

Jeffrey Danciger

Department of Mathematics
The University of Texas at Austin
1 University Station, C1200
Austin, TX 78712

phone: 512-471-1140
email: jdanciger@math.utexas.edu
website: www.ma.utexas.edu/users/jdanciger

Current Position

Assistant Professor, UT Austin. Fall 2014 -

Past Positions

Visiting Assistant Professor, Stanford University. AY 2018 - 2019

Research member, MSRI, Spring 2015.

R.H. Bing Instructor and NSF postdoctoral fellow, UT Austin, Fall 2011 - Spring 2014.

Research Interests

Geometry and topology in low dimensions.

Geometric structures modeled on non-Riemannian homogeneous geometries, including constant curvature semi-Riemannian geometry, projective geometry, and affine geometry.

Education

June 2011 Ph.D. Mathematics, Stanford University.
Adviser: Steven Kerckhoff
Thesis: *Geometric transitions: from hyperbolic to anti de Sitter geometry.*

June 2006 B.S. Mathematics and Physics, UCSB, College of Creative Studies.

Honors, Awards & Fellowships

NSF Grant - Topology, *Deformation spaces of geometric structures*, 2018–

Sloan Research Fellowship, 2016–2019.

NSF Grant - Topology, *Spaces of geometric structures via geometric transitions*, 2015–2019.

Séminaire N. Bourbaki about my work with Guéritaud and Kassel, by Jean-Marc Schlenker, June 2015.

Publications

1. F. Bonsante, J. Danciger, S. Maloni, J.-M. Schlenker, *Quasircles and width of Jordan curves in $\mathbb{C}\mathbb{P}^1$* , arXiv:1908.09175, 2019 (submitted).

2. F. Bonsante, J. Danciger, S. Maloni, J.-M. Schlenker, *The induced metric on the boundary of the convex hull of a quasicircle in hyperbolic and anti de Sitter geometry*, arXiv:1902.04027, 2019 (submitted).
3. J. Danciger, T. Zhang, *Affine actions with Hitchin linear part*, Geometric and Functional Analysis, doi 10.1007/s00039-019-00511-6 (online first).
4. J. Danciger, F. Guéritaud, F. Kassel, *Proper affine actions of right-angled Coxeter groups*, arXiv:1804.03132, 2018 (submitted).
5. J. Danciger, F. Guéritaud, F. Kassel, *Convex cocompact actions in real projective geometry*, arXiv:1704.08711, 2017 (submitted).
6. J. Danciger, F. Guéritaud, F. Kassel, *Convex cocompactness in pseudo-Riemannian hyperbolic spaces*, Geometriae Dedicata, special issue *Geometries: A celebration of Bill Goldman's 60th birthday.*, **192**, Issue 1, pp. 87–126, 2018.
7. S. Ballas, J. Danciger, G.-S. Lee, *Convex projective structures on non-hyperbolic three-manifolds*, Geometry and Topology, **22** (2018), pp 1593–1646.
8. J. Danciger, F. Guéritaud, F. Kassel, *Fundamental domains for free groups acting on anti-de Sitter 3-space*, Mathematical Research Letters, **23** (2016), no. 3, pp. 735–770.
9. J. Danciger, S. Maloni, J.-M. Schlenker, *Polyhedra inscribed in a quadric*, arXiv:1410.3774, 2014 (submitted).
10. D. Cooper, J. Danciger, A. Wienhard, *Limits of geometries*, Transactions of the American Mathematical Society, **370** (2018), 6585–6627.
11. J. Danciger, F. Guéritaud, F. Kassel, *Margulis spacetimes via the arc complex*, Inventiones Mathematicae, **204** (2016), no. 1, pp. 133–193.
12. J. Danciger, F. Guéritaud, F. Kassel, *Geometry and topology of complete Lorentz spacetimes of constant curvature*, Annales scientifiques de l'École normale supérieure, **49** (2016), no. 1, pp/ 1–56.
13. J. Danciger, *Ideal triangulations and geometric transitions*, Journal of Topology, **7** (2014), no. 4, pp. 1118–1154.
14. J. Danciger, *A geometric transition from hyperbolic to anti de Sitter geometry*, Geometry and Topology **17** (2013), no. 5, pp. 3077–3134.
15. J. Danciger, S. Devadoss, J. Mugno, D. Sheehy, R. Ward, *Shape deformation in continuous map generalization*, GeoInformatica **13** (2009), no. 2, pp. 203–221.
16. J. Danciger, S.R. Garcia, M. Putinar, *Variational principles for symmetric bilinear forms*, Math. Nachr. **281** (2008), Issue 6, pp. 761–911.
17. J. Danciger, S. Rubinstein-Salzedo, *A Hilbert Space Approach to Bounded Analytic Interpolation Theory*, Complex Analysis and Operator theory, **1** (2007), no. 4, 523–532.
18. J. Danciger, *A Min Max Theorem for Complex Symmetric Matrices*, Linear Algebra and Its Applications **412** (2006), no. 1, 22–29.
19. J. Danciger, S. Devadoss, D. Sheehy, *Compatible Triangulations and Point Partitions by Series Triangular Graphs*, Computational Geometry: Theory and Applications **34** (2006), no. 3, 195–202.

