

Curriculum Vitae
David Bachman

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CURRENT POSITION

Associate Professor, *Pitzer College* 2008-present

PREVIOUS EMPLOYMENT

Assistant Professor, *Pitzer College* AY 2004-08
Assistant Professor, *California Polytechnic State University at San Luis Obispo* AY 2002-04
Research Assistant Professor, *The University of Illinois at Chicago* AY 2000-02
Assistant Professor, *Portland State University* AY 1999-2000

EDUCATION

Ph.D., Mathematics, *The University of Texas at Austin* May 1999
Dissertation: *A Piecewise-Linear Theory of Minimal Surfaces of Non-Zero Index*
Advisor: C. McA. Gordon
B.S., Mathematics, *State University of New York at Binghamton* June 1993

RESEARCH INTERESTS

Knot theory and 3-Manifold Topology: *normal and almost normal surfaces, Heegaard splittings, thin position, Dehn surgery, contact structures.*
Geometry: *hyperbolic geometry, minimal surfaces, surface modelling.*
Game Theory: *poker models, combinatorial game theory*

GRANTS AND AWARDS

NSF Research Grant (PI, DMS-0906151), "Topologically Minimal Surfaces in 3-Manifolds" 2009-12
Math Circle mini-grant (PI) 2010-11
Support for the "Gateway to Exploring the Mathematical Sciences Program."
MAA Tensor-SUMMA Grant (PI) 2010-11
Support for the "Gateway to Exploring the Mathematical Sciences Program."
Research and Awards Grants, *Pitzer College* 2005-10
State Faculty Support Grant, *California Polytechnic State University, San Luis Obispo* Winter 2003
Outstanding Teaching Award nomination, *Portland State University* June 2000
Continuing Fellowship, *University of Texas at Austin* Spring 1999, Fall 1998
David Bruton Jr. Graduate Fellowship, *University of Texas at Austin* Fall 1997, Summer 1995

PUBLICATIONS

Books

1. "Advanced Calculus DeMYSTiFieD," McGraw-Hill, 2007.
2. "A Geometric Approach to Differential Forms," Birkhäuser, Boston, 2006

Papers

1. "Heegaard Splittings with Boundary and Almost Normal Surfaces," *Topology and its applications* 116 (2001) 153-184.

2. “Critical Heegaard Surfaces and Index 2 Minimal Surfaces,” *Proceedings of the Conference on Heegaard splittings and Dehn surgeries of 3-manifolds, Kyoto (Japan), July, 2001*.
3. “Critical Heegaard Surfaces,” *Transactions of the American Mathematical Society* 354 (2002), 4015-4042.
4. “Thin position for tangles,” (with S. Schleimer) *Journal of Knot Theory and its Ramifications* 12, No. 1 (2003) 117-122.
5. “A note on Kneser-Haken finiteness,” *Proceedings of the American Mathematical Society* 132 (2004) 899-902.
6. “Large embedded balls and Heegaard genus in negative curvature,” (with D. Cooper and M. White) *Algebraic & Geometric Topology* 4, No. 3 (2004) 31-47.
7. “Distance and bridge position,” (with S. Schleimer) *Pacific Journal of Mathematics*. **219** (2005), no. 2, 221-235.
8. “Surface Bundles versus Heegaard Splittings,” (with S. Schleimer) *Communications in Analysis and Geometry* 13, No. 5 (2005) 1-26.
9. “Sweepouts of amalgamated 3-manifolds,” (with S. Schleimer and E. Sedgwick) *Algebraic & Geometric Topology* 6(2006) 171-194.
10. “Non-isotopic Heegaard splittings of Seifert fibered spaces,” (with R. Derby-Talbot) *Algebraic & Geometric Topology* 6(2006) 351-372.
11. “Degeneration of Heegaard genus, a survey,” (with R. Derby-Talbot), Workshop on Heegaard Splittings, *G & T Monographs* **12** (2007) 1-15.
12. “Connected sums of unstabilized Heegaard splittings are unstabilized,” *Geometry & Topology* 12 (2008), no. 4, 2327-2378.
13. “Topological Index Theory for Surfaces in 3-Manifolds,” *Geometry & Topology* 14 (2010) 585-609.
14. “On the existence of high index topologically minimal surfaces,” (with Jesse Johnson), *Mathematical Research Letters* 17 (2010), no. 3, 389-394.
15. “Stabilizing and Destabilizing Heegaard Splittings of Sufficiently Complicated 3-Manifolds,” to appear in *Mathematische Annalen*.

Preprints

1. “Heegaard structure respects complicated JSJ-decompositions,” (with R. Derby-Talbot and E. Sedgwick) submitted for publication, November 2009.
2. “Surfaces that become isotopic after Dehn filling,” (with R. Derby-Talbot and E. Sedgwick) submitted for publication, January 2010.

In Preparation

1. “Persistence of the Heegaard tree after Dehn filling,” (with R. Derby-Talbot and E. Sedgwick).
2. “Topological, Piecewise-Linear, and Geometric Minimal Surfaces.”

