

---

# Christopher J. Leininger

---

Department of Mathematics  
University of Illinois at Urbana Champaign  
273 Altegeld Hall, 1409 W. Green St.  
Urbana, IL 61802

clein@math.uiuc.edu  
(217)-265-6763

U.S. Citizen, Born Dec. 5, 1973

---

## EDUCATION

- **The University of Texas**, Austin, TX  
Ph.D. in Mathematics, May 2002. Supervisor: Alan W. Reid
- **Ball State University**, Muncie, IN  
B.S. in Mathematics, May 1997

## ACADEMIC POSITIONS

- **University of Illinois**, Urbana-Champaign, IL  
Associate Professor, Dept. of Math., Fall 2010–present
- **University of Illinois**, Urbana-Champaign, IL  
Assistant Professor, Dept. of Math., Fall 2005–Summer 2010.
- **Columbia University/Barnard College**, New York City, NY  
Assistant Professor/NSF Postdoctoral Fellow, Dept. of Math., Fall 2002–Spring 2005.

## VISITS

- **Centro di Ricerca Matematica Ennio De Giorgi**, Pisa, Italy, June 2014.
- **Aix-Marseille Universite**, July 2013.
- **Centre de Recerca Matemàtica Barcelona**, Spain, September/October 2012.
- **Park City Math Institute**, Utah, July 2011, July 2012.
- **Oberwolfach**, Germany, May 2011, June 2011, June 2015.
- **Hausdorff Research Institute for Mathematics**, Bonn, Germany, May/June 2010.
- **Université Paul Cézanne**, Marseille, France, *Professeur Invité*, June 2008.
- **Mathematical Sciences Research Institute** Berkeley, CA, *Member*, Fall 2007.
- **Max-Planck-Institut für Mathematik**, Bonn, Germany, July 2006.
- **University of Chicago**, Chicago, IL, May/June, 2006.

## GRANTS & AWARDS

- N.S.F. Grants D.M.S.-060388, 0905748, 1207184, 1510034: 5/2006–5/2018.
- *Lois M. Lackner Scholar*, Dept. of Math., UIUC, 2011–2013.
- *Campus Research Board*, UIUC, Summer 2010, spring 2007, Fall 2005.
- *Helen Corley Petit Scholar*, College of LAS, UIUC, 2010–2011.
- *N. Tenney Peck Teaching Award in Mathematics*, Dept. of Math., UIUC, 2008.
- *Center for Advanced Study Fellowship*, UIUC, Fall 2007.
- *University of Texas Graduate School Outstanding Dissertation Award*, Spring 2003

- NSF *Mathematical Sciences Postdoctoral Research Fellowship*,  
Fall 2002–Summer 2005. Sponsor: Walter D. Neumann
- C.M.I. *Liftoff Mathematician*, Summer 2002
- *University Continuing Fellowship*, UT, Austin, Fall 2000 - Spring 2001
- Departmental Fellowships, UT, Austin, Spring 1999 and Summer 1998

## Publication and preprints

(all papers/preprints available at <http://www.math.uiuc.edu/~clein/papers.html>)

