stationary with respect to even parametric elliptic functionals", with Bruce Solomon, Indiana Univ. Math. J. **38** (1989), 683–691.
67. "Homotopy classes in sobolev spaces and the existence of energy minimizing maps", Acta Math. **160** (1988), 1–17.
68. "Curvature estimates and compactness theorems in 3-manifolds for surfaces that are stationary for parametric elliptic functionals", Invent. Math. **88** (1987), 243–256.
69. "Complete surfaces of finite total curvature", J. Diff. Geometry **26** (1987), 315–216. **Correction**: JDG **28** (1988), 359–360.
70. "The space of m-dimensional surfaces that are stationary for a parametric elliptic integrand", Indiana Univ. Math. J. **36** (1987), 567–602.
71. "A regularity theorem for minimizing hypersurfaces modulo p", Proc. A. M. S. Symposia in Pure Math. **44** (1986), 413–427.
72. "Infima of energy functionals in homotopy classes of mappings", J. Diff. Geometry **23** (1986), 127–142.
73. "Homotopy classes in sobolev spaces and energy minimizing maps", Bull. Amer. Math. Soc. **13** (1985), 166–168.
74. "Regularity of singular sets in immiscible fluid interfaces and in solutions to other plateau-type problems", Proc. Centre for Math. Analysis (1985), 244–249.
75. "Generic regularity of unoriented two-dimensional area minimizing surfaces", Ann. of Math. **121** (1985), 595–603. **Correction**: Ann. of Math. **124** (1986), 403.
76. "Mappings that minimize area in their homotopy classes", J. Diff. Geometry **20** (1984), 433–446.
77. "The least area bounded by multiples of a curve", Proc. Amer. Math. Soc. **90** (1984), 230–232.
78. "Existence of least-area mappings of N-dimensional domains", Ann. of Math. **118** (1983), 179–185.
79. "Tangent cones to 2-dimensional area-minimizing integral currents are unique", Duke Math. Journal **50** (1983), 143–160.
80. "Regularity of area-minimizing hypersurfaces at boundaries with multiplicity", Ann. of Math. Studies **103** (1983), 293–301.

81. "The structure of minimizing hypersurfaces mod 4", Invent. Math. **53** (1979), 45–58.

PhD students:

- Chao Li (2018).
- Nick Edelen (2016).
- Tarn Adams (2005).
- Claire Chan (1995).
- Jordan Drachman (1994).
- Gary Lawlor (1988).
- Martin Ross (1989).

Supervision of undergraduate honors theses:

- Ted Westling (2012).
- Arjun Talwar (2006).
- Xuanming Su (2000)
- Keith Chen (1998)
- Nathan Reading (1995).
- Garret Vargas (1993).
- Pouria Dehghanpour (1993).

Supervision of postdocs:

- Or Hershkovits
- Jacob Bernstein
- Felix Schultze
- Jose Escobar
- Daniel Wienholz
- Claudio Arezzo
- Karsten Grosse-Brauchman
- Sisto Baldo