

SAMUEL A. BALLAS

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Current Employment

Florida State University

- Assistant Professor

Tallahassee, Florida
August 2016-Present

Previous Employment

University of California at Santa Barbara

- RTG Visiting Assistant Professor

Santa Barbara, California
July 2013-July 2016

Education

University of Texas at Austin

- Ph.D., Mathematics
Thesis: *Flexibility and Rigidity of Three-Dimensional Convex Projective Structures*.
Advisor: Alan Reid

Austin, Texas
May 2013

- M.A., Mathematics

May 2011

Emory University

- B.S. Mathematics., *Summa cum Laude*
Thesis: *Geometrically Finite Fuchsian Groups and the Patterson-Sullivan Measure*.
Advisor: David Borthwick

Atlanta, Georgia
May 2007

Research Interests

Low-dimensional topology, hyperbolic geometry, real projective geometry, deformation theory, higher Teichmüller theory.

Publications and Preprints

- *Constructing thin subgroups of $SL(n+1, \mathbb{R})$ via bending*
(with D.D. Long), arXiv:1809.02689, submitted 2018.
- *Constructing convex projective 3-manifolds with generalized cusps*
arXiv:1805.09274, submitted 2018.
- *Generalized cusps in real projective manifolds: classification*
(with D. Cooper and A. Leitner), arXiv:1710.03132, submitted 2017.
- *Properly convex bending of hyperbolic manifolds*
(with L. Marquis), arXiv:1609.03046, submitted 2016.
- *Convex projective structures on non-hyperbolic 3-manifolds*
(with J. Danciger and G.S. Lee), *Geom. & Topol* 22 (2018) 1593–1646.
- *Constructing thin subgroups commensurable with the figure-eight knot group*
(with D.D. Long), *Algebr. Geom. Topol.* 15 (2015) no. 5, 3011–3024.

- *Finite volume properly convex deformations of the figure-eight knot*,
Geom. Dedicata 178 (2015), 49-73.
- *Deformations of non-compact, projective manifolds*,
Algebr. Geom. Topol. 14 (2014), no. 5, 2595-2625.

In Preparation

- *Complex projective structures on the thrice punctured sphere*
(with P. Bowers, A. Casella, and L. Ruffoni).
- *Gluing equations for 3-dimensional projective structures*
(with A. Casella).
- *Convex projective Dehn filling*
(with J. Danciger, G.S. Lee, and L. Marquis).
- *Generalized cusps in real projective manifolds: deformations*
(with D. Cooper and A. Leitner).

Selected Talks

- “Gluing Equations for Projective Structures on 3-manifolds”
Geometry Seminar
Stanford University
Mar 2019
- “Thin Groups via Bending”
Topology Seminar
Rice University
Feb 2019
- “Thin Groups from Projective Geometry”
Thin Groups in Number Theory, Geometry and Topology
Rice University
May 2018
- “Convex Projective Structures in Low Dimensions”
University of Georgia, Topology Seminar
April 2018
- “Generalized Cusps in Convex Projective Manifolds”
GEAR Retreat, Stanford University
August 2017
- “Generalized Cusps in Convex Projective Manifolds”
Dynamics on Character Varieties Workshop, University of Rennes I
June 2017
- “Rank 1 Deformations of Non-cocompact Hyperbolic Lattices”
University of Texas Topology Seminar
March 2017
- “Geometric Structures on Manifolds”
UF/FSU Topology and Dynamics Meeting
University of Florida
February 2017
- “Classification of Generalized Cusps”
Joint Mathematics Meetings, Special Session on Group Actions and Geometric Structures,
Atlanta, GA
January 2017
- “Classification of Generalized Cusps”
California Institute of Technology, Geometry and Topology Seminar
April 2016

