# Kenneth Bromberg

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- **Employment**

  - University of Utah
    Professor 2012 - Present
    Associate Professor, 2005 - 2012
    Assistant Professor, 2003 - 2005

  - California Institute of Technology
    Scott Russell Johnson Senior Research Fellow, 2001 - 2003

  - University of Michigan
    Assistant Professor, 1998 - 2001

- **Education**

  - University of California at Berkeley
    Ph.D. in Mathematics, May 1998
    Advisor: Steve Kerckhoff

  - Brown University
    Sc.B. Mathematics, May 1993

- **Grants and Awards**

  - AMS Fellow
  - Director, RTG: Algebraic Geometry and Topology at Utah, 2013 - Present
  - Principal Investigator on NSF Grants, 2000 - Present
  - Co-Principal Investigator on NSF Focused Research Group: Geometry and Deformation Theory of Hyperbolic 3-manifolds, 2006 - 2009
  - Sloan Foundation Fellow 2004 - 2006

- **Visiting Positions**

  - Visiting Professor, Yale University, Fall 2018
  - Visitor Université de Rennes, June 2017
  - Research Professor, MSRI, Fall 2016
  - Research Professor, MSRI, Spring 2015
  - Distinguished Visiting Professor, Brown Univ., Spring 2014
  - Gehring Visiting Professor, Univ. of Michigan, Fall 2009
  - Visitor Université Paul Sabatier, May 2009
  - General Member, MSRI, Fall 2007
  - Visitor Università di Pisa, June 2007
  - Visitor IHES, June 2006
  - Senior Researcher at the Fields Institute Thematic Program on Dynamics and Geometry, May 2006

- **Publications**

  - (with M. Bestvina and K. Fujiwara) Proper actions on finite products of quasi-trees, preprint 2019
  - (with A. Kent and Y. Minsky) Skinning bounds along thick rays, to appear *J. Top. Anal.*
  - (with M. Bestvina, K. Fujiwara and A. Sisto) Acylindrical actions on projection complexes, to appear *Enseign. Math.*
  - (with J. Brock, R. Canary, C. Lecuire and Y. Minsky) Local topology in deformation spaces of hyperbolic 3-manifolds II, *Groups, Geometry and Dynamics* (13) 2019, 767-793
  - (with M. Bridgeman and J. Brock) Schwarzian derivatives, projective structures, and the Weil-Petersson gradient flow for renormalized volume, *Duke Math. J.* (168) 2019, 867-896
  - (with M. Bestvina and K. Fujiwara) The verbal width of ayclindrically hyperbolic groups is finite, *Alg. Geom. Top.* (19) 2019, 477-489
  - (with M. Bestvina, A. Kent and C. Leininger) Undistorted purely pseudo-Anosov groups, to appear *J. Reine Angew. Math.*
  - (with J. Brock, R. Canary and Y. Minsky) Windows, cores and skinning maps, to appear *Ann. Sci. Ec. Norm. Super.*

- (with M. Bestvina) On the asymptotic dimension of the curve complex, *Geometry and Topology* (23) 2019, 2227-2276
- (with J. Brock) Geometric inflexibility of hyperbolic cone-manifolds, *Proceedings of the 2014 MSJ-SI*
- (with J. Brock) Inflexibility, Weil-Petersson distance, and volumes of fibered 3-manifolds, *Math. Res. Lett.* (23) 2016, 649-674
- (with J. Brock, R. Canary and C. Lecuire) Convergence and divergence of Kleinian surface groups, *J. of Topology* (4) 2015, 811-841
- (with M. Bestvina and K. Fujiwara) Stable commutator length on mapping class groups, *Ann. d. l'Inst. Fourier* (66) 2016, 871-898
- (with M. Bestvina and K. Fujiwara) Bounded cohomology with coefficients in a uniformly convex Banach space, *Comm. Math. Helv.* (91) 2016, 203-218
- (with J. Brock, R. Canary and Y. Minsky) Convergence properties of end-invariants, *Geometry and Topology* (17) 2013, 2877-2922
- (with M. Bestvina and K. Fujiwara) Constructing group actions on quasi-trees and applications to mapping class groups, *Publ. I.H.E.S.* (122) 2015, 1-64
- (with J. Brock, R. Canary and Y. Minsky) Local topology in deformations spaces of hyperbolic 3-manifolds, *Geometry and Topology* (15) 2011, 1169-1224
- (with M. Bestvina, K. Fujiwara and J. Souto) Shearing coordinates and convexity of length functions on Teichmüller space, *Amer. J. of Math.* (135) 2013, 1449-1476
- (with J. Brock) Geometric inflexibility and 3-manifolds that fiber over the circle, *J. of Topology* (4) 2011, 1-38
- The space of Kleinian punctured torus groups is not locally connected, *Duke Math. J.* (156) 2011, 387-427
- Drilling long geodesics in hyperbolic 3-manifolds, preprint 2006
- Projective structures with degenerate holonomy and the Bers' density conjecture, *Annals of Math.* (166) 2007, 77-93
- Drilling short geodesics in hyperbolic 3-manifolds, in *Spaces of Kleinian Groups*, London Math Society Lecture Notes, Cambridge University Press, 2006

