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Positions Held

Visiting Assistant Professor, Texas A&M University, College Station, TX, January 2010 – current.

Visiting Scholar, University of Notre Dame, Notre Dame, IN, July 2009 – current.

Fields Postdoctoral Fellow, Fields Institute, Toronto, Ontario, Canada, July 2009 – December 2009.

Thematic Program on the Foundations of Computational Mathematics

Postdoctoral Research Associate, University of Notre Dame, Notre Dame, IN, May – June 2009.

Education

Ph.D. in Mathematics, University of Notre Dame, Notre Dame, IN, May 2009.

Thesis adviser: Andrew Sommese

Thesis title: Regeneration, local dimension, and applications in numerical algebraic geometry

M.S. in Mathematics, Miami University, Oxford, OH, August 2005.

B.S. *summa cum laude* in Mathematics and Math–Pre-Engineering Emphasis (minor in Computer Science),
University of Findlay, Findlay, OH, May 2003.

Research Stays at Mathematics Institutes

Royal Institute of Technology (KTH), Stockholm, Sweden, June 2008.

Institute for Mathematics and its Applications (IMA), Minneapolis, MN, October 2006.

Thematic Year on Applications of Algebraic Geometry

Publications

Software

- (1) D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Bertini: Software for Numerical Algebraic Geometry. Available at <http://www.nd.edu/~sommese/bertini>.

Published Articles

- (2) D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Adaptive multiprecision path tracking. *SIAM J. Numer. Anal.* 46(2), 722–746, 2008.
- (3) D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Software for numerical algebraic geometry: a paradigm and progress towards its implementation. *Software for Algebraic Geometry*, edited by M.E. Stillman, N. Takayama, and J. Verschelde, volume 148 of *IMA Volume in Mathematics and its Applications*, Springer Verlag, 1–14, 2008.
- (4) A.N. Al-Khateeb, J.M. Powers, S. Paolucci, A.J. Sommese, J.A. Diller, J.D. Hauenstein, and J.D. Mengers. One-dimensional slow invariant manifolds for spatially homogeneous reactive systems. *Journal of Chemical Physics* 131(2), 024118, 2009.
- (5) D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Stepsize control for adaptive multiprecision path tracking. *Contemp. Math.* 496, 21–31, 2009.
- (6) J.D. Hauenstein, J.C. Migliore, C. Peterson, and A.J. Sommese. Numerical computation of the dimensions of the cohomology of twists of ideal sheaves. *Contemp. Math.* 496, 235–242, 2009.
- (7) D.J. Bates, J.D. Hauenstein, C. Peterson, and A.J. Sommese. Numerical decomposition of the rank-deficiency set of a matrix of multivariate polynomials. *Approximate Commutative Algebra*, edited by L. Robbiano and J. Abbott, *Texts and Monographs in Symbolic Computation*, Springer, 55–77, 2009.
- (8) D.J. Bates, J.D. Hauenstein, C. Peterson, and A.J. Sommese. A numerical local dimension test for points on the solution set of a system of polynomial equations. *SIAM J. Numer. Anal.* 47(5), 3608–3623, 2009.

Accepted

- (9) W. Hao, J.D. Hauenstein, B. Hu, Y. Liu, A.J. Sommese, and Y.-T. Zhang. Multiple stable steady

states of a reaction-diffusion model on zebrafish dorsal-ventral patterning. To appear in *Discrete and Continuous Dynamical Systems - Series S*.

(10)J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Regeneration homotopies for solving systems of polynomials. To appear in *Mathematics of Computation*.

Submitted

(11)D.J. Bates, J.D. Hauenstein, and A.J. Sommese. Efficient endgames and path tracking methods.

(12)J.D. Hauenstein. A counter example to an ideal membership.

Presentations

Computing Hilbert functions using dual bases, AMS National Meeting, San Francisco, January 2010 (invited).

Algebraic computations using numerical dual bases, “Oberwolfach Seminar: New Trends in Algorithms for Real Algebraic Geometry,” Mathematisches Forschungsinstitut Oberwolfach, November 2009 (invited).

Finite games, homotopy continuation, and numerical algebraic geometry, Combinatorics and Probability seminar, University of Pennsylvania, October 2009 (invited).

Homotopy continuation and numerical algebraic geometry, Postdoctoral seminar series, Fields Institute, October 2009.

Numerical algebraic geometry and its applications, University of Central Oklahoma, January 2009 (invited).

Algorithms of Numerical Algebraic Geometry and Bertini, CIAM Tutorial, Royal Institute of Technology (KTH), June 2008 (invited).

