Abigail A. Thompson

Address

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Education

B.A.   Wellesley College, Mathematics/Music, 1979
Ph.D. Rutgers University, Mathematics, 1986

Appointments

2017-2020	Chair, Department of Mathematics, UC Davis
1997-present	Professor, UC Davis
2015-2016	Member, Institute for Advanced Study, Princeton
2002-2017	Director, Cosmos Program, UC Davis
2001-2002	Co-Director, Cosmos Program, UC Davis
2000-2001	Member, Institute for Advanced Study, Princeton
1992-1997	Associate Professor, UC Davis
1988-1992	Assistant Professor, UC Davis
1990-1991	Member, Institute for Advanced Study, Princeton
1987-1988	UC President's Fellow, UC Berkeley
1986-1987	Lady Davis Fellow, Hebrew University of Jerusalem

Awards and Fellowships

2022	Christensen Fellow, St. Catherine's College, Oxford
2013	Fellow, American Mathematical Society
2010	UC Davis Distinguished Teaching Award for Graduate Teaching
2003	American Mathematical Society Ruth Lyttle Satter Prize
1994-1995	NSF Career Advancement Award
1991-1993	Alfred P. Sloan Foundation Research Fellow
1988-1991	NSF Postdoctoral Fellow

Professional Service (selection)

2021-present	Secretary, Association for Mathematical Research
2019-2022	Vice-President, American Mathematical Society
2018	Member, External Review Committee U.C. Berkeley Mathematics
2015-2019	Member, International Advisory Committee, RET Spanish Topology Network
2015-2019	Member, Mathematical Sciences Publishers Board of Directors
2015-2018	Member and Chair (2017-2018), American Mathematical Society Fellows Program Selection Committee
2015	Co-organizer, American Mathematical Society Western Section Special session on low-dimensional topology and knot theory
2011-2014	Member and Chair (2012-2014), American Mathematical Society Committee on the Profession
2011-2014	Member and Chair (2013), Association for Women in Mathematics Noether Lecture committee
2009	Co-organizer, International Conference in Low-Dimensional Topology in honor of M. Scharlemann's 60th Birthday, Davis, CA
2008	Co-organizer, American Mathematical Society Mathematical Research Communities Workshop in 3-manifolds and Teichmuller Theory, Snowbird, Utah
2006-2009	Member, Association for Women in Mathematics Executive Committee (elected position)
2005-2008	Member and Chair (2007-2008), American Mathematical Society Editorial Boards Committee, (elected position)
2005	Co-organizer, Workshop in Computational Geometry and Topology Foundations of Computational Mathematics, Santander, Spain
2002-2004	Member and Chair (2003-2004), American Mathematical Society Centennial Prize Committee
2003	Co-organizer, Banff International Research Station Workshop in Low-Dimensional Topology

University Service (selection)

2017-2020	Chair, Department of Mathematics
2017-18	Member, UC Davis Prize Selection Committee
2017-19	Member, College of L&S Teaching Awards Selection Committee
2018-present	Member, Math and Science Teaching (MAST) Advisory Committee
2017-18	Member, College of L&S Teaching Awards Planning Committee
2016-17	Member, Confidential Review Committee
2011-2014	Member and Secretary (2013-15) Academic Senate Executive Council
2011-2012	Member, Mathematical and Physical Sciences Restructuring Committee
2009-2012	Member and Chair (2011-12) College of Letters and Science Executive Committee

Ph.D. Students

Daniel J. Heath (1994);
Curtis Feist (1998) ;
Brad Ballinger (2003; joint with W. Thurston);
Jesse Johnson (2006);
Robin Wilson (2006);
Mike Williams (2008);
Fabiola Manjarrez-Gutierrez (2008);
Marion Moore (2010);
Matthew Rathbun (2010);
Emi Arima (2013);
George Mossessian (2015);
Dale Koenig (2016);
Carson Rogers (2017);
Kevin Lamb (2018);
Patrick Weed (2018).

Postdoctoral Scholars

Nikolas Castro (2016-18)
Anastasiia Tsvietkova (2014-16)

Outreach and Education Activities

- Director, COSMOS program at UC Davis, 2001-2017. This is a 4-week residential cross-disciplinary mathematics and science program for 200 high-achieving high school students, held every summer on the UC Davis campus.

- featured in: California State Library "Women in STEM" 2013 Calendar; [http://www.library.ca.gov/calhist/calendar9-4.html].

- featured in: American Mathematical Society "Women Doing Mathematics" poster, 2010; [http://www.ams.org/women-mathematicians].

- Played cello in string quartets for two UCD Medical School events annually, "Celebration of Life" at the MIND Institute (September) and graduation reception (May), 2017-19.

