Joshua Jerome Thompson

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Education

University of Utah, Ph.D. in Mathematics, *2010*
Thesis Advisor: Kenneth W. Bromberg
Wake Forest University, M.A. in Mathematics, *2002*
Thesis Advisor: Hugh N. Howards
Wofford College, B.A. in Mathematics, *1999*
Mentor: James P. Mahaffey

Employment

Northern Michigan University
Assistant Professor, Mathematics *Fall 12 - Current*
Colorado State University
Departmental Postdoctoral Fellow, *Fall 11 - Summer 12*
Colorado State University
Directorate of Central Intelligence Postdoctoral Fellow, *Fall 08 - Fall 11*
University of Utah
Teaching Assistant, *Fall 02 - Spring 07*

Research

Geometric and Topological Data Analysis
We derive and implement geometric algorithms for anomaly and feature detection in large data sets. This includes clustering algorithms, computational geometry, manifold learning, and identity map interpolations as well as extensions of established vector space algorithms to non-linear parameter spaces.

Geometric Topology
Complex projective structures on surfaces are rich geometric structures which draw upon ideas of low-dimensional topology and geometry, complex analysis and geometric group theory. Using work of William Thurston and Bill Goldman we generate new classes projective structures. We use topological and combinatorial techniques to classify these new geometric structures in terms of their underlying topological properties.

Publications

Accurate fault prediction of BlueGene/P RAS logs via geometric reduction, with M. Kirby, D. Dreisigmeyer, T. Jones, & J. Ladd. *Proc. of the Int. Conf. on Dependable Systems and Networks Workshops* (DSN-W), pp. 8-14, 2010, doi:10.1109/DSNW.2010.5542626.

Some graftings of complex projective structures with Schottky holonomy. Soon to appear in *Geometriae Dedicata*. doi: 10.1007/s10711-012-9792-3.

Identity maps and their extensions on parameter spaces: Applications to anomaly detection in video processing, with M. Kirby and C. Peterson. *In preparation*

Talks

MAA/AMS Joint Meetings: What if Ax=b mean Ax=Me?	*Winter 2013*
NMU Math Colloquium: Penrose Tilings from the ground up.	*Fall 2012*
UPMAA Sectional Conference: Penrose Tilings.	*Fall 2012*
NMU Math Colloquium: What does data look like?	*Fall 2012*
NMU Math Colloquium: Applications of Linear Algebra	*Spring 2012*
ICIAM 2011: Novelty Detection on the Grassmannian	*Summer 2011*
CSU Dynamics Seminar: The Dynamics of MSET	*Spring 2010*
CSU Applied Math Colloquium: Extending a Mapping of the Identity	*Spring 2010*
CSU Pattern Analysis Seminar: MSET and Supercomputer RAS Logs	*Spring 2009*
CSU Pattern Analysis Seminar: The Nash C-1 Embedding Theorem	*Fall 2008*
MSRI Teichmuller Theory Program: Fuchsian Schottky Projective Structures	*Fall 2007*
MSRI Graduate Colloquium: Grafting and Bending Hyperbolic Surfaces	*Fall 2007*
Math Circle: Knots and Their Invariants	*Spring 2006*
Mini Max Dehn Seminar: Surfaces and the Hyperbolic Plane	*Fall 2006*
Pure Math Group: Introduction to Complex Projective Structures	*Fall 2006*
GSAC Colloquium: Fractal Dust and Schottky Dancing	*Fall 2006*
Mini Max Dehn Seminar: Earthquakes	*Fall 2005*
GSAC Colloquium: Introduction to Geometric Structures	*Spring 2004*
Mini Max Dehn Seminar: The Loop and Sphere Theorems	*Fall 2003*
GSAC Colloquium: Normal Curves and Surfaces in Ideal Triangulations	*Fall 2002*
High Point University: Curves, Surfaces and Triangulations	*Spring 2002*

Invited Talks

DCI Colloquium: Parameter Spaces for Anomaly Detection	*Spring 2011*
DCI Colloquium: Classification & Detection of Features and Anamolies in Signals	*Spring 2010*
FTXS 1st Annual Workshop: Fault Prediction using BlueGene/P Syslogs and MSET	*Summer 2010*

Teaching Experience

Northern Michigan University

Precalculus	*Fall 2012*
Linear Algebra	*Fall 2012, Winter 2013*
College Algebra	*Winter 2013*
Topology	*Winter 2013*

