CURRICULUM VITAE

Joel Hass
Department of Mathematics
University of California
One Shields Ave.
Davis, California, 95616
(530) 554-2572

1224 Sequoia Place
Davis, CA 95616
(530) 753-4645
FAX: (530) 752-6635

Education

B.A.	Columbia University	1976
M.A.	University of California, Berkeley	1978
Ph.D.	University of California, Berkeley	1981

Experience

Professor, University of California, Davis, 1994-
Department Chair, 2010-2014
Research Professor, MSRI, Fall 2006
Member, Institute for Advanced Study, Princeton, 9/2000-6/2001
Member, Mathematical Sciences Research Institute, 1996-97
Associate Professor, University of California, Davis, 1990-93
Member, Mathematical Sciences Research Institute, Fall 1993
Visitor, Inst. of Advanced Study in Mathematics, Technion, Israel, Spring 1992
Member, Institute for Advanced Study, Princeton, 1990-91
Assistant Professor, University of California, Davis, 1988-90
Visiting Assistant Professor, University of California, Berkeley, Spring 1988
Member, Mathematical Sciences Research Institute, Fall 1987
Senior Lecturer, Hebrew University of Jerusalem, 1986-87
National Science Foundation Postdoctoral Fellow, 1984-86
Mathematical Sciences Research Institute, 1984-85
Hebrew University of Jerusalem, 1985-86
T.H. Hildebrandt Research Asst. Prof., University of Michigan, 1982-84
Postdoctoral Fellow, Hebrew University of Jerusalem, 1981-82

Awards and Fellowships

Fellow of the American Mathematical Society, 2013-
Alfred P. Sloan Research Fellow: 1989-91
Rothschild Fellow, 1987-88
National Science Foundation Postdoctoral Fellow, 1984-86
Rackham Fellow, University of Michigan, 1983
Hebrew University Postdoctoral Fellow, 1981-82

Grants

BSF Grant: *Combinatorics, probability and topology,* co-PI, 2013-17, (with Linial, Nowik)
NSF III: Small:Collaborative Research: *Shape Differences in the Biological Sciences*, co-PI, 2011-14 (with Amenta, Carmichael) $429,322
GAANN Fellowship Grant, Dept. of Education, co-PI , 2010-13
GAANN Fellowship Grant, Dept. of Education, co-PI, $399,798, 2012-15
National Science Foundation research grant, PI, 1983-84, 1987-2010
Conference on Future Directions in 3-manifolds, PI, Ann Arbor Nov. 2005
CARGO program, NSF/DARPA, Co-PI, 2002-2005
GAANN Fellowship Grant, Dept. of Education, PI, 2000-2003 and 2003-2006 and 2006-2010.
Sci. Computing Research Environments for Math. Sci, Co-PI, 1995-97

Professional Service

Workshop organizer, FoCM'2014, Montevideo, Uruguay, 12/2014
Workshop organizer, *Topology and geometric group theory in low dimensions, informed by experiment*, Institute for Computational and Experimental Research in Mathematics, Providence, 10/21-25/2013
Co-organizer, Bay Area Differential Geometry Seminar, 2008-14
NSF Postdoc Panel 12/2008
NSF VIGRE/RTG Panel 12/2007
American Math. Society, Committee on Conferences, 2005-2008 (Chair, 2007-2008).
Co-organizer, *Bay Area Topology Conference*, 1998-2006
Organizer, *Conference on Future Directions in 3-Manifolds*, Ann Arbor, 10/2005
NSF-CBMS Panel, 6/2003
Co-organizer, *SIAM Geometric Design & Computing*, Sacramento, 11/5-8/2001
Organizer, *Mini-symposium on Computational Geometry*, SIAM Geometric Design and Computing, Sacramento, 11/5-8/2001
Co-organizer and co-PI: Clay Mathematics Institute/MSRI summer workshop: *The global theory of minimal surfaces*, MSRI, Berkeley, 6-7/2001
Organizer, Graduate Summer Workshop, *The Global theory of minimal surface,* Clay Math. Institute/MSRI, 6-7/2001
Co-organizer, coPI: *Conference in Low-Dimensional Topology-The KirbyFest*, 6/1998.
Co-organizer, AMS special session, *Topology in dimension 3*, Davis, 4/1997
Organizer & PI, CBMS Conference, *Algorithms in 3-manifolds*, Davis, 8/1995