Works in preparation

1. *Margulis spacetimes with parabolic elements*, with F. Guéritaud, and F. Kassel.
2. *Convex cocompactness for right angled reflection groups*, with F. Guéritaud, F. Kassel, G.-S. Lee, and L. Marquis.
3. *Examples and counter-examples of convex cocompact groups*, with F. Guéritaud, and F. Kassel.
4. *Exotic real projective Dehn surgery space*, with S. Ballas, G.-S. Lee, and L. Marquis.

Teaching

University of Texas–Austin.

Fall 2019	Math 408C, Differential calculus for engineers (scheduled).
Fall 2017	Math 382C, Algebraic topology (graduate prelim course).
Fall 2017	Math 408D, Calculus for engineers (second semester).
Fall 2016	Math 382C, Algebraic topology (graduate prelim course).
Fall 2015	Math 341, Linear Algebra.
Fall 2015	Math 408D, Calculus for engineers (second semester).
Fall 2014	Math 373K, Algebraic structures I.
Spring 2014	Math 392C, Geometry of surface group representations (graduate topics course).
Spring 2014	Math 408K, Differential calculus.
Fall 2011	Math 408C, Differential calculus for engineers.

Service

1. Scientific committee, Conference on Geometric Structures in Nice, January 14-18, 2019.
2. Organizer, Stanford Informal Geometry and Topology Seminar, Stanford, AY 2018–2019 (with Steve Kerckhoff).
3. Co-organzier, The 58th Texas Geometry and Topology Conference, University of Texas, Austin, November 17-19, 2017.
4. Graduate Awards Committee, AY 2016–2017, College of Natural Sciences, UT Austin.
5. Instructor hiring committee, AY 2015–2017, UT Austin.
6. Organizer, UT Austin Groups and dynamics seminar, AY 2017-2018 (with Lewis Bowen).
7. Organizer, UT Austin Topology Seminar, Spring 2017 (with John Luecke, and Alan Reid), Spring 2018.
8. Organizer, Special session of the JMM on Group actions and geometric structures, January 7, 2017. (with Anna Wienhard)
9. Organizer, Department Colloquium, Fall 2015– Spring 2018, UT Austin. (with Arie Israel)
10. Organizer, Lorentzian geometric structures seminar, Spring 2015, MSRI.
11. Co-organzier, The 52nd Texas Geometry and Topology Conference, University of Texas, Austin, November 14-16, 2014.

12. Co-organizer, RTG workshop on Geometric Structures and Discrete Groups, University of Texas, Austin, May 2-4, 2014.
13. Co-organizer, GEAR Junior Retreat, University of Illinois, Champaign-Urbana, July 23 - August 3, 2012.
14. Co-organizer, AMS special session on the geometry of real projective structures (Mathematical Research Communities), JMM Boston, January 5, 2012.
15. Referee for many journals, including *Annales de la Faculté des sciences de Toulouse*, *Bulletin of the London Mathematical Society*, *Commentarii mathematici helvetici*, *Duke Mathematical Journal*, *Geometriae Dedicata*, *Geometry and Topology*, etc.

