

## CURRICULUM VITAE : SIDDHARTHA GADGIL

**Citizenship.** : Indian

**Date of Birth.** : 11 July 1974.

**Education.** :

- California Institute of Technology, 1995–1999
  - *Ph. D.* received in June 1999.  
Thesis title: *On the geometric simple-connectivity of 4-manifolds.*  
*Advisor:* David Gabai
  - *M.S.* received in June 1998
- Indian Statistical Institute, Calcutta, 1992–1995  
*Bachelor of Statistics (Honours)* received in 1995

**Positions Held.** :

- *Professor* at the Indian Institute of Science 2012–
- *Associate Professor* at the Indian Institute of Science 2006–2012.
- *Associate Professor* at the Indian Statistical Institute, Bangalore, 2002–2006.
- *Simons Instructor* at the State University of New York, Stony Brook, 1999–2002
- *Graduate Teaching Assistant*, California Institute of Technology, 1995–98.

**Research interests.** :

- *Low-dimensional topology* including 3-manifold topology and geometric topology of smooth 4-manifolds.
- *Geometric Group theory* in particular connections with and applications of topology.

## PUBLICATIONS

**Research Publications.**

- (1) *Cobordisms and Reidemeister torsions of homotopy lens spaces*, *Geom. Topol.* **5** (2001), 109–125.
- (2) *The pq-condition for 3-manifold groups*, *Proc. Amer. Math. Soc.* **129** (2001), no. 6, 1873–1875.
- (3) *Topological geodesics and virtual rigidity* (joint with Louis Funar), *Algebr. Geom. Topol.* **1** (2001), 369–380.
- (4) *Equivariant framings, lens spaces and contact structures*, *Pacific Journal of Mathematics* **1** (2003), 73–84.
- (5) *Contact Structures on elliptic 3-manifolds*, *Proc. Amer. Math Soc.* **132** (2004), no. 12, 3705–3714.
- (6) *On the Geometric simple-connectivity of open manifolds* (joint with Louis Funar), *Int. Math. Res. Not.* 2004, no. 24, 1193–1248.

- (7) *Limits of functions and elliptic operators*. Proc. Indian Acad. Sci. Math. Sci. 114 (2004), no. 2, 153–158.
- (8) *Homology and homeomorphisms of non-orientable surfaces* (joint with Dishant Pancholi), Proc. Indian Acad. Sci. Math. Sci. 115 (2005), no. 3, 251–257.
- (9) *Embedded spheres in  $S^2 \times S^1 \# \dots \# S^2 \times S^1$* , Topology Appl. 153 (2006), no. 7, 1141–1151.
- (10) *Extremes of the Indian summer monsoon*, (joint with Sulochana Gadgil, P.N. Vinaychandran and P.A. Francis) Geophysical Research letters, Volume 31, Issue 12, 2004.
- (11) *The Chord algebra and fundamental groups* (joint with Lenny Ng), Appendix to Knot and braid invariants from contact homology II by Lenny Ng, Geom. Topol. 4 (2005), 1603–1637.
- (12) *Degree-one maps, Surgery and four-manifolds*, Bull. Lond. Math. Soc. 39 (2007), no. 3, 419–424
- (13) *On theta characteristics of a compact Riemann surface*. (joint with Indranil Biswas and Parameswaran Sankaran) Bull. Sci. Math. 131 (2007), no. 5, 493–499.
- (14) *Least-area surfaces and Incompressibility*, Expos. Math. 26 (2008), 93–98.
- (15) *Non-orientable Thom-Pontrjagin constructions and Seifert surfaces*, (joint with Dishant Pancholi), J. Ramanujan Math. Soc. 23 (2008), 143–149
- (16) *Watson-Crick pairing for RNA and Milnor invariants of links*, Journal of Mathematical Biology. Vol. 59, 123–142.
- (17) *Algebraic and Geometric intersection numbers for free groups* (joint with Suhas Pandit), Topology Appl. 156 (2009), no. 9, 1615–1619.
- (18) *Cup products for groups and commutators* (joint with Geetanjali Kachari), to appear in Journal of Group theory.
- (19) *Real theta characteristics and automorphisms of a real curve*(joint with Indranil Biswas), to appear in Journ. Aust. Math. Soc.
- (20) *On the topology of manifolds with positive isotropic curvature* (joint with Harish Seshadri), Proc. Amer. Math. Soc. **137** (2009), no. 5, 1807–1811.
- (21) *Open manifolds, Ozsvath-Szabo invariants and Exotic  $\mathbb{R}^4$ 's*, Expo. Math. **28** (2010), no. 3, 254–261.
- (22) *Splittings of free groups, Normal forms and Partitions of Ends* (joint with Suhas Pandit), Proc. Indian Acad. Sci. (Math. Sci.) **120** (2010), 217–241.
- (23) *Real theta characteristics and automorphisms of a real curve*(joint with Indranil Biswas), J. Aust. Math. Soc. **88** (2010), 29–42.
- (24) *Conjugacy invariant pseudo-norms, representability and RNA secondary structures*, Indian Journal of Pure and Applied Mathematics **42** (2011), 225–237.
- (25) *Surfaces of bounded mean curvature in Riemannian manifolds* (joint with Harish Seshadri), Trans. Amer. Math. Soc. **363** (2011), 3977–4005.
- (26) *A chain complex and Quadrilaterals for normal surfaces* (joint with Tejas Kalelkar), **accepted** by Rocky Mountain Jour. Math.
- (27) *Geosphere Laminations in free groups*, **accepted** by Geometriae Dedicata.
- (28) *The Goldman bracket characterizes homeomorphisms*, **accepted** by Comptes Rendus Mathématique.