Ph.D. Students supervised:

1. Howard Iseri, Ph.D. 1992
2. Michelle Stocking, Ph.D. 1996
3. Richard Vaughn, Ph.D. 1998
4. Alex Barchechat, Ph.D. 2003
5. Chan Ho Suh, Ph.D. 2007
6, Kei Nakamura, Ph.D. 2008
7. William Breslin, Ph.D. 2008
8. Carlos Barrera Rodriguez, Ph.D. 2012

External Ph.D. Committees

Ben Burton (Melbourne, 2003)
Bell Foozwell (Melbourne, 2008)
Harry Baik (Cornell, 2014)
Eli Appleboim (Technion, 2014)
Alexander Tsui (Computer Science, UC Davis)

Departmental Service

Department Chair, 2010-14
Member, Academic Senate Executive Committee, 2008-2011
Editor, Mathematics Department Newsletter, 2009-2010
Department Representative, L&S. Assembly, 2008-10.
Member (elected), Math. Dept. Faculty Representative Committee, 2006-8
Chair, Math. Dept. Faculty Representative Committee, 2007-8
Chair, Math. Dept. Search Committee, 2005-06
Department Representative, Acad. Senate Rep. Assembly, 2003-05.
Graduate Vice-Chair, Mathematics Department, 1992-1996, 2001-2004.
Chair, curriculum review committee, Department of Mathematics, 1995

University Service

Member, Provost's 2020 Planning task force, 2011-12
Member, Academic Senate Faculty Welfare Committee, 2010-2013
Davis Representative, UC Assembly of the Academic Senate (elected) 2009-11
Chair, Academic Senate Faculty Welfare Committee, 2008-2009
Member, Academic Senate Faculty Welfare Committee, 2006-2009
L&S Executive Committee, 2005-2007
Dean's Advisory Committee, L&S 2004-2005
Member, Academic Senate Faculty Welfare Committee, 1999-2000
Member, L&S Teaching and Program Review Committee, 1995-98
Dept Representative, Academic Senate Representative Assembly, 1994-97
Academic Senate Committee on Admissions and Enrollment, 1992-93, Chair, 1993-94