- Hyperbolic cone-manifolds, short geodesics and Schwarzian derivatives, *J. of AMS* (17) 2004, 783-826
- (with J. Brock) On the density of geometrically finite Kleinian groups, *Acta Mathematica* (192) 2004, 33-93
- Rigidity of geometrically finite hyperbolic cone-manifolds, *Geometriae Dedicata* (105) 2004, 143-170
- (with J. Brock, R. Evans and J. Souto) Tameness on the boundary and Ahlfors' measure conjecture, *Publ. I.H.E.S.* (98) 2003, 145-166
- (with J. Brock) Cone-manifolds and the density conjecture, in *Kleinian Groups and Hyperbolic 3-Manifolds*, London Math Society Lecture Note Series, Cambridge University Press, 2003
- (with J. Holt) Self bumping of deformation spaces of hyperbolic 3-manifolds, *J. Diff. Geom.* (57) 2001, 47-65
- Hyperbolic Dehn surgery on geometrically infinite 3-manifolds, preprint 2000

- **Talks**

  **Conferences:**
  - 2019 Winter School on Geometric Structures, mini-course (Nice), Young Geometric Group Theory, mini-course (Bilbao)
  - 2018 Workshop on Geometry of Teichmüller space (Fields Institute, Toronto), Surface Group Representations and Projective Sturcutres, mini-course (Bangalore)
  - 2017 In and Around the Mapping Class Group (Barcelona), Low-dimensional Geometry and Topology (Vanderbilt), Dynamics on Representation Varieties (Rennes), GEAR Network Senior Retreat (Stanford)
  - 2016 Geometry of Groups (Montevideo), Advanced School on Geometric Group Theory and Low-Dimensional Topology: Recent Connections and Advances (ICTP, Trieste)
  - 2015 Mapping class groups and $Out(F_n)$ - 2 lectures (U of Texas), Dubrovnik Topology Conference (Dubrovnik)
  - 2014 Hyperbolic Geometry and Geometry Group Theory (Univ. of Tokyo)
  - 2013 The Topology of 3-dimensional Manifolds (CRM, Montreal), Geometry and Groups after Thurston - Mini-course (Hamilton Institute, Dublin)

- 2011 Analysis, Geometry and Surfaces (Autrans), Geometric and Algebraic Structures in Mathematics (Stony Brook), Aspects of hyperbolicity in geometry, topology and dynamics (Warwick), Geometry and Dynamics of Teichmüller Space (Hamilton Institute, Dublin)

- 2010 AMS Spring western section meeting - Invited address (Albuquerque), Character varieties in the geometry and topology of low-dimensional manifolds - 2 lectures (Banff International Research Station), Subgroups of mapping class groups (Hausdorff Research Institute, Bonn), Workshop on discrete groups in complex geometry - 3 lectures (ICTP, Trieste), Topology, geometry and dynamics of character varieties (IMS, Singapore)

- 2008 International Workshop and Conference on Surface Mapping Class Groups and Related Topics - 3 lectures (Shillong, India)