Special Event

6/2018 UC Berkeley, "thomscharbyfest"
5-day conference in honor of the 60, 70 and 80th birthdays of
A. Thompson, M. Scharlemann and R. Kirby,
https://sites.google.com/sjsu.edu/thompscharbyfest

Invited Talks   **(since 2013)**

4/2013   UC Davis; (Keynote Address)
                Mathematics and Science Teaching Program
                "Knots, Links and Surfaces"

5/2013   Portland State University; (Invited Address)
                Cascade Topology Seminar
                "Generalized width for knots in the 3-sphere"

1/2014   American Mathematical Society; (Moderator)
                Committee on the Profession Panel Discussion
                "Online Courses, Benefits and Pitfalls"

3/2014   Banff International Research Center; (co-Moderator)
                Problem Session in 3- and 4-dimensional topology

8/2014   University of Iowa; (Invited Address)
                Thin Manifolds Conference
                "Finding geodesics on a triangulated 2-sphere"

10/2014   Technion, Haifa, Israel
                Topology Seminar
                "Finding geodesics on a triangulated 2-sphere"

11/2014   Hebrew University, Jerusalem, Israel
                Topology Seminar
                "Thin position and triangulations of the 2-sphere"

1/2015   UC Davis
                Mathematics Club
                "3-dimensional manifolds"

2/2015   Columbia University
                Topology Seminar
                "Heegaard splittings and stabilizations"

8/2015   Trinity College, Dublin; (Invited Address)
                William Rowan Hamilton Geometry and Topology Conference
                "Incompressible surfaces and distance 2 manifolds"

10/2015	Rutgers University Colloquium "Knots and thin position"
11/2015	Institute for Advanced Study Members' Seminar "Optimal knots"
11/2015	Temple University Colloquium "In search of optimal knots"
11/2015	Bryn Mawr College PATCH seminar "Surgery on fibered knots"
12/2016	Institute for Advanced Study Friends of the Institute for Advanced Study "Exploring three dimensions"
1/2016	Institute for Advanced Study Math Conversations "Heegaard splittings and the stabilization problem for 3-manifolds"
1/2016	University of Nebraska Plenary speaker Nebraska Conference for Undergraduate Women in Mathematics "Understanding 3-dimensional spaces"
2/2016	Institute for Advanced Study After-Hours Conversations "Math in the Social Sciences: A story"
3/2016	University of Iowa Plenary Speaker Advances in quantum and low-dimensional topology conference "Surgery on complicated fibered knots"

3/2016	University of Pennsylvania Topology Seminar "Incompressible surfaces and Heegaard splittings of 3-manifolds"
4/2016	Princeton University Topology Seminar "Surgery on complicated fibered knots"
4/2016	C.U.N.Y. Graduate Center Topology Seminar "Incompressible surfaces and Heegaard splittings of 3-manifolds"
2/2017	Yuba College Sacramento Valley Community College Mathematics conference " Problems in combinatorics and knot theory"
3/2017	American Institute of Mathematics Workshop: trisections and low-dimensional topology "An invariant of 4-manifolds"
4/2017	University of Buffalo AWM Lecture series "An invariant of trisected 4-manifolds"
4/2018	AMS Boston meeting Special Session "Link surgery and trisections"
4/2018	Oklahoma State University Redbud Topology Seminar "Link surgery and trisections"

5/2018	UCSB
	Hypatia Seminar
	"Graphs and surfaces"
5/2018	UCSB
	Topology seminar
	"Trisections and surgery on links"
5/2018	Okinawa Institute of Technology
	Workshop: geometry and topology of 3-manifolds
	"Trisections and link surgeries"
1/2019	MATRIX Institute
	Creswick, Australia
	"Trisections and surgery questions on links in 3-manifolds"
3/2022	Oxford
	Topology Seminar
	"Trisected 4-manifolds and link surgery'"
5/2022	ISTA
	Austria
	Topology Seminar
	"Constructing trisections of 4-manifolds"
6/2022	Le Croisic, France
	Surfaces in 4-manifolds conference
	"Kirby diagrams and trisections"

Publications

1. *Property P for the band-connect sum of two knots*, Topology, vol. 26, 1987.

2. *Compressing handlebodies with holes* (with W. Menasco), Topology, vol. 28,1989.

3. *Unknotting number, genus and companion tori* (with M. Scharlemann), Math. Annalen vol. 280, 1988.

4. *Finding disjoint Seifert surfaces* (with M. Scharlemann), Bull. L.M.S., vol. 20,1988.

5. *Knots with unknotting number one are determined by their complements*, Topology, vol. 28, 1989.

6. *Link genus and the Conway moves* (with M. Scharlemann), Comm. Math. Helv., vol. 64,1989.

7. *Thurston norm-minimizing surfaces and skein trees for links in S^3*, Proc. Amer. Math. Soc., vol. 106,1989.

8. *A necessary and sufficient condition for a 3-manifold to have Heegaard genus one* (with J. Hass), Proc. Amer. Math. Soc., vol.107, 1989.

9. *Detecting unknotted graphs in 3-space* (with M. Scharlemann), Journal of Diff. Geometry, vol. 34, 1991.

10. *A polynomial invariant for graphs in 3-manifolds*, Topology, vol. 31, 1992.

11. *Heegaard splittings of (surface)xI are standard* (with M. Scharlemann), Math. Annalen, vol. 295, 1993.

12. *A note on Murasugi sums*, Pacific Journal of Mathematics,vol. 163, no. 2,1994.