45. (w/ J. Brock, B. Modami, and K. Rafi) *Limit sets of Teichmüller geodesics with minimal non-uniquely ergodic vertical foliations*, preprint.
44. (w/ F. Gültepe), *An arc graph distance formula for the flip graph*, preprint.
43. (w/ S. Dowdall and I. Kapovich), *Endomorphisms, train track maps, and fully irreducible monodromies*, preprint.
42. (w/ A. Bankovic), *Marked length spectral rigidity for flat metrics*, preprint.
41. (w/ J. Aramayona), *Exhausting curve complexes by finite rigid sets*, to appear in Pacific J. Math.
40. (w/ I. Agol and D. Margalit), *Pseudo-Anosov stretch factors and homology of mapping tori*, to appear in J. London Math. Soc.
39. (w/ S. Dowdall and I. Kapovich), *Unbounded asymmetry of stretch factors*, C. R. Math. Acad. Sci. Paris 352 (2014), no. 11, 885–887..
38. (w/ W. Jeon, I. Kapovich, K. Ohshika), *Conical limit points and Cannon-Thurston maps*, to appear in Conf. Geom. Dynam.
37. (w/ A. Lenzen and K. Rafi), *Limit sets of Teichmüller geodesics with minimal non-uniquely ergodic vertical foliations*, to appear in (Crelle) J. Reine Angew Math.
36. (w/ S. Dowdall and I. Kapovich) *McMullen polynomials and Lipschitz flows for free-by-cyclic groups*, to appear J. Eur. Math. Soc. (JEMS).
35. (w/ M. Clay and D. Margalit) *Abstract commensurators of right-angled Artin groups and mapping class groups*, Math. Res. Lett. 21 (2014), no. 3, 461–467
34. (w/ G. Lakeland) *Systols and Dehn surgery for hyperbolic 3-manifolds*, Alg.& Geom. Top. 14 (2014), no. 3, 1441–1460.
33. (w/ S. Dowdall and I. Kapovich) *Dynamics on free-by-cyclic groups*, Geometry & Topology 19 (2015) 2801–2899.
32. (w/ V. Gadre, E. Hironaka, and R.P. Kent IV) *Lipschitz constants to curve complexes*, Math. Res. Lett. 20 (2013), no. 4, 647–656.
31. (w/ S. Dowdall and R.P. Kent IV) *Pseudo-Anosov subgroups of fibered 3-manifold groups*, Groups Geom. Dyn. 8 (2014), no. 4, 1247–1282.
30. (w/ S. Schleimer) *Hyperbolic spaces in Teichmüller spaces*, J. Eur. Math. Soc. (JEMS) 16 (2014), no. 12, 2669–2692.
29. (w/ R.P. Kent IV) *A geometric criterion to be pseudo-Anosov*, Michigan Math. J, 63 (2014), no. 2, 227–251.
28. (w/ J. Aramayona) *Finite rigid sets in curve complexes*, J. Topol. Anal. 5 (2013), no. 2, 183–203.
27. (w/ D. Margalit) *On the number and location of short geodesics in moduli space*, Journal of Topology, no. 6 (1), (2013) 30–48.
26. (w/ M. Clay and J. Mangahas) *The geometry of right angled Artin subgroups of mapping class groups*, Groups Geom. Dyn. 6 (2012), no. 2, 249–278
25. (w/ B. Farb and D. Margalit) *Small dilatation pseudo-Anosov homeomorphisms and 3-*