- 2007 Braids and Their Ramifications (Cortona Italy), Hyperbolic structures on 3-manifolds and Large Scale Geometry of Teichmüller Space (Warwick), Minicourse - Introduction to Current Developments in Kleinian Groups (MSRI)

- 2006 Hyperbolic Geometry Workshop (Fields Institute, Toronto), Workshop on Geometry and Group Theory (Max-Planck, Bonn)

- 2005 Geometry and Topology of 3-Manifolds (ICTP, Trieste), XXth Nevanlinna Colloquium (EPF Lausanne), Low-Dimensional Manifolds (Oberwolfach), Flavors of Groups (Banff International Research Station), Complex Analysis and Geometry of Hyperbolic Spaces (Kyoto Univ.)

- 2004 Tameness in Texas (U of Texas), Hyperbolic Manifolds and Geometric Analysis (Wesleyan)

- 2003 Bay Area Topology Seminar (Stanford), Geometric and Analytic Methods in 3-Dimensional Topology (Oberwolfach), Southern CA Topology Conference (Caltech), Spaces of Kleinian Groups and Hyperbolic 3-Manifolds (Newton Institute, Cambridge)

- 2002 Georgia Topology Conference (U of GA), Lecture series at Nagoya University, Complex Analysis - Satellite Conference of 2002 ICM (Kyoto Institute of Technology)

- 2001 Kleinian Groups and Hyperbolic 3-Manifolds (Warwick), Ahlfors-Bers Colloquium (U of CT)

**Colloquia and Seminars:**

- 2019 UCSB (colloquium), UC Riverside (Burton Jones Lecture), Caltech

- 2018 UC Berkeley, Harvard, Yale, CUNY, Stonybrook

- 2017 University of WI (colloquium), Oklahoma University (colloquium), University of MI

- 2016 Stonybrook (colloquium), CUNY, Technion, MSRI

- 2015 MSRI, Brown, Boston College (colloquium)

- 2014 Brown (colloquium), Boston College, CUNY

- 2013 UT Austin

- 2012 Caltech, Institut Henri Poincaré

- 2010 Stanford

- 2009 BYU, Hebrew University, Technion, University of MI (colloquium), UIUC, UT Austin

- 2008 Boston College, Princeton, UC Davis

- 2007 University of MN (colloquium), Universitat Autònoma de Barcelona, MSRI-Evans Lecture

- 2006 University of MI, Université Paul Sabatier, Università di Pisa, Yale, UIUC (colloquium), Brown (colloquium)

- 2005 Université Paul Sabatier, University of Zagreb (colloquium), BYU (colloquium)

- 2004 Yale, Michigan, UIC

- 2003 USC, UT Austin, U of Chicago, Michigan

- 2002 UCSB, UCSD, UC Berkeley

- 2001 UIC, Utah, Michigan, Caltech

- **Service**

  - Organizing Committee for Aspects of Non-Positive and Negative Curvature in Group Theory at CIRM, Luminy, France, July 2019

  - Chair, Instructorship Committee, U of UT 2012-3 and 2017-8

  - Organizing committee for Geometric Topology in Cortona, June 2017

  - Editor for geometric topology, Proceedings of the AMS (2016-2020)

- Editor, Rocky Mountain Journal of Math. (2015 - Present)
- Director of Graduate Studies, U of UT, 2013 - 2015
- Chair of organizing committee for conference on Rigidity and Flexibility in Dimensions 2, 3 and 4 at CIRM, Luminy, France, May 2012
- Director of Graduate Recruitment, U of UT, 2004 - 2005 and 2006 - 2009
- Organizer of conference on Topics in Teichmüller Theory and Kleinian Groups at MSRI
- Organizer Wasatch Topology Conference, 2004 - Present
- Referee for J. of Topology, Geometry, Groups and Dynamics, Duke Math. J., Inven. Math., GAFA, J. of Diff. Geometry, Annals of Math., Transactions of the AMS and Pacific J. of Math.

- **Phd Students**

  - Josh Thompson (2010)
  - Yohsuke Watanabe (2015)
  - James Farre (2019)
  - Hannah Hoganson (current)