Graduate Students

Current students (in candidacy): Martin Bobb, Max Riestenberg, Theodore Weisman, Neza Zager-Korenjak

Invited talks

- June 2019 Perspectives on convex projective geometry, Sete, France.
Convex cocompact subgroups in real projective geometry, mini-course.
- May 2019 Topology seminar, Temple.
Exotic real projective Dehn surgery space.
- April 2019 Topology seminar, University of Maryland.
Exotic real projective Dehn surgery space.
- April 2019 Informal geometry and topology seminar, Stanford.
Exotic real projective Dehn surgery space.
- April 2019 Topology seminar, UC Santa Barbara.
Exotic real projective Dehn surgery space.
- April 2019 Topology seminar, UC Davis.
Exotic real projective Dehn surgery space.
- September 2018 Topology seminar, UC Berkeley.
Exotic real projective Dehn surgery space.
- September 2018 New trends in Teichmüller theory and mapping class groups, Oberwolfach.
Affine actions with Hitchin linear part.
- June 2018 Characters in low dimensional topology: in honor of Steve Boyer, Montréal.
Exotic real projective Dehn surgery space.
- May 2018 Thin Groups in Geometry and Number Theory, Rice University.
Convex cocompact actions in real projective geometry.
- April 2018 Geometry seminar, UT Austin.
Affine geometry and the Auslander conjecture.
- April 2018 Geometry and topology seminar, Caltech.
Convex cocompactness in real projective geometry.
- April 2018 RTG Lecture Series, University of Michigan.
Convex cocompact subgroups in real projective geometry, mini-course joint with Fanny Kassel.
- February 2018 Texas Geometry and Topology Conference, University of Houston.
Convex cocompactness in real projective geometry.
- August 2017 GEAR Junior Retreat, Stanford.
Geometric structures on manifolds, mini-course (4 lectures).
- June 2017 Geometric Topology in Cortona, Cortona Italy.
Convex real projective structures and Anosov representations
- May 2017 IHES, Geometry and Discrete Groups seminar.
Convex real projective structures and Anosov representations
- May 2017 Université Lille 1, Geometry seminar.
Convex real projective structures and Anosov representations
- October 2016 UT Austin Topology seminar
Proper affine actions of right-angled Coxeter groups
- October 2016 UT Austin Groups actions and dynamics seminar
Convex cocompact actions and generalizations
- June 2016 Conference in honor of Bill Goldman, Maryland
Proper affine actions of right-angled Coxeter groups
- May 2016 Advanced school on low-dimensional topology and geometric group theory, Trieste
Proper affine actions of right-angled Coxeter groups
- March 2016 Geometric structures on three-manifolds seminar, Institute for advanced study
Proper affine actions of right-angled Coxeter groups
- March 2016 Geometry and Topology Seminar, Columbia University
Proper affine actions of right-angled Coxeter groups

- October 2015 LA Joint Topology Seminar, USC
Convex projective structures on non-hyperbolic manifolds
- July 2015 Workshop on three-dimensional geometric structures, representations of surface groups and related topics, Luxembourg
Convex projective structures on non-hyperbolic manifolds
- May 2015 Daryl Cooper birthday conference, UC Berkeley
Convex projective structures on non-hyperbolic manifolds
- May 2015 Geometry and topology seminar UChicago
Convex projective structures on non-hyperbolic manifolds
- April 2015 MSRI Research seminar - Dynamics on moduli spaces of geometric structures.
Convex projective structures on non-hyperbolic manifolds
- March 2015 MSRI Lorentzian Geometric Structures Seminar.
Margulis spacetimes and contracting deformations of hyperbolic surfaces I + II.
- October 2014 UT Austin Back porch seminar.
Degenerations of anti de Sitter 2+1 space-times.
- October 2014 UT Austin Group Actions and Dynamics seminar.
Limits of geometries.
- July 2014 Borel Seminar, Les Diablerets
Complete spacetimes of constant curvature in dimension 3.
- May 2014 Conference on Geometry, Topology, and Physics, Pitt
Moduli spaces of constant curvature spacetimes.
- April 2014 Rice Geometry and Analysis seminar
Moduli spaces of constant curvature spacetimes.
- February 2014 UIUC Differential geometry seminar
Moduli spaces of constant curvature spacetimes.
- January 2014 UIC Colloquium
Moduli spaces of constant curvature spacetimes.
- December 2013 Berkeley Topology seminar
Moduli spaces of constant curvature spacetimes.
- December 2013 Stanford Topology seminar
Moduli spaces of constant curvature spacetimes.
- November 2013 UCSB Topology seminar.
Moduli spaces of constant curvature spacetimes
- October 2013 UT Austin Group Actions and Dynamics seminar.
Moduli spaces of constant curvature spacetimes.
- September 2013 Temple Geometry seminar.
Margulis spacetimes via the arc complex.
- September 2013 Exotic geometric structures workshop, ICERM, Brown University.
Margulis spacetimes, the arc complex, and the Crooked Plane Conjecture.
- August 2013 William Rowan Hamilton geometry and topology workshop, Dublin.
Margulis spacetimes via the arc complex.
- August 2013 Rolf Nevanlinna Colloquium, Helsinki, Finland.
Complete flat Lorentz three-manifolds.
- June 2013 Geometric topology in Cortona (in honor of Riccardo Benedetti), Cortona Italy.
Complete flat Lorentz three-manifolds.
- May 2013 Université Lille 1 Geometry and Dynamics seminar.
Ideal triangulations of anti de Sitter manifolds.
- April 2013 Heidelberg Geometry seminar.
Geometric transitions in Lorentzian geometry.
- April 2013 Michigan GEAR/RTG lecture series (2 lectures).
Geometric transitions in Lorentzian geometry.
- April 2013 Maryland Geometry and Dynamics seminar.
Complete flat Lorentz three-manifolds.