Colorado State University

Calculus I	*Fall 2010*
PDEs, ODEs & Linear Algebra: Math for Scientists & Engineers	*Fall 2011*
Intro to Ordinary Differential Equations	*Spring 2012*

University of Utah

Calculus for Business	*Spring 2006*
Linear Algebra & Diffferential Equations	*Summer 2005*
Calculus II WebWork Administrator	*Spring 2005*
Quantitative Reasoning	*Fall 2005, Spring 2004, Summer 2003*
Algebra for Buisiness	*Spring 2004*
Calculus I	*Fall 2003*

Calculus I (Teaching Assistant)   *Fall 2002*

Wake Forest University
Calculus I Teaching Assistant   *Fall 2000 to Fall 2002*

Special Education Teacher's Aide   *Spring 2000*
Assisted and led the instruction of fifteen Special Needs students in mathematics, science and history at Morristown West High School in Morristown, Tennessee.

Student Teacher   *Fall 1999*
Final component of South Carolina Secondary School Teacher Certification. Assumed full teaching duties of five sections; remedial math, intermediate algebra and precalculus at Spartanburg High School in Spartanburg, South Carolina. Responsibilities included writing syllabus, exams, quizzes, lectures and evaluations.

Other Employment

Whitewater Raft Guide & Kayaking Instructor   Summer 1999, 2001, 2002, 2007, 2008
Guided, led and organized single-day and multi-day rafting and kayaking trips on multiple rivers in Tennessee and West Virginia and Colorado. Trained new river guides and instructed kayaking while working at Wildwater Ltd. in Hartford, TN, North American River Runners in Fayetteville, WV and Mountain Whitewater Descents in Ft. Collins, CO.

C/C++ Programming   *Summer 1998*
Wrote programs to sort and read pharmaceutical data at QS/1 in Spartanburg, South Carolina.

Conferences, Workshops and Programs

Joint AMS/MAA Meeting	*Spring 2013*
MAA UP Sectional	*Fall 2012*
MAA Minicourse on geometry and algebra in mathematical music theory	*Winter 2010*
AMS Short Course on Computational Topology	*Winter 2010*
Directorate of Central Intelligence Colloquium 2010	*Spring 2010*
IEEE Workshop on Fault Tolerance for HPC at Extreme Scale	*Summer 2010*
Joint AMS/MAA Meeting	*Spring 2007*
Viewpoints: The Connections Between Math and Art	*Spring 2007*
MAA Mini-Course on Math and Origami	*Spring 2007*
MAA Mini-Course on Math and Music	*Spring 2007*
Kleinian Groups and Teichmuller Theory MSRI Program	*Fall 2007*
AMS Sectional Meeting	*Fall 2004 & Fall 2006*
Wasatch Topology Conference	*Winter 2004 - Fall 2006*
Mini-Course on Recent Advances in Hyperbolic 3-manifolds	*Summer 2006*
Fields Institute, Toronto, CA	
Hyperbolic Geometry Workshop	*Summer 2006*
Fields Institute, Toronto, CA	
Ahlfors Bers Colloquium	*Summer 2005*
Mini-Course on Teichmuller Theory	*Summer 2004*

Awards, Honors and Achievements

NSF supported VIGRE Research Fellowship *2006 - 2007*
This award given to promising students is designed to promote the Vertical Integration of Research and Eduction.

College Football
Academic All-District at Wofford College *1999*
Wofford College team captain *1999*

Long-Distance Hiking *Spring - Summer 2000*
Completed a continuous 6 month thru-hike of all 2162 miles of the Appalachian Trail. Chronicled the experience online at www.trailplace.com.

Service

VIGRE Instructor/Assistant for Utah Math Circle *2007*
As part of the VIGRE program, instructed and assisted discussion for the Math Circle, a program for promising high school mathematics students.

VIGRE Judge of Middle School Science Fair *2007*
As part of the VIGRE program, judged science fair projects at several Utah middle schools.

Graduate Student Advisory Committee
College of Science Retention Promotion and Tenure Committee *2004 - 2005*
GSAC Co-Chair *2005 - 2006*

University of Utah Graduate Teaching Orientation Facilitator *August 2006*
Incoming graduate students enlist in this workshop, preparing them for teaching responsibilities. I was asked to serve as a facilitator of this two-week workshop.

Wofford College Speaker's Bureau *1998 - 1999*
Visited inner-city grade schools, promoting well-being, work ethic and joy of education.

References

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