Publications and Research

0. *Minimal surfaces in low dimensional manifolds*, Ph.D. Thesis, 1981, (Prof. Robion Kirby, thesis adviser).
1. M. Freedman, J. Hass and G. P. Scott, *Closed geodesics on surfaces*, Bull. London Math. Soc. 14 (1982) 385-391.
2. *The geometry of the slice-ribbon problem*, Proc. Camb. Phil Soc. 94 (1983) 101-108.
3. M. Freedman, J. Hass and G. P. Scott*, Least area incompressible surfaces in 3-manifolds*, Invent. Math. 71 (1983) 609-642.
4. *Complete area minimizing surfaces which are not totally geodesic*, Pacific J. of Math. 111 (1984) 35-38.
5. *Minimal surfaces in Seifert fiber spaces*, Topology and its Applications 18 (1984) 145-151.
6. J. Hass and J. Hughes, *Immersions of surfaces in 3-manifolds*, Topology 24 (1985) 97-112.
7. J. Hass and G. P. Scott, *Intersections of curves on surfaces,* Israel Math. J. 51 (1985) 90-120.
8. J. Hass and J. H. Rubinstein, *One-sided closed geodesics on surfaces*, Mich. Math. J. 33 (1986) 155-168.
9. *Minimal surfaces in foliated manifolds*, Comment. Math. Helvetici 61 (1986) 1-32.
10. *Minimal surfaces in manifolds with S^1 actions and the simple loop conjecture for Seifert fiber spaces*, Proc. Amer. Math. Soc. 99 (1987) 383-388.
11. J. Hass, J.H. Rubinstein and G. P. Scott, *Compactifying Covering spaces of 3-manifolds*, Bull. Amer. Math. Soc. 16 (1987) 117-119.
12. *Surfaces minimizing area in their homology class and group actions on 3-manifolds*, Math. Z. 199, (1988) 501-509.
13. J. Hass and G. P. Scott, *The existence of least area surfaces in 3-manifolds*, Trans. Amer. Math. Soc. 310, (1988) 87-114.
14. J. Hass and C. Frohman, *Compactifying Unstable minimal surfaces and Heegaard Splittings*, Invent. Math. 95, 529-540 (1989)
15. J. Hass, J.H. Rubinstein and G. P. Scott, *Compactifying coverings of 3-manifolds*, J. Differential Geometry 30, (1989) 817-832.
16. J. Hass and A. Thompson, *A necessary and sufficient condition for a manifold to have Heegaard genus one*, Proc. Amer. Math. Soc. 107, (1989) 1107-1110.
17. *Singular curves and the Plateau problem*, International J. of Math. 2, (1991) 1-16.
18. *Genus two Heegaard splittings*, Proc. Amer. Math. Soc. 114, (1992) 565-570.
19. *Intersections of least area surfaces*, Pacific J. of Math. 152, (1992) 119-123.
20. J. Hass and G. P. Scott, *Homotopy equivalence and homeomorphism of 3-manifolds*, Topology 31, (1992) 493-517.
21. J. Hass, J.T. Pitts and J.H. Rubinstein*, Existence of unstable minimal surfaces in manifolds with homology and applications to triply periodic minimal surfaces*, Proc. Symposia in Pure Math. 54 (1992) 147-162.
22. J. Hass and G. P. Scott, *Curve flows on surfaces and intersections of curves*, Proc. Symposia in Pure Math. 54, (1992) 415-421.
23. J. Hass and G. P. Scott, *Homotopy and isotopy in non-Haken 3-manifolds*, Comment. Math. Helvetici 68, (1993) 341-364.

24. J. Hass and W. Menasco, *Topologically rigid non-Haken 3-manifolds*, J. Austral. Math. Soc. 55, (1993) 60-71.
25. J. Hass and G. P. Scott, *Shortening curves on surfaces*, Topology 33, (1994) 25-43.
26. *Metrics on bounded manifolds with convex or concave boundary*, Contemporary Math. 164, (1994) 41-46.
27. J. Hass, *Bounded 3-manifolds admit negatively curved metrics with concave boundary* J. Differential Geometry 40, (1994) 449-459.
28. *Acylindrical surfaces in 3-manifolds*, Michigan Math. J. 42 (1995) 357-365.
29. J. Hass . M. Hutchings and R. Schlafly*, The double bubble conjecture*, ERA-AMS 1, (1995) 98-102.
30. J. Hass and F. Morgan, *Geodesics and soap bubbles on surfaces*, Math. Z. 223 (1996) 185-196.
31. J. Hass and F. Morgan, *Geodesic nets on the 2-sphere*, Proc. Amer. Math. Soc. 124 (1996) 3843-3850.
32. J. Hass and A. Thompson, *Neon bulbs and the unknotting of arcs in manifolds*, J. Knot Theory and its Ramifications 6 (1997) 235-242.
33. J. Hass and R. Schlafly, *Bubbles and Double Bubbles*, Amer. Sci. 84, (1996) 462-467. (Survey article.)
34. J. Hass and R. Schlafly, *Histoires de bulles et de double bulles*, La Recherche 303, (1997) 42–47. (Survey article.)
35. J. Hass, J. Lagarias and N. Pippenger, *The computational complexity of knot and link problems*, preliminary report, Proc. 38th Annual Symp. on Foundations of Comp. Sci., (1997) 172-181.
36. *Algorithms for knots and 3-manifolds*, Chaos, Solitons and Fractals 9, (1998) 569-581.
37. C. Adams, J. Hass and G. P. Scott, *Simple closed geodesics in hyperbolic 3-manifolds*, Bull. London Math. Soc. 31 (1999) 81-86
38. J. Hass, J. Lagarias and N. Pippenger, *The computational complexity of knot and link problems*, Journal of the ACM, 46, (1999) 185-211.
39. J. Hass, H. Rubinstein and S. Wang, *Boundary-slopes of immersed surfaces in 3-manifolds*, J. Differential Geometry 52 (1999) 303-325.
40. J. Hass and G. P. Scott, *Configurations of curves on surfaces*, Proc. of the KirbyFest, Geometry and Topology Monographs, Volume 2, J. Hass and M. Scharlemann Ed., (1999) 201-213.
41. J. Hass and R. Schlafly, *Double Bubbles Minimize,* Annals of Mathematics 151, (2000) 459-515.
42. *General Double Bubble Conjecture in R^3 solved*, MAA FOCUS 20 (2000) 4-5.
43. J. Hass and J. Lagarias, *The number of Reidemeister moves needed for unknotting*, J. Amer. Math. Soc. 14 (2001), no. 2, 399-428.
44. J. Hass, S. Wang and Q. Zhou, *On finiteness of the number of boundary slopes of immersed surfaces in 3-manifolds*, Proc. Amer. Math. Soc. 130 (2002), 1851-1857.
45. I Agol, J. Hass and W. P. Thurston, *3-manifold knot genus is NP-complete,* 761-766, STOC 2002.
46. J. Hass, J.Snoeyink and W.P. Thurston, *The size of spanning disks for polygonal knots,* Discrete and Computational Geometry 29 (2003) 1-17.

