

Simon Brendle

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Personal Information

Born June 1981. Citizen of Germany; Permanent Resident of the United States of America

Research Interests

Differential Geometry; Partial Differential Equations; Probability Theory and Stochastic Control Theory

Education

Doctoral Degree in Mathematics (summa cum laude), Tübingen University, Germany, February 2001

Undergraduate Degree (with distinction), Tübingen University, Germany, October 1999

Appointments

Professor, Stanford University, September 2008 – present

Assistant Professor, Stanford University, September 2005 – August 2008

Assistant Professor, Princeton University, July 2003 – August 2005

Member, Institute for Advanced Study, September 2002 – June 2003

Postdoctoral Fellow, German Research Foundation (Deutsche Forschungsgemeinschaft), March 2001 – August 2002

Honors

National Science Foundation Three-Year Grant, 2009 – 2011

Presidential Research Grant, Stanford University, 2009

Distinguished Lecture Series (Nachdiplomvorlesung), ETH Zürich, 2008
Alden H. and Winifred Brown Fellowship, 2007
Invited Speaker (45 minute lecture), International Congress of Mathematicians, Madrid, 2006
National Science Foundation Three-Year Grant, 2006 – 2008
Alfred P. Sloan Fellowship, 2006
Frederick E. Terman Fellowship, 2005
National Science Foundation Three-Year Grant, 2003 – 2005
Clay Mathematics Institute, Special Research Project, 2002
Doctoral Dissertation Award, Tübingen University, 2001
Undergraduate Thesis Award, German Mathematical Society, September 1999
Fellow, German National Merit Foundation (Studienstiftung des Deutschen Volkes), 1996 – 1999
Highest rank in a nationwide Mathematics Contest for high school students in Germany (Bundeswettbewerb Mathematik), 1995, 1996, 1997

Professional Activities

Co-organizer of a Special Session on Elliptic and Parabolic Problems in Geometry, American Mathematical Society Eastern Sectional Meeting, Newark, May 22 – 23, 2010
Reviewer for the Swiss National Science Foundation
Reviewer for the Research Commission at ETH Zürich
Reviewer for the United States National Science Foundation

Selected Invited Lectures

Conference on Scalar Curvature, Geometry, and Topology, Münster, August 30 – September 3, 2010
Conference on Calculus of Variations, Oberwolfach, July 18 – 24, 2010
Seminar on Spectral Theory and Geometry, Institut Fourier, Grenoble, June 24, 2010
International Symposium on Geometry and Topology in Honor of C.C. Hsi-

ung, Lehigh University, May 29 – June 1, 2010
Plenary Lecture, American Mathematical Society Eastern Sectional Meeting, Newark, May 22 – 23, 2010
Yamabe Memorial Lectures, Northwestern University, May 24 – 25, 2010
Colloquium Lecture, University of Chicago, May 7, 2010
Roever Lecture, Washington University, St. Louis, April 29, 2010
Conference on Optimal Transportation and Applications, Banff, April 18 – 23, 2010
Herbert Seifert Lecture, Heidelberg University, December 21, 2009
Conference on Complex and Differential Geometry, Hannover, September 14 – 18, 2009
Plenary Lecture, 27th Brazilian Mathematical Colloquium, held at the Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, July 27 – 31, 2009
Conference on the occasion of Charles Fefferman’s 60th birthday, Princeton University, May 4 – 8, 2009
Conference on Geometric Partial Differential Equations, held at the Institute for Advanced Study, Princeton, February 23 – 28, 2009
Joint Colloquium, ETH Zürich and Zürich University, December 9, 2008
Colloquium Lecture, Université de Fribourg, November 4, 2008
Yamabe Memorial Symposium, University of Minnesota, September 26 – 28, 2008
Mathematics Conference on the occasion of the 50th Anniversary of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, May 19 – 21, 2008
7th Conference on Geometry and Topology, Harvard University, May 2 – 4, 2008
Colloquium Lecture, Bonn University, December 19, 2007
Colloquium Lecture, University of Notre Dame, November 14, 2007
Colloquium Lecture, University of California, Santa Barbara, October 25, 2007
Texas Geometry and Topology Conference, College Station, October 19 – 21, 2007
Workshop on Geometric Partial Differential Equations, Columbia Univer-

sity, October 4 – 5, 2007

Conference on Manifolds with Nonnegative Sectional Curvature, American Institute of Mathematics, Palo Alto, September 17 – 21, 2007

Conference on Curvature and Global Shape, Münster, July 29 – August 4, 2007

Conference on Partial Differential Equations, Oberwolfach, July 22 – 28, 2007

International Conference on Geometry and Partial Differential Equations, Luminy, June 18 – 22, 2007

22nd Annual Geometry Festival, held at the University of Maryland, April 27 – 29, 2007

Conference on Geometric Evolution Equations, Berkeley, March 12 – 16, 2007

8th Pacific Rim Geometry Conference, held at Murramarang, Australia, December 11 – 15, 2006

Conference on Analytic and Computational Aspects of Elliptic and Parabolic Equations, Berkeley, October 23 – 27, 2006

Conference on Nonlinear Evolution Problems, Scuola Normale Superiore di Pisa, September 19 – 23, 2006