- (29) *Lipschitz correspondence between metric measure spaces and random distance matrices*, submitted for publication, arXiv:1110.6333.
- (30) *One-handles and Concordance Kernels for smooth 4-manifolds*, submitted for publication.
- (31) *A triangulation of a homotopy-Deligne-Mumford compactification of the Moduli of curves*, submitted for publication, arXiv:1004.1498.
- (32) *The projective plane, Holomorphic curves and Desargues theorem*, submitted for publication.

#### Expository articles.

- (1) *On the proof of the Poincaré conjecture*, J. Indian Inst. Sci. 87 (2007), 451–456.
- (2) *Orders on manifolds and surgery*, Math. Student **77** (2008), 145-159 (2009).
- (3) *Ricci flow and Perelman’s proof of the Poincaré conjecture* (joint with Harish Seshadri), Current Science 91 (2007), 1326–1334.
- (4) *Ricci flow and the Poincaré conjecture.*(joint with Harish Seshadri) Math. Intelligencer 29 (2007), no. 4, 34–43.
- (5) *A topological characterisation of hyperbolic groups (following Bowditch)*, Proceedings of the Workshop on Topological methods in Group theory, I.M.Sc., Chennai, 2002.
- (6) *Dynamics on the circle*, Resonance, November 2003.
- (7) *Chern and total curvature*, Resonance, April 2005.

#### INVITED LECTURES

- *On the Andrew-Curtis conjecture and Algorithms from topology*, West Coast topology colloquium, Stanford University, April 1999
- *Finite groups that act on  $S^3$  without fixed points*, Colloquium, I.I.Sc., Bangalore, June 2000
- *Introductory lectures (five lectures) on 3-manifolds*, Instructional Conference in low-dimensional topology, Allahabad, December 2000.
- *Cobordisms and Reidemeister torsions of homotopy lens spaces*, Seminar, T.I.F.R., Mumbai, January 2001
- *Equivariant framings of 3-manifolds*, Seminar, T.I.F.R., Mumbai, June 2001
- *Topological Geodesics in 3-manifolds*, Topology seminar, University of Melbourne, August 2001
- *On the Andrew-Curtis conjecture and Algorithms from topology*, Topology Seminar, University of Melbourne, August 2001.
- *On the Andrew-Curtis conjecture and Algorithms from topology*, Special session in Computational topology, American Mathematical Society National meeting, San Diego, January 2002.
- *On the Andrews-Curtis conjecture and Algorithms from Topology*, Groupes et leurs applications en géométrie et topologie, Institut Fourier, Grenoble, 2002.
- *Equivariant framings, Space forms and Contact structures*, Groupes et leurs applications en géométrie et topologie, Institut Fourier, Grenoble, 2002.
- *Random walks and Contact geometry*, Groupes et leurs applications en géométrie et topologie, Institut Fourier, Grenoble, 2002.