47. J. Hass, P. Norbury, and J.H. Rubinstein, *Minimal spheres of arbitrarily high Morse index*, Communications in Analysis and Geometry 11, (2003) 425-439.
48. J. Hass and J. C. Lagarias, *The minimal number of triangles needed to span a polygon embedded in R^d*, Discrete and computational geometry, 509-526, Algorithms Combin., 25, Springer, Berlin, 2003.
49. X. Song, T. Sederberg, J. Zheng, R. Farouki and J. Hass, *Linear perturbation methods for topologically consistent representations of free-form surface intersections*, Comput. Aided Geom. Design 21 (2004), no. 3, 303-319.
50. J. Hass, J. Lagarias and W. Thurston, *Area Inequalities for Embedded Disks Spanning Unknotted Curves*, J. Diff. Geom. 66 (2004), 1-29.
51. , R. Farouki, C. Y. Han, J. Hass, and T. W. Sederberg), *Topologically consistent trimmed surface approximations based on triangular patches*, Computer Aided Geometric Design 21, 459-478 (2004)
52. J. Hass, *Minimal surfaces and the topology of 3-manifolds,* Global theory of minimal surfaces, Clay Math. Proc., 2, Amer. Math. Soc., Providence, RI, (2005) *705--724,*
53. R. Farouki, C. Y. Han and J. Hass, *Boundary evaluation algorithms for Minkowski combinations of complex sets using topological analysis of implicit curves*, Numer. Algorithms 40 (2005), 251-283.
54. I Agol, J. Hass and W. P. Thurston, *The Computational Complexity of Knot Genus and Spanning Area*, Trans. A.M.S 358, 3821-3850 (2005).
55. J.Hass, R. Farouki C. Y. Han, X. Song and T. W. Sederberg*, Guaranteed consistency of surface intersections and trimmed surfaces using a coupled topology resolution and domain decomposition scheme*, Advances in Computational Mathematics, 27 (2007), 1--26.
56. J. Hass and R. Farouki, *Evaluating the boundary and covering degree of planar Minkowski sums and other geometrical convolutions*, Journal of Computational and Applied Mathematics 209, 246-266 (2007).
57. J. Hass and A Thompson, *Is it knotted*?" in Mathematical Adventures for Students and Amateurs, Mathematical Association of America.
58. J. Hass and T. Nowik, *Invariants of knot diagrams,* Math. Ann. 342 (2008) 125–137.
59 J. Hass, J.H. Rubinstein and A. Thompson, *Knots and k-width*, Geometriae Dedicata, 143, (2009) 7--18.
60. J. Hass, A. Thompson and W.P. Thurston*, Stabilization of Heegaard splittings,* Geometry & Topology 13 (2009) 2029–2050. arXiv:0802.2145.
61. J. Hass and T. Nowik, *Unknot Diagrams Requiring a Quadratic Number of Reidemeister Moves to Untangle*, Discrete & Computational Geometry: 44 (2010), 91-95.
62. P. Francis-Lyon, S. Gu, J. Hass, N Amenta and P. Koehl, *Sampling the conformation of protein surface residues for flexible protein docking*, *BMC Bioinform* **11** (2010) 575–588.
63. Selected Mathematical Review: *Proof of the double bubble conjecture*, Bull. AMS 48 (2011) 463--465.