PROFESSIONAL EXPERIENCE

Journal Referee

Proceedings of the AMS, Geometry & Topology, Memoirs of the AMS, Topology and its Applications, Experimental Mathematics, Boletín of the Mexican Mathematical Society, Science in China, Series A: Mathematics

Reviewer

Zentralblatt MATH, Mathematical Reviews Database, Addison-Wesley Publishing, National Science Foundation

Organizer/Coordinator

Gateway to Exploring the Mathematical Sciences program (Claremont Math Circle)
Claremont Colleges Consortium

AY 2009-11

Southern California Topology Colloquium <i>Claremont Colleges Consortium</i>	March 2011
Southern California Topology Colloquium <i>Claremont Colleges Consortium</i>	February 2010
AMS sectional meeting special session in Topology <i>Claremont McKenna College</i>	May 2008
Geometry, Topology & Dynamical Systems seminar <i>University of Illinois at Chicago</i>	AY 2000-01
Cascade Topology Conference <i>Portland State University</i>	May 2000
Saturday Morning Math Group <i>University of Texas, Dept. of Mathematics</i>	Spring 1996

CONFERENCE TALKS

The 8th East Asian School of Knots and Related Topics (plenary speaker), Daejeon, Korea Title: <i>Topological, PL, and geometric minimal surfaces</i>	January 9-12, 2012
AMS Section Meeting, Iowa City, IA Title: <i>Normalizing Topologically Minimal Surfaces</i>	March 20, 2011
MAA Mathfest, Portland, OR Title: <i>Convergence of Discrete Poker Models</i>	August 7, 2009
Geometric Topology in 3 and 4 Dimensions, in honor of Martin Scharlemann, Davis, CA Title: <i>Topologically Minimal Surface in 3-Manifolds</i>	June 23-26, 2009
Joint AMS/MAA meeting, Washington, DC Title: <i>Topological Index Theory for Surfaces in 3-Manifolds</i>	January 6, 2009
Cascade Topology Conference, Portland, OR Title: <i>Topological Index Theory for Surfaces in 3-Manifolds</i>	November 8-9, 2008
Joint AMS/MAA meeting, San Diego, CA Title: <i>Counter-examples to the Stabilization Conjecture</i>	January 9, 2008
Conference on Heegaard splittings of 3-Manifolds, Haifa, Israel Title: <i>Gordon's Conjecture</i>	July 10-20, 2005
AMS meeting, Santa Barbara, CA Title: <i>Heegaard splittings and connected sums</i>	April 16-17, 2005
Complex of Curves Fest, Caltech Title: <i>Waldhausen's converse</i>	January 7-9, 2005
Joint AMS/MAA meeting, San Diego, CA Title: <i>A machine for constructing almost normal surfaces</i>	January 5-9, 2002
Conference on Heegaard splittings and Dehn surgeries of 3-manifolds, Kyoto, Japan Title: <i>Critical Heegaard Surfaces</i>	July 5-12, 2001
AMS meeting, New York, New York Title: <i>A new class of useful surfaces in 3-manifolds</i>	November 4-5, 2000
AMS meeting, Santa Barbara, CA Title: <i>Piecewise-Linear Index 2 minimal surfaces.</i>	February 12-13, 2000
International workshop on Geometry and Topology, Haifa, Israel	January 5-12, 1999

Title: <i>Minimizing Morse functions transverse to boundaries</i>	
AMS meeting, Winston-Salem, NC	October 9-10, 1998
Title: <i>Minimizing Morse functions transverse to boundaries</i>	
AMS meeting, Louisville, KY	March 20-21, 1998
Title: <i>Boundary Heegaard Splittings</i>	
Georgia Topology Conference, Athens, GA	July 30-August 3, 1997
Title: <i>Immersed Foliations and Normal Surfaces</i>	
Workshop on Low Dimensional Topology and Geometric Group Theory, Canberra, Australia	
Title: <i>Isotopic Normal Surfaces</i>	June 25-27, 1997
Dehn Surgery Conference, Fayetteville, Arkansas	April 10-12, 1997
Title: <i>Isotopic Normal Surfaces</i>	
Workshop on Computation and Algorithmic Methods in Three Dimensional Topology, Mathematical Sciences Research Institute, Berkeley, CA	March 10-14, 1997
Title: <i>Isotopic Normal Surfaces</i>	
Low Dimensional Topology Seminar, Mathematical Sciences Research Institute, Berkeley, CA	
Title: <i>Isotopic Normal surfaces</i>	December 12, 1996
AMS meeting, Iowa City, IA	March 22-23, 1996
Title: <i>Recognizing Lens Spaces</i>	

SEMINAR TALKS

MIT, Yale, Princeton, UC Bekeley, Caltech, Columbia, UCSD, UCSB, UC Davis, University of Melbourne, Rutgers Newark, American Institute of Mathematics, Boston College, UIC, UT Austin, Cal Poly SLO, Portland State University, Kansas State University, U Penn, Claremont, UC Riverside, USC, Georgia tech, UGA, Cal State Channel Islands.

COURSES TAUGHT

College Algebra, Pre-Calculus, Calculus I-IV, Vector Calculus, Linear Algebra, Differential Equations, Topology I,II, Set Theory, Dynamical Systems, Differential Forms, Graph Theory, Combinatorial Group Theory, Differential Geometry, Combinatorial Game Theory, Mathematics of Cartography, Mathematics of Poker

COMMITTEES/SERVICE

Pitzer College Faculty Executive Committee, Chair	AY 2010-11
Pitzer College Faculty Executive Committee	AY 2009-10
Claremont Center for Mathematical Sciences executive committee	AY 2009-11
Budget Implementation Committee	AY 2009-10
Personnel Review Committee	Spring 2009
Alumni Board	AY 2007-08, 2008-09
Personnel Review Committee	Spring 2008
Research and Awards Committee	2006-07
Personnel Review Committee	Fall 2005