- manifolds*, Adv. Math. 228 (2011), no. 3, 14661502.
24. (w/ M. Mj and S. Schleimer) *The universal Cannon–Thurston map and the boundary of the curve complex*, Comment. Math. Helv. 86 (2011), no. 4, 769816.
  23. (w/ A. Reid and D. Long) *Commensurators of non-free finitely generated Kleinian groups*, Algebr. Geom. Topol. 11 (2011) 605–624.
  22. (w/ M. Duchin and K. Rafi) *Length spectra and degeneration of flat metrics*, Invent. Math., 182 (2010) No. 2, 231–277.
  21. (w/ D. Margalit) *Two-generator subgroups of the pure braid group*, Geom. Dedicata 147 (2010) 107–113.
  20. (w/ R. P. Kent IV) *A fake Schottky group in  $\text{Mod}(S)$* , In the Tradition of Ahlfors–Bers, V, Contemporary Math. 510, AMS, 2010, 185–196.
  19. *Accidental parabolics in the mapping class group*, Proc. Amer. Math. Soc. 137 (2009), no. 3, 1153–1160.
  18. (w/ R. P. Kent IV and S. Schleimer) *Trees and convex cocompactness*, (Crelle) J. Reine Angew Math. 637 (2009), 1–21.
  17. (w/ S. Schleimer) *Connectivity of the space of ending laminations*, Duke Math. J. 150 (2009) no. 3, 533–575.
  16. (w/ J. Aramayona and J. Souto) *Injections of mapping class groups*, Geometry & Topology 13 (2009) 2523–2541.
  15. (w/ R. P. Kent IV) *Uniform convergence in the mapping class group*, Ergodic Theory and Dynam. Systems **28**, (2008), 1177–1195.
  14. (w/ B. Farb and D. Margalit) *The lower central series and pseudo-Anosov dilatations*, Amer. J. Math. **130**, (2008), no. 3, 799–827.
  13. (w/ R. P. Kent IV) *Shadows of mapping class groups: capturing convex cocompactness*, Geom. Funct. Anal. 18 (2008), 1270–1325.
  12. (w/ D. B. McReynolds, W. D. Neumann, and A. W. Reid) *Length and eigenvalue equivalence*, Int. Math. Res. Not. IMRN (2007), no. 24, Art. ID rnm135, 24 pp.
  11. (w/ R. P. Kent IV) *Subgroups of the mapping class group from the geometrical viewpoint*, In the tradition of Ahlfors–Bers IV, Contemp. Math., 432, Amer. Math. Soc. Providence, RI, 2007.
  10. (w/ R. D. Canary) *Kleinian groups with discrete length spectrum*, Bull. London Math. Soc. **39** (2007), 189–193.
  9. (w/ D. B. McReynolds) *Separable subgroups of the mapping class group*, Topology Appl. **154**, (2007), no 1, 1–10.
  8. (w/ D. Margalit) *Abstract commensurators of braid groups*, J. Algebra **299**, (2006), no. 2, 447–455.
  7. (w/ A. W. Reid) *A combination theorem for Veech subgroups of the mapping class group*, Geom. Funct. Anal. **16**, (2006), 403–436.
  6. *Small curvature surfaces in hyperbolic 3-manifolds*, J. Knot Theory Ramifications **15**, (2006), 379–411.
  5. *On groups generated by two positive multi-twists: Teichmüller curves and Lehmer’s number*, Geom. Topol., **8**, (2004), 1301–1359.
  4. *Equivalent curves in surfaces*, Geom. Dedicata **102**, (2003), 151–177.
  3. (w/ A. W. Reid) *The co-rank conjecture for 3-manifold groups*, Algebr. Geom. Topol. **2**, (2002), 37–50.
  2. *Compressing totally geodesic surfaces*, Topology Appl. **118**, (2002), 309–328.
  1. *Surgeries on one component of the Whitehead link are virtually fibered*, Topology **41**, (2002), 307–320.