64. S. Gu, P. Koehl, J. Hass and N. Amenta, *Surface-histogram: A new shape descriptor for protein-protein docking,* Proteins: Structure, Function, and Bioinformatics 80, 221–238, (2012).
65. Alex Tsui, Devin Fenton, Phong Vuong, Joel Hass, Patrice Koehl, Nina Amenta, David Coeurjolly**,** Charles DeCarli, and Owen Carmichael, *Globally Optimal Cortical Surface Matching With Exact Landmark Correspondence*, *Proceedings Information Processing in Medical Imaging, IPMI 2013*, 487-498, 2013.
66. J. Hass and G. Kuperberg, *The Complexity of Recognizing the 3-Sphere,* Oberwolfach Reports, Volume 9, Issue 2, 2012, Triangulations, Gert-Martin Greuel (ed.), Oberwolfach Reports, EMS Publishing House, Zurich, Switzerland, (2012), Non-refereed extended abstract 1425-26.
67. J. Hass, *What is an Almost Normal Surface,* Proceedings of Geometry and Topology Down Under: The Rubinstein birthday conference. Contemporary Mathematics 597 (2013), 1-14.
68. P. Koehl and J. Hass, *Automatic alignment of genus-zero surfaces,* IEEE Transactions on Pattern Analysis and Machine Intelligence, 36: 466-478, 2014.
69. A. Coward and J. Hass, *Topological and physical knot theory are distinct,* (to appear in Pacific Math. J.)
70. J. Hass and P. Scott. *Simplicial energy and simplicial harmonic maps*. (to appear in Asian Math. J.)
71. J. Hass and P. Koehl, *How round is a protein? Exploring protein structures for globularity using conformal mapping*. Front. Mol. Biosci. 1:26.

Books

1. *How to Ace Calculus: The Streetwise Guide*, by Colin Conrad Adams, Joel Hass, Abigail Thompson. WH Freeman & Co., September, 1998.
2. *How to Ace the Rest of Calculus: The Streetwise Guide*, by Colin Conrad Adams, Joel Hass, Abigail Thompson. WH Freeman & Co., September, 2001.
3. *Proceedings of the Kirbyfest*. Held in Berkeley, CA, June 22-26, 1998. Edited by Joel Hass and Martin Scharlemann, Geometry & Topology Publications, Coventry, 1999.
4. *Thomas' Calculus* 11th ed. (with Thomas, Weir, Girodano) Addison-Wesley, 2005.
5. *Thomas' Calculus ET*, 11th ed. (with Thomas, Weir, Girodano) Addison-Wesley, 2005.
6. *University Calculus,* (with Thomas, Weir), Addison-Wesley, 2006.
7. *University Calculus Elements,* (with Thomas, Weir), Addison-Wesley, 2008.
8. *Thomas' Calculus,* 12th ed. (with Thomas, Weir) Addison-Wesley, 2009.
9. *Thomas' Calculus ET,* 12th ed. (with Thomas, Weir) Addison-Wesley, 2009.
10. *University Calculus* 2nd ed., (with Thomas, Weir), Addison-Wesley, 2011.
11. *Thomas' Calculus,* 13th ed. (with Thomas, Weir) Addison-Wesley, 2013.
12. *Thomas' Calculus ET,* 13th ed. (with Thomas, Weir) Addison-Wesley, 2014.
13. *University Calculus* 3rd ed., (with Thomas, Weir), Addison-Wesley, 2015.