- February 2013 UT Austin Topology seminar.
Complete affine three-manifolds.
- October 2012 Workshop on Higher Teichmüller-Thurston Theory, Montreal.
Volumes and rigidity in anti de Sitter geometry.
- September 2012 UT Austin Group Actions and Dynamics seminar.
Geometry and topology of complete Lorentz spacetimes of constant curvature.
- August 2012 GEAR retreat, University of Illinois, Urbana-Champaign.
Geometry and topology of complete Lorentz spacetimes of constant curvature.
- May 2012 Rigidity and flexibility in dimensions 2,3, and 4 (KerckhoffFest), Luminy.
Degenerations and transitions of sub-geometries of projective geometry.
- April 2012 TCU Department Colloquium.
Hyperbolic and AdS geometry in dimension three.
- April 2012 Brown topology seminar.
Geometric transitions: from hyperbolic to AdS geometry.
- April 2012 Boston college topology seminar.
Geometric transitions: from hyperbolic to AdS geometry.
- February 2012 Université Lille 1, Geometry seminar.
Geometric transitions: from hyperbolic to AdS geometry.
- February 2012 Geometry Seminar, Université Paul Sabatier, Toulouse.
Geometric transitions: from hyperbolic to AdS geometry.
- February 2012 Workshop on moduli spaces of representations, Institut Henri Poincaré, Paris.
Degenerations and transitions of sub-geometries of projective geometry.
- December 2011 Wasatch Topology Conference, Kimball Junction, Utah.
Geometric transitions: from hyperbolic to AdS geometry.
- September 2011 UT Austin Topology seminar.
Geometric transitions: from hyperbolic to AdS geometry.
- April 2011 RTG Conference on higher Teichmüller theory, Michigan.
Geometric transitions: from hyperbolic to AdS geometry.
- April 2011 UC Berkeley Topology seminar.
Geometric transitions: from hyperbolic to AdS geometry.
- March 2011 Yale Geometry and Topology seminar.
Geometric transitions: from hyperbolic to AdS geometry.
- March 2011 Ahlfors Bers Colloquium, Rice University.
Geometric transitions: from hyperbolic to AdS geometry.

Expository talks and outreach

- February 2016 Texas Undergraduate Geometry and Topology Conference
Polyhedra inscribed in quadrics
- January 2016 Workshop on $\mathrm{Sp}(4, \mathbb{R})$ -Anosov representations, Granby Colorado.
Morse actions of discrete groups on symmetric spaces a la Kapovich–Leeb–Porti
- March 2015 Graduate student topology and geometry conference, UIUC
Introduction to complete $2 + 1$ spacetimes of constant curvature
- June 2013 Workshop on higher Teichmüller-Thurston theory, Maine.
Anosov representations in AdS geometry

References

Ph.D. adviser: Steven Kerckhoff – spk@math.stanford.edu

NSF postdoc mentor: Alan Reid – areid@math.utexas.edu

Other references:

William Goldman – wmg@math.umd.edu

François Labourie – francois.labourie@math.unice.fr

Miscellaneous

U.S. citizen.

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