- “Geometric Structures on Manifolds”
Mathematics Colloquium
Florida State University January 2016
- “Gluing Convex Projective Manifolds”
Higher Teichmüller theory and Higgs bundles: interactions and new trends
Heidelberg November 2015
- “Convex Projective Structures on Manifolds”
A Mini Course at Workshop on Geometric Structures
KIAS, Seoul, South Korea November 2014
- “Geometry of Cusps in Convex Projective Manifolds”
Workshop on Geometry and Physics, University of Pittsburgh May 2014
- “Geometry of Cusps in Convex Projective Manifolds”
RTG Workshop on Geometric Structures and Discrete Groups, UT Austin May 2014
- “A Geometric Description of $(P)SL_4(\mathbb{R})$ Hitchin Representations”
Workshop on Higher Teichmüller-Thurston Theory, Northport, Maine June 2013
- “Convex Projective Structures on Non-compact 3-manifolds”
California Institute of Technology, Geometry and Topology Seminar May 2013
- “Convex Projective Deformations of the Figure-8 Knot Complement”
AMS Special Session on Algebraic and Geometric Structures of 3-manifolds April 2013
- “Convex Projective Deformations of Non-Compact Manifolds”
Arizona State University Differential Geometry Seminar January 2013
- “Convex Projective Deformations of Non-Compact Manifolds”
Purdue University Geometric Analysis Seminar January 2013
- “Convex Projective Structures on 3-manifolds”
University of California at Santa Barbara Topology Seminar October 2012
- “Twisted Cohomology and Deformation Theory”
GEAR Junior Retreat, Urbana, Illinois July 2012

Teaching Experience

Florida State University

- *MAC 2313, Calculus III* Fall 2019
- *MAC 2312, Calculus II* Spring 2019
- *MTG 5327, Graduate Topology II* Spring 2019
- *MAC 2313, Calculus III* Fall 2018
- *MTG 5326, Graduate Topology I* Fall 2018
- *MAP 2303, ODEs* Spring 2018
- *MAC 2312, Calculus II* Spring 2017
- *MAC 2313, Calculus III* Fall 2016

University of California, Santa Barbara

- *Math 260P, Projective Structures on Manifolds* Spring 2016
- *Math 108A, Introduction to Linear Algebra* Fall 2015

- *Math 8, Transition to Higher Mathematics* Fall 2015
- *Math 260P, The Casson Invariant* Spring 2015
- *Math 6A, Vector Calculus* Winter 2015
- *Math 108A, Introduction to Linear Algebra* Fall 2014
- *Math 260P, Representations of Surface Groups* Spring 2014
- *Math 8, Transition to Higher Mathematics* Winter 2014
- *Math 103, Introduction to Group Theory* Fall 2013

Mentorship

Postdocs Supervised

- Alex Casella

Independent Study

- Daniel Hartman (2018, graduate student, geometric structures and characteristic classes)
- Jose Bousa (2017, undergraduate, projective geometry)

Ph.D. Committee Member

- Anindya Chanda (advisor Sergio Fenley)
- Aamir Rasheed (advisor Wolfgang Heil)
- Jay Leach (advisor Kathleen Petersen)
- Opal Graham (advisor Phil Bowers)
- John Bergschneider (advisor Wolfgang Heil)
- Leona Sparaco (advisor Kathleen Petersen)

Funding and Awards

Grants Awarded

- First Year Assistant Professor Award, Council for Research and Creativity, Florida State University, \$20,000, Summer 2017
- NSF research grant -DMS 1709097- *Geometry and topology of convex projective manifolds*, \$139,278, 2017-2020

Grants Pending

- NSF CAREER Grant, #1942427 *Projective structures at the interface of geometry, topology, and number theory*, Amount requested \$404,444, 60 months. Submitted July 2018

Professional and University Service

Florida State University

2016-present

- Organizer of AMS Sectional Meeting on Geometric Structures on Manifolds, Nov 2019.
- Organizer of UF/FSU Topology and Geometry Meeting, Feb 2019
- Organizer of FSU Topology Seminar, AYs 2018-2020
- Organizer of GEAR network Junior Retreat
- Referee for several journals (e.g. Proceedings of the American Mathematical Society, Journal of the London Mathematical Society, Pacific Journal of Mathematics, etc.).
- Reviewer for Mathematical Reviews

Honors, Awards, and Fellowships

- Research Training Grant Postdoc, UC Santa Barbara 2013-2016
- Research Training Grant Fellowship, UT Austin 2011-2012
- Deborah Jackson Award recipient, Emory University 2007

Professional Memberships and Associations

- Member of the American Mathematical Society (AMS) 2007-present.

Last updated September 3, 2019