Plenary Lecture, International Conference on Global Differential Geometry, Münster, August 13 – 19, 2006

Conference on the Einstein Constraint Equations, Isaac Newton Institute, Cambridge, December 12 – 16, 2005

Conference on Nonlinear Elliptic Equations and their Interactions with Geometry, Berkeley, October 31 – November 4, 2005

Conference on Partial Differential Equations and Mathematical Finance, Royal Institute of Technology, Stockholm, August 15 – 19, 2005

Conference on Geometric Evolution Problems, Oberwolfach, May 29 – June 4, 2005

Applied Mathematics Colloquium, Massachusetts Institute of Technology, November 22, 2004

Texas Geometry and Topology Conference, College Station, October 29 – 31, 2004

Conference on Geometric Flows, University of California, Los Angeles, Febru-

ary 23 – 27, 2004

Workshop on General Relativity, Stanford University, April 21 – 27, 2002

Conference on Geometric Evolution Equations, Isaac Newton Institute, Cambridge, March 26 – 30, 2001

Conference on Functional Analysis and Partial Differential Equations, Oberwolfach, March 20 – 24, 2000

Conference on Evolution Equations and their Applications in Physical and Life Sciences, Bad Herrenalb, September 14 – 19, 1998

Monograph

Ricci Flow and the Sphere Theorem, Graduate Studies in Mathematics vol. 111, American Mathematical Society (2010)

Selected Research Publications and Surveys

27. Area-minimizing projective planes in three-manifolds (joint with H. Bray, M. Eichmair, and A. Neves), arxiv:0909.1665

26. An existence theorem for the Yamabe problem on manifolds with boundary (joint with S. Chen), arxiv:0908.4327

25. A Prékopa-Leindler-type inequality for Ricci flow, arxiv:0907.3726

24. Einstein manifolds with nonnegative isotropic curvature are locally symmetric, *Duke Mathematical Journal* 151, 1–21 (2010)

23. A boundary value problem for minimal Lagrangian graphs, to appear in *Journal of Differential Geometry* (joint with M. Warren)

22. Sphere theorems in geometry, *Surveys in Differential Geometry* volume XIII, 49–84 (2009)¹ (joint with R.M. Schoen)

21. A generalization of Hamilton’s differential Harnack inequality for the Ricci flow, *Journal of Differential Geometry* 82, 207–227 (2009)

20. Minimal Lagrangian diffeomorphisms between domains in the hyperbolic plane, *Journal of Differential Geometry* 80, 1–22 (2008)

19. A general convergence result for the Ricci flow in higher dimensions, *Duke Mathematical Journal* 145, 585–601 (2008)

18. Classification of manifolds with weakly $1/4$ -pinched curvatures, *Acta*

¹This article will also appear in the *Handbook of Geometric Analysis*, volume II.

- Mathematica 200, 1–13 (2008) (joint with R.M. Schoen)
17. Manifolds with 1/4-pinched curvature are space forms, *Journal of the American Mathematical Society* 22, 287–307 (2009) (joint with R.M. Schoen)
 16. On the conformal scalar curvature equation and related problems, *Surveys in Differential Geometry* volume XII, 1–19 (2008)
 15. Blow-up phenomena for the Yamabe equation II, *Journal of Differential Geometry* 81, 225–250 (2009) (joint with F.C. Marques)
 14. Blow-up phenomena for the Yamabe equation, *Journal of the American Mathematical Society* 21, 951–979 (2008)
 13. Convergence of the Yamabe flow in dimension 6 and higher, *Inventiones Mathematicae* 170, 541–576 (2007)
 12. A short proof for the convergence of the Yamabe flow on S^n , *Pure and Applied Mathematics Quarterly* 3, 499–512 (2007)
 11. On a problem of optimal stochastic control with incomplete information, *Applied Mathematics and Optimization* 58, 257–274 (2008)
 10. Portfolio selection under incomplete information, *Stochastic Processes and Applications* 116, 701–723 (2006)
 9. Convergence of the Q -curvature flow on S^4 , *Advances in Mathematics* 205, 1–32 (2006)
 8. Convergence of the Yamabe flow for arbitrary initial energy, *Journal of Differential Geometry* 69, 217–278 (2005)
 7. A variational characterization of $\sigma_{n/2}$, *Calculus of Variations and Partial Differential Equations* 20, 399–402 (2004) (joint with J. Viaclovsky)
 6. Global existence and convergence for a higher order flow in conformal geometry, *Annals of Mathematics* 158, 323–343 (2003)
 5. Hypersurfaces in Minkowski space with vanishing mean curvature, *Communications in Pure and Applied Mathematics* 55, 1249–1279 (2002)
 4. Curvature flows on surfaces with boundary, *Mathematische Annalen* 324, 491–519 (2002)
 3. Partial functional differential equations with non-autonomous past, *Discrete and Continuous Dynamical Systems* 8, 1–24 (2002) (joint with R. Nagel)
 2. On the asymptotic behavior of perturbed strongly continuous semigroups, *Mathematische Nachrichten* 226, 35–47 (2001)
 1. One parameter semigroups for linear evolution equations, *Graduate Texts*

in Mathematics, Springer-Verlag, 2000 (contributed a section on "Interpolation and extrapolation spaces for semigroups")