13. *Thin position for 3-manifolds* (with M. Scharlemann) Contemporary Mathematics, A.M.S. proceedings of the joint U.S.-Israel workshop on Geometric Topology, vol. 164, 1994.

14. *Thin position and Heegaard splittings of the 3-sphere* (with M. Scharlemann), Journal of Diff. Geometry, vol. 39, 1994.

15. *Pushing arcs and graphs around in handlebodies* (with M. Scharlemann), Proceedings of Low-Dimensional Topology, International Press, 1994.

16. *Thin position and the recognition problem for S^3*, Mathematical Research Letters, vol. 1, 1994.

17. *Book Review: The Classification of Knots and 3-Dimensional Spaces*, by Geoffrey Hemion, Bulletin of the A.M.S., vol. 31, no.2, 1994.

18. *Thin position and bridge position for knots in the 3-sphere*, Topology, vol. 36, no. 2, 1997.

19. *Neon bulbs and the unknotting of arcs in 3-manifolds* (with J. Hass)Journal of Knot Theory and its Ramifications, vol. 6, No. 2, 1997.

20. *Algorithmic recognition of 3-manifolds*, Bull. Amer. Math. Soc., vol. 35, no. 1, 1998.

21. *Genus two manifolds and the disjoint curve property*, Topology and its Applications, vol. 95, 1998.

22. *Levelling an unknotting tunnel*, (with H. Goda and M. Scharlemann) Geometry and Topology, vol. 4, 2000.

23. *Thinning genus two spines in the 3-sphere* (with M. Scharlemann), J. Knot Theory Ramifications 12, no. 5, 2003.

24. *Unknotting tunnels and Seifert surfaces* (with M. Scharlemann), Proc. London Math. Soc. (3) 87 no. 2, 2003.

25. *On the additivity of knot width* (with M. Scharlemann), Proceedings of the Casson Fest, Geom. Topol. Monogr., 7, Geom. Topol. Publ., Coventry, 2004.

26. *Surfaces, submanifolds, and aligned Fox reimbedding in non-Haken 3-manifolds* (with M. Scharlemann), Proc. Amer. Math. Soc. 133 no. 6, 2005.

27. *Invariants of curves in RP^2 and R^2*, Algebraic and Geometric Topology 6, 2006.

28. *Stabilization of Heegaard splittings* (with J. Hass and W. Thurston) Geometry and Topology 13, 2009.

29. *Knots and k-width* (with J. Hass and J. H. Rubinstein), Geometriae Dedicata, Springer, 2009.

30. *Surgery on a knot in (surface X I)* (with M. Scharlemann), Algebraic and Geometric Topology 9, 2009.

31. *Is it knotted?* (with J. Hass), Expeditions in Mathematics, Mathematical Association of America, 2011.

32. *On tunnel number one knots which are not (1,n)* (with J. Johnson), Journal of Knot Theory and its Ramifications 20, 2011.

33. *Fibered knots and potential counterexamples to the property* $2R$ *and slice-ribbon conjectures* (with R.E. Gompf and M. Scharlemann), Geometry and Topology 14 (2010).

34. *3-manifolds with Heegaard splittings of distance two* (with J.H. Rubinstein), Geometry and Topology Down Under, Contemporary Mathematics, AMS, 2013.

35. *Does diversity trump ability?*, Notices of the American Mathematical Society, vol. 61, no. 9, 2014.

36. *Tori and Heegaard splittings*, Illinois J. Math.Volume 60, Number 1, 2016, 141-148.

37. *The number of surfaces of fixed genus in an alternating link complement* (with J. Hass and A. Tsvietkova), International Math Research Notes 6, 2017, 1611-1622.

38. *A new invariant of 4-manifolds*, (with R. Kirby), Proceedings of the National Academy of Sciences, 115 (43), 2018, 10857-10860.

39. *Alternating links have at most polynomially many Seifert surfaces of fixed genus* (with J. Hass and A. Tsvietkova), Indiana University Mathematics Journal, 70(2), 525-534, 2021.

40. *Finding geodesics in a triangulated 2-sphere*, arXiv 1408.5949.

41. *Surgery on complicated fibered knots*, arXiv:1604.04902.

42. *MathJobs at the University of California-R.I.P.*, Notices of the American Mathematical Society, August 2019.

43. *A word from...*, Notices of the American Mathematical Society, November 2019.

44. *Tangle decompositions of alternating link complements* (with J. Hass and A. Tsvietkova), Illinois J. Math. 65(3): 533-545, 2021.

45. *Trisections and link surgeries* (with R. Kirby), New Zealand Journal of Mathematics, Vol. 52, 2021.

46. *The freeness index of a graph*, arXiv:2206.12939.

Books

- *How to Ace Calculus* (with C. Adams and J. Hass), W.H. Freeman, New York, 1998 (Chinese translation, World of Science, 2003).

- *How to Ace the Rest of Calculus* (with C. Adams and J. Hass), W.H. Freeman, New York, 2001.

Co-authors

C. Adams; H. Goda; R.E. Gompf; J. Hass; J. Johnson; W. Menasco; R. Kirby; J.H. Rubinstein; M. G. Scharlemann; A. Tsvietkova; W. Thurston.