Refereed for:

National Science Foundation, US Civilian Research and Development Foundation, Department of Energy, Annals of Math, Journal of Differential Geometry, Inventiones Math., Journal of the American Mathematical Society, Michigan Math. Journal, Topology, Topology and its applications, Proceedings of the AMS, Pacific Math. Journal, Israel Math. Journal, Michigan Math. Journal, Contemporary Math., Prentice Hall, Cambridge Univ. Press, Bull. LMS, Geometry & Topology, Asian Math. Journal, Math. Research Letters, Pacific Journal of Math, Geometry and Topology, Discrete and Computational Geometry, Math Z, Geometriae Dedicata, Proceedings of the Cambridge Math. Soc, Asian Journal of Math, Electronic Research Announcements, Experimental Mathematics, Algebraic and Geometric Topology, Journal of London Math. Society, Topology, Journal of the AMS, JKTR.

Plenary Lectures

Institute for Mathematical Analysis, Minneapolis MN, *Optimal maps between surfaces and applications to biology,* 5/1/2014.
Oberwolfach meeting on physical knot theory, 4/2013, *Physical knots and biological geometry (one of two plenary talks given during the week).*
Bay Area Differential Geometry Seminar, UCSC, *Characterizing the sphere via patterns of minimal surfaces,* 10/6/2012.
Joint Annual Meeting, AMS/MAA, Invited Session on Open Problems, Boston, *The smooth 4-dimensional Poincare Conjecture,* 1/6/2012.
Workshop on Low Dimensional Topology and Geometry, Princeton, *Combinatorial harmonic maps,* 3/2011.
Geometry and Topology Down Under Conference, Melbourne Australia
Level-N normal surfaces 7/18/2011 and *What is an almost normal surface* 7/20/2011
Philadelphia Area Topology Seminar, *Width invariants and the physical motion of curves through a medium,* 3/2011.
Workshop on Computational Differential Geometry, Topology, and Dynamics, Fields Institute, Toronto, 11/2009.
Conference on Geometry and Dynamics in Surfaces and 3-Manifolds, Park City Utah, 8/2009.
Texas Topology Conference, Austin, TX 10/2008.
Hamilton Math Institute, Dublin, Ireland, 9/2008.
Conference on Heegaard Splittings, AIM, Stanford CA 12/2007.
Conference on Higher Mathematics, Chengdu, China 11/2007.
Canadian Math Society Winter Meeting, Toronto, 12/11/2006.
MSRI Workshop on Topological methods in combinatorics and computational geometry, 10/4/2006.
Foundations of Computational Mathematics, Santander, Spain 6/2005.
Minerva Graduate Summer School on Surfaces and their Mappings, Univ. Heidelberg (four 90 minute lectures) 8/2003.
MSRI workshop on discrete and computational geometry, 8/2003.

CARGO Seminar, Sonoma, 2/19/2003.
Pacific Northwest Geometry Seminar, 2002 Meeting, Corvallis, 11/16/2002.
Bay Area Mathematics Association Lecture, San Jose State, 11/6/2002.
VISMATH 2002, Conference on Visualization, Berlin, 5/22/2002.
Cascade Topology Conference, Reno, Nevada, 11/3/2001.
Computational Topology Conference, Stanford, 7/30/2001
MSRI/Clay Math. Inst. workshop on Minimal Surfaces, Berkeley, 2 lectures, 7/2001
Pacific Northwest Geometry Seminar, Corvallis, 11/14/1999,
The 15th Annual ACM Symp. on Computational Geom., Miami, 6/13/1999
Computational Topology Conference, Stillwater, March 1999
Technion - International conference on topology and geometry, 1/7/1999
Wasatch Topology Seminar (series of two lectures), 6/15-6/16/98
Topology and Dynamics Conference, Lafayette, Louisiana, 4/1997
Mathematical Association of America, N. CA meeting, SF, CA, February 1997
AMS-MAA invited lecture, Combined summer meeting, Seattle, 8/1996
Math Awareness Week invited speaker, UC Davis, 4/1996
Conference on 3-manifolds, CIRMS, Montreal, June 1995
Cascade topology seminar, Vancouver, Canada, 1994
Conference on low dimensional topology, Haifa, 1992
Pacific geometry conference, Berkeley, 1992
Canadian Math. Society Annual Meeting, Victoria, BC, 1991
Michigan topology conference, 1991
Georgia topology conference, Athens, Georgia, 1990
Conference on Differential Geometry, UCLA, 1990
Topology conference, Columbus, Ohio, 1990
M.S.R.I. Evans Lecture Series, 1987
Annual meeting of the Israel Math. Union, Tel Aviv, 1987
Conference on 3-manifolds, M.S.R.I., 1985
NSF-CBMS Regional Conference on Minimal Surfaces, Stillwater, 1984
Annual meeting of the Australian Math. Society, Melbourne 1984
Michigan topology conference, Ann Arbor, Michigan 1984
Georgia topology conference, Athens, Georgia 1983
Karcher Lectures, University of Oklahoma, 1983