- *A topological characterisation of hyperbolic groups (following Bowditch)*, Workshop on Topological methods in Group theory, I.M.Sc., Chennai, 2002 (3 lectures).
- *Contact structures on 3-manifolds*, Colloquium, T.I.F.R., Bangalore, 2002.
- *Topological geodesics in 3-manifolds*, Colloquium, Chennai Mathematical institute, 2002.
- *Topological geodesics in 3-manifolds*, Colloquium, T.I.F.R., Mumbai, 2003.
- *Topological spherical space forms*, Institut Fourier, Grenoble, 2003 (3 lectures).
- *On the Andrew-Curtis conjecture and Algorithms from topology*, Frankfurt-Bocham group theory seminar, Frankfurt, 2003.
- *Topological spherical space forms*, AMS-India meeting, Bangalore, 2003.
- *Symmetries of spheres*, Indian Academy of Sciences Annual Meeting, Varanasi, 2004.
- *Exotic  $\mathbb{R}^4$ 's and Ozsvath-Szabo invariants*, I.I.Sc. Mathematics Colloquium, 2005.
- *Automorphisms of surfaces*, H.R.I., Allahabad, June-July 2005 (4 lectures).
- *The Quest for the best metric*, Conference on *Relativity and its impact on Mathematics*, Belgaum, September 2005.
- *Degree-one maps, surgery and low-dimensional topology*, North-Eastern Hill University, Shillong, October 2006.
- *Heegaard Floer theory, Open manifolds and Teichmuller spaces*, Geometric Topology Conference, Peking University, Beijing, 2007.
- *Embedded spheres, intersection numbers and free groups*, International Conference on Surface mapping class groups, North-Eastern Hill University, Shillong 2008.
- *Topology of Manifolds : Constructing, Describing and Distinguishing spaces*, T.I.F.R. Young Indian Scientists Colloquium, September 2009.

#### OTHER ACTIVITIES

- Co-organiser of the ICM Satellite Conference on *Geometric Topology and Riemannian Geometry*, June 2010.
- Co-organiser of the International Conference *Geometric method in low-dimensional topology*, IISc, Bangalore, June 2006.
- Member, Programme Committee, International Center for Theoretical Science, 2010-
- Co-organiser of the conference 'Low-dimensional manifolds and Groups', ISI, Bangalore June 2004.
- Co-organiser of the Geometry/Topology seminar at Stony Brook, 1999-2002
- Member, Graduate committee, Department of Mathematics, Stony Brook, 2001-2002
- Colloquium chair, I.S.I. Bangalore, 2005-2006
- Seminar-in-charge, IISc, Bangalore, 2006-
- Member, Research fellows advisory committee, I.S.I. Bangalore, 2005-
- Convener, computer committee, I.S.I. Bangalore, 2004-

#### Honours and Awards. :

- *Sloan dissertation fellowship* in Mathematics, 1998-99.

- *Associate of the Indian Academy of Sciences*, 2003-2008.
- *Indian National Science Academy medal for Young Scientists*, 2008.
- *Platinum Jubilee medal for Young Scientist*, National Academy of Sciences India, 2008.
- *Ganesh Prasad Memorial Award lecture* at the Indian Mathematical Society, 2007.
- *NASI-Scopus Young Scientist Award* from Elsevier, 2010.