

John M. Sullivan

Born in Princeton, New Jersey on 25 February 1963

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Professional Preparation

Harvard University	Mathematics	<i>A.B., summa cum laude</i>	1985
Cambridge University	Mathematics	Certif. Adv. Study	1986
Princeton University	Mathematics	<i>Ph.D.</i>	1990
Geometry Center, U. Minnesota	Mathematics	Postdoctoral Fellow	1990–1993
Mathematical Sciences Res. Inst.	Mathematics	Postdoctoral Fellow	1993–1994

Appointments

Mathematical Sciences Research Institute	Research Professor	2003–2004
University of Illinois, Urbana	Associate Professor	2000–
University of Illinois, Urbana	Assistant Professor	1997–2000
University of Illinois, Urbana	Visiting Assistant Professor	1996
University of Massachusetts, Amherst	Visiting Assistant Professor	1995
University of Minnesota	Assistant Professor	1991–1997

Selected Related Publications

(Note: all of these are available electronically at <http://torus.math.uiuc.edu/jms/Papers/>.)

1. Jason Cantarella, Robert B. Kusner and John M. Sullivan. On the minimum ropelength of knots and links. *Inventiones Math.* **150**:2 (2002) 257–286.
2. Chaim Goodman-Strauss and John M. Sullivan. Cubic polyhedra. In A. Bezdek, editor, *Discrete Geometry*, Marcel Dekker, 2003, to appear.
3. Karsten Große-Brauckmann, Rob Kusner, and John M. Sullivan. Constant mean curvature surfaces with three ends. *Proc. Natl. Acad. Sci.* **97**:26 (2000) 14067–14068.
4. John M. Sullivan. The geometry of bubbles and foams. In N. Rivier and J.-F. Sadoc, editors, *Foams and Emulsions*, volume 354 of *NATO Advanced Science Institute Series E: Applied Sciences*, pp 379–402. Kluwer, 1998.
5. Jason Cantarella, Robert B. Kusner, and John M. Sullivan. Tight knot values deviate from linear relations. *Nature*, **392**:6673 (1998) 237–238.

Selected Other Publications

1. John M. Sullivan. Sphere eversions: from Smale through “The Optiverse”. In C. P. Bruter, editor, *Mathematics and Art*, pages 201–212 and 311–313. Springer, Berlin, 2002.
2. Ho-Lun Cheng, Tamal K. Dey, Herbert Edelsbrunner and John M. Sullivan. Dynamic Skin Triangulation. *Discr. Comput. Geometry* **25** (2001) 525–568.

3. Robert B. Kusner and John M. Sullivan. Möbius-invariant knot energies. In A. Stasiak, V. Katritch, and L. H. Kauffman, editors, *Ideal Knots*, volume 19 of *Knots and Everything*, pp 315–352. World Scientific, Singapore, 1998.
4. John M. Sullivan, George Francis, and Stuart Levy. The Optiverse. In H.-C. Hege and K. Polthier, editors, *VideoMath Festival at ICM'98*, page 16 plus 7-minute video. Springer, Heidelberg, 1998. See <http://torus.math.uiuc.edu/ov/>.
5. Rob Kusner and John M. Sullivan. Comparing the Weaire-Phelan equal-volume foam to Kelvin's foam. *Forma*, **11**(3):233–242, 1996. Reprinted, by invitation, in D. Weaire, editor, *The Kelvin Problem*. Taylor and Francis Ltd, London, 1996.

Synergistic Activities

- **Course Development:** I have developed new undergraduate geometry courses which emphasize hands-on work in small groups, and attempt to give more intuitive feeling for the material than in a typical course. Under the Illinois Professional Learners Partnership, I have worked with the UIUC Math Education department to redesign our non-Euclidean geometry course for future teachers. (See <http://torus.math.uiuc.edu/jms/Teach/>.)
- **Outreach:** Over the past seven years, I have given over two dozen lectures to nonmathematical audiences: in industrial research labs, in engineering departments, and to undergraduate groups. My computer graphics images of the mathematical objects I study have been published in over forty different books and magazines, often as cover illustrations. Articles about my video “The Optiverse” have appeared in *Science*, *Science News*, and many other places around the world. (See <http://torus.math.uiuc.edu/jms/Images/>.)
- **Interdisciplinary Research:** I have collaborated on foam problems with chemists and material scientists at Sandia, Arizona State, Illinois, and in France. I am collaborating with computational geometers in the CS department here, on problems related to mesh generation; this work is partially supported by an ITR grant. Some of my work in geometric knot theory was published in *Nature* because of its interest to biophysicists studying DNA loops; other biophysicists have cited my work on Willmore surfaces because these seem to describe cell membranes.

Collaborators

My collaborators over the past four years have been Ken Brakke (Susquehanna U), Jason Cantarella (U Georgia), Ho-Lun Cheng (NU Singapore), Tamal Dey (Ohio State), Jeff Erickson (U Illinois/CS), Herbert Edelsbrunner (Duke U), George Francis (U Illinois), Chaim Goodman-Strauss (U Arkansas), Karsten Große-Brauckmann (TU Darmstadt), Damrong Guoy (U Illinois/CS), Andy Krainik (Sandia), Greg Kuperberg (UC Davis), Rob Kusner (UMass/Amherst), Stuart Levy (U Illinois/NCSA), Alper Üngör (Duke U).

My thesis advisor at Princeton was Fred Almgren (deceased), and my postdoctoral sponsor at the Geometry Center was Al Marden (Minnesota).

My student Wacharin Wichiramala got his PhD in May 2002, having solved the planar triple bubble problem. I am currently supervising three further students at Illinois: Ulises Cervantes-Pimentel, Elizabeth Denne, and Pavel Groisman.