

John M. Sullivan

Born in Princeton, New Jersey on 25 February 1963

Department of Mathematics, University of Illinois
250 Altgeld Hall, 1409 W Green St, Urbana, IL 61801-2975 +1-217-244-5930

jms@math.uiuc.edu <http://www.math.uiuc.edu/~jms/>

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

University of Illinois, Urbana	Associate Professor, Mathematics	2000–
	Faculty Fellow, Theor. & Appl. Mech.	2000–
	Faculty Fellow, NCSA	2000–2001
University of Illinois, Urbana	Assistant Professor, Mathematics	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://www.math.uiuc.edu/~jms/Papers/>.)

1. George Francis, John M. Sullivan, Rob B. Kusner, Ken A. Brakke, Chris Hartman, and Glenn Chappell. The minimax sphere eversion. In H.-C. Hege and K. Polthier, editors, *Visualization and Mathematics*, pages 3–20. Springer Verlag, Heidelberg, 1997.
2. 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*, pages 315–352. World Scientific, Singapore, 1998.
3. 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*, pages 379–402. Kluwer, Dordrecht, 1998.
4. Jason Cantarella, Robert B. Kusner, and John M. Sullivan. Tight knot values deviate from linear relations. *Nature*, **392**(6673):237–238, March 1998.
5. Karsten Große-Brauckmann, Rob Kusner, and John M. Sullivan. Constant mean curvature surfaces with three ends. *Proc. Natl. Acad. Sci. USA* To appear, November 2000.

Selected Other Publications

1. John M. Sullivan. Sphere packings give an explicit bound for the Besicovitch covering theorem. *J. Geometric Analysis*, **4**(2):219–231, 1993.

2. Frank Morgan, John M. Sullivan, and Francis C. Larché. Monotonicity theorems for two-phase solids. *Archive for Rational Mechanics and Analysis*, **124**(4):329–353, 1994.
3. 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.
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 Verlag, Heidelberg, 1998. Available at <http://new.math.uiuc.edu/optiverse/>.
5. John M. Sullivan. “The Optiverse” and other sphere eversions. In *ISAMA 99*, pages 491–497. The International Society of The Arts, Mathematics and Architecture, Univ. of the Basque Country, 1999. Reprinted, by invitation, in *Visual Mathematics*, **1**(3), September 1999. Available at <http://www.math.uiuc.edu/~jms/Papers/isama/>.

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. Now, under the Illinois Professional Learners Partnership, I am working with the Math Education department to redesign our geometry course for future teachers. (See <http://www.math.uiuc.edu/~jms/Teach/>.)
- **Outreach:** Over the past five years, I have given over a 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 three dozen 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://www.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; my work in this area is currently supported by an interdisciplinary grant from NASA. I am collaborating with computational geometers in the CS department here, on problems related to mesh generation; this work is currently supported by an OPAAL 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 (UMass/Amherst), Herbert Edelsbrunner (Duke U), George Francis (U Illinois), Chaim Goodman-Strauss (U Arkansas), Karsten Große-Brauckmann (Uni. Bonn), Andy Kraynik (Sandia), Rob Kusner (UMass/Amherst), Stuart Levy (U Illinois/NCSA), Michael O’Keeffe (AZ State).

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

I am currently supervising four graduate students at Illinois: Ulises Cervantes-Pimentel, Elizabeth Denne, Pavel Groisman, and Wacharin Wichiramala.