Seminars and colloquium talks

GGAM annual meeting, *Three applications of Geometry to Biology,* 1/2014
UC Davis Geometry-Topology Seminar, *New results on recognizing the 3-sphere,* 12/4/2013
GGAM Colloquium, UC Davis, *Geometric problems in Biology*, 3/15/2013
UC Santa Cruz, Colloquium, *Geometric problems in Biology*, 12/4/2012,
Technion, Topology Seminar, *What is an almost normal surface*? 7/5/2012
Hebrew University of Jerusalem, Combinatorics Seminar, *Recognizing the 3-sphere is in coNP*, 6/2012
Oberwolfach, Germany, *Recognizing the 3-sphere is in coNP,* 3/2012
Stanford Geometry Seminar, *Physical and Topological Knots,* 2/15/2012

Sacramento State Colloquium, *Physical and Topological Knots,* 12/1/2011,
University of Queensland, Colloquium, 4/2010
University of Queensland, Topology Seminar, 4/2010
University of Melbourne, Colloquium 3/2010
Stanford Differential Geometry Seminar, 5/27/2009
Beijing University Topology Seminar, China 11/2007
UC Davis Geometry/Topology Seminar 1/2009
UC Davis Geometry/Topology Seminar 1/2008
Topology Seminar, Beijing, China 11/2007
UC Berkeley Topology Seminar 9/19/2007
UC Irvine Differential Geometry Seminar 11/1/2006
UC Berkeley Topology Seminar 11/1/2006
CARGO conference, Santa Fe, 4/2005
Undergraduate research workshop, Chico State University, 6/2004
Undergraduate research workshop, Chico State University, 6/2003
Colloquium, Chico State University, 3/14/2003
Stanford Differential Geometry Seminar 10/2002
AMS Special Session on Geometric Topology, San Diego, 1/8/2002
Colloquium, Sacramento State University, 5/9/2001
Colloquium, Cal Poly SLO, 11/15/2001
Geometry seminar, Princeton University, 4/27/2001
Princeton University, Differential Geometry seminar, 4/27/2001
Computational complexity seminar, IAS, 3/2/2001
Members seminar, IAS 3/12/2001
Rutgers Newark, 2/15/2001
University of Pennsylvania, Geometry seminar, 12/6/2000
Yale University, Topology seminar, 11/16/2000
Princeton University, Topology seminar, 10/26/2000

Talks at American Mathematical Society special sessions

Special session on Topology around dimension 3, Riverside, 11/2009.
Special session on Computational Topology, San Diego, 1/2002.
Special session on Dehn Surgery, Austin, 1999.
Special session on soap bubbles, Burlington, 1995.
Special session on hyperbolic geometry, Los Angeles, 1992.
Special session on hyperbolic manifolds, Dayton, 1992.
Special session on hyperbolic geometry, Santa Barbara, 1991.
Special session on low-dimensional geometry, Pomona, 1988.
Special session on 3-manifolds, Lawrence, 1988.
Special session on differential geometry, Los Angeles, 1987.
Special session on differential geometry, Anaheim, 1985.
Special session on geometric topology, Salt Lake City, 1983.