Homotopy continuation and intersecting algebraic sets without defining equations, Graduate Student Seminar, University of Notre Dame, October 2007 (invited).

Regeneration, adaptive multiprecision and Bertini, AMS Sectional Meeting, DePaul University, October 2007 (invited).

Parallel Solving of Polynomial Systems, Center for Research Computing Workshop on Scientific Computing, University of Notre Dame, May 2007 (invited).

An Introduction to Multiobjective Optimization and Its Applications to Finite Games, AMS Sectional Meeting, Miami University, March 2007 (invited).

Kuhn-Tucker Conditions in Multiobjective Optimization, MAA Ohio Sectional Meeting, Miami University, April 2005.

Other Conferences and Workshops Attended

Mathematical Developments Arising from Biology, Mathematical Biosciences Institute, November 2009.

Workshop on Complexity of Numerical Computation, Fields Institute, October 2009.

International Workshop on Model Reduction in Reacting Flows, University of Notre Dame, March – April 2009.

Joint Mathematics Meetings, Washington, D.C., January 2009.

International Conference on Scientific Computing, Las Vegas, Nevada, July 2008.

Foundations of Computational Mathematics, City University of Hong Kong, June 2008.

Interactions of Classical and Numerical Algebraic Geometry, University of Notre Dame, May 2008.

SIAM Conference on Parallel Processing for Scientific Computing, Atlanta, Georgia, March 2008.

Spring Center for Applied Mathematics Workshop, University of Notre Dame, February – March 2008.

Symbolic-Numeric Computation International Workshop, University of Western Ontario, July 2007.

International Conference on Applications of Computer Algebra, Oakland University, July 2007.

Spring Center for Applied Mathematics Workshop, University of Notre Dame, March 2007.

Software for Algebraic Geometry Workshop, Institute for Mathematics and its Applications, October 2006.

Spring AMS Sectional Meeting, University of Notre Dame, April 2006.

Spring Center for Applied Mathematics Workshop, University of Notre Dame, March 2006.

Teaching and Related Experience

Instructor, *Differential Equations*, Texas A&M University, Spring 2010.

Differential equations course for all majors. Responsible for creating all course material, including exams, all lectures, and exam grading.

Instructor, *Center for Applied Mathematics Minicourse on Parallel Programming*, University of Notre Dame, April 24, May 1, and May 8, 2008.

Sequence of lectures that introduce and demonstrate MPI to those familiar with programming in C.
Instructor, *Principles of Finite Mathematics*, University of Notre Dame, Spring 2008.

Introductory finite mathematics class. Responsible for creating all course material, including exams, all lectures, and exam grading.

Instructor, *Calculus I*, Miami University, Fall 2004 and Spring 2005.

Calculus course for all majors. Responsible for creating all course material, including hour exams, all lectures, and grading.

Instructor, *Precalculus*, Miami University, Fall 2003 and Spring 2004.

Precalculus course for all majors. Responsible for creating all course material, including hour exams, all lectures, and grading.

Tutor, various courses, University of Findlay, 2000 – 2002.

Pedagogical Training

University of Notre Dame Mathematics Teaching Seminar, 2006.

Miami University Seminar in the Teaching of First-Year Mathematics and Statistics, 2003.

Honors and Awards

Outstanding Graduate Student Teacher Award for Excellence in Teaching, Kaneb Center for Teaching and Learning, University of Notre Dame, 2009.

Graduate Assistant Effective Teacher Award in Mathematics and Statistics, Miami University, 2005.

Graduate Faculty Prize in Mathematics and Statistics, Miami University, 2005.

Outstanding Senior Majoring in Mathematics, University of Findlay, 2003.

Mathematics and Computer Science Horizons Award, University of Findlay, 2001 and 2002.

Scholarships and Fellowships

Graduate Fellow of the Center for Applied Mathematics, University of Notre Dame, 2007 – 2008.

University of Notre Dame University Fellowship, 2005 – 2006.

Miami University Graduate Summer Scholarship, 2004 and 2005.

Miami University Graduate Assistantship, 2003 – 2005.

Miami University Graduate School Academic Achievement Assistantship, 2003.

Ohio Board of Regents Graduate/Professional Fellowship, 2003 – 2004.

Service

Miami University Mathematics Student Advisory Board member, 2004 – 2005.

Memberships

American Mathematical Society (AMS).

Society for Industrial and Applied Mathematics (SIAM).

References

Professor Andrew Sommese
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Professor Bei Hu (teaching)
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