## INVITED PRESENTATIONS

- *Geometry of mapping class groups and  $Out(F_n)$* , MSRI, Berkeley, CA (scheduled October 2016).
- *Topology and Dynamics of Moduli Spaces*, IMS, Singapore (scheduled August 2016).
- *Advanced School and Workshop on Geometric Group Theory and Low-Dimensional Topology: Recent Connections and Advances*, ICTP, Trieste, Italy (scheduled May 2016).
- *Effective and Algorithmic Methods in Hyperbolic Geometry and Free Groups*, ICERM, Brown University, Providence, RI (scheduled May 2016).
- *Integrated Conference in Geometry, Dynamics, and Topology*, Eastern Illinois University, Charleston, IL. (scheduled April 2016).
- *Advanced school and workshop on geometry of discrete actions*, Trieste, Italy. September, 2015
- *New perspectives on the interplay between discrete groups in low-dimensional topology and arithmetic lattices*, Oberwolfach, Germany. June 2015
- *Low-dimensional topology workshop for Menasco's 60<sup>th</sup> Birthday*, SUNY Buffalo, NY. May, 2015
- *Tech Topology Conference*, Georgia Tech, December 2014.
- *Workshop on Teichmüller theory and surfaces in 3-manifolds*, Centro De Giorgi, Pisa, Italy, June 2014.
- *Georgia Topology Conference*, Athens, GA, May 2014
- *Bloomington Geometry Conference*, Bloomington, IN, April 2014
- *Redbud Topology conference*, Norman, OK, April 2014
- *Network Retreat of the GEAR Research Network in the Mathematical Sciences*, Univ. Maryland, March 2014.
- *Six Crash Course on Mapping Class Groups*, (one "crash course"), Joint Meetings of AMS/MAA, Baltimore, MD, January 2014.
- *Geometric Topology in New York*, Columbia, August 2013.
- *Growth and Mahler measures in geometry and topology*, Institute Mittag-Leffler, Sweden, July 2013.
- *The Topology of 3-dimensional Manifolds*, CRM, Montreal, May 2013
- *Mapping class groups and Categorification*, Banff, April 2013
- *Automorphisms of free groups: Algorithms, Geometry and Dynamics*, (2 lectures) Barcelona, Spain, September 2012.
- *Geometric structures on manifolds*, Chicago, IL, June 2012
- *Geometry and Rigidity in dimensions 2, 3, and 4*, Luminy, France, May 2012.
- *Geometry, Dynamics and Topology Day*, EIU, Charleston, IL, April 2012.
- *AMS Section meeting 1081*, Invited Address, Lawrence, KS, March 2012.
- *Texas Geometry and Topology Conference*, October, 2011.
- *Undergraduate Mathematics Symposium*, U. Illinois, Chicago, IL, October 2011.
- *William Rowan Hamilton Geometry and Topology Workshop*, Hamilton Mathematics Institute in Trinity College Dublin, Ireland, September 2011.
- *Undergraduate summer school on Riemann surfaces*, Park City Math Institute, Park City, UT July 2011 (3 week course)
- *Arithmetic Groups vs. Mapping Class Groups: Similarities, Analogies and Differences*, Oberwolfach, Germany, June 2011.
- *Geometry, Topology and Dynamics of Character Varieties*, Institute of Mathematical Sciences, National University of Singapore (tutorial lecture series), July 2010.
- *Workshop on Subgroups of the Mapping Class Group*, Hausdorff Institute of Mathematics, Bonn, Germany, May 2010.
- *Workshop on pseudo-Anosovs with small dilatation*, Madison, WI, April 2010.
- *Geometry and Dynamics in Surfaces and 3-manifolds II*, Park City, UT, August 2009 (3 lectures).

- *Dynamics and Geometry of Teichmüller space*, C.I.R.M. Luminy, Marseille, France, June 2009 (3 workshop lectures and plenary lecture).
- *Spring Topology and Dynamical Systems Conference*, Gainesville, FL, March 2009 (20 min talk).
- *N+4th Southern California Topology Conference*, Pasadena, CA, January 2009.
- *Great Lakes Geometry Conference*, Ann Arbor, MI, October 2008.
- *International Workshop and Conference on Surface Mapping Class Groups and Related Topics*, NEHU, Shillong, Meghalaya, India, June 2008. (4 talks)
- *Alhfors–Bers Colloquium: Plenary speaker*, Newark, NJ, May 2008.
- *Geometric Groups on the Gulf*, Pensacola, FL, March 2008.
- *Spring Topology and Dynamical Systems Conference*, Milwaukee, WI. (20 min talk), March 2008.
- *Topics in Teichmüller theory and Kleinian groups*, MSRI, Berkeley, CA, November 2007.
- *Hyperbolic structures on 3-manifolds and the large scale geometry of Teichmüller space*, Conference at the University of Warwick, England, July 2007.
- *Cornell Topology Festival*, Cornell U., Ithaca, NY, May 2007.(2 talks)
- *Geometry and Dynamics in Surfaces and 3-manifolds*, Brown U., Providence RI, May 2007.
- *Outre-espace et Espace de Teichmüller*, C.I.R.M. Luminy, Marseille, France, February 2007.
- *Geometry, Topology, and Their Interaction*, a conference to honor the 35th anniversary of the Farrell-Jones collaboration, Morelia Mexico, January 2007.
- *William Rowan Hamilton Geometry and Topology Workshop*, Hamilton Mathematics Institute in Trinity College Dublin, Ireland, September 2006.
- *Workshop in Geometry and Group Theory*, Max-Planck-Institut für Mathematik, Bonn, Germany, July 2006.
- *XXth Nevanlinna Colloquium*, E.P.F. Lausanne, Switzerland, August 2005.
- *Rational Billiards and Flows on Moduli Space*, U.I.C., Chicago, IL, June 2005.
- *Wasatch Topology Conference*, Park City, UT, May 2005.
- *Alhfors–Bers Colloquium: Workshop speaker*, Ann Arbor, MI, May 2005.
- *Conference in Hyperbolic Geometry & Geometric Analysis*, Wesleyan U., Middletown, CT, October 2004.
- *Conference on Combinatorial Topology in Mapping Class Groups*, U. of Chicago, Chicago, IL, April 2004.
- *Spring Topology and Dynamical Systems Conference*, Morelia, Mexico, March 2001. (20 min. talk)
- *AMS Meeting Special Sessions: Low-dimensional Topology and Group Theory*, Sectional **1098**, Baltimore, MD, March 2014; *Geometric Topology in Low Dimensions*, Sectional **1094**, Wash. U, St. Louis, MO, October 2013; *Geometric Aspect of Topology and Group Theory*, Sectional **1093**, Temple U, Philadelphia, PA; Joint meetings, Boston, MA, January 2011; *Combinatorial and Geometric Group Theory and Geometric Topology*, Sectional **1025**, Miami U., Oxford, OH March 2007; *Teichmüller Theory and Hyperbolic Geometry*, Sectional **1021**, Storrs, CT October 2006; *Low Dimensional Topology and Geometry*, Sectional **1019**, Salt Lake City, UT October 2006; *Mahler Measure and Heights*, **112th** National Meeting, San Antonio, TX, January 2006; *Low Dimensional topology and Kleinian groups*, Sectional **1001**, Evanston, IL, October 2004; *Algebraic Geometry and Topology*, Sectional **994** Tallahassee, FL, March 2004; *Geometry and Topology*, Sectional **981**, Salt Lake City, UT, October 2002; *Hyperbolic Manifolds and Discrete Groups*, Sectional **974**, Ann Arbor, MI, March 2002.
- SEMINARS: Ball State; Brown; Caltech; Columbia; Cornell; CRM (Barcelona, Spain); Florida State; Indiana U; Inst. of Math. Polish Acad. Sciences (Warsaw, Poland); Karlsruhe (Germany); Lafayette College; Marseille (France); MSRI; Michigan State; Northwestern; NUI, Galway (Ireland); Purdue U; Ohio State; Oklahoma State U./Oklahoma U.; Princeton; Rice; Rutgers, New

Brunswick; Stanford; SUNY Stony Brook; SUNY Buffalo; Toulouse (France); Universidad Autonoma de Madrid (Spain); UC, Santa Barbara; U Arkansas, U Chicago; U Georgia; U Illinois, Chicago; U Illinois, Urbana-Champaign; U Maryland; U Michigan; U Minnesota; U Texas; U Utah; Yale; U Warwick; Vanderbilt U, Nashville; Walailak, U (Thailand).

• COLLOQUIA: Boston C; CCNY; Chiang-Mai U; Eastern Illinois U; Florida State U; Indiana U; Louisiana State U; Rice; U Arkansas; U Illinois, Urbana-Champaign; U Iowa; U Minnesota; U Oklahoma; U Utah;

## TEACHING

(\* indicates appearance on University's *List of teachers ranked as excellent by their students*)

• U.I.U.C.:

–Fall 2015: MATH 417, Introduction to Abstract Algebra.

–Spring 2015: MATH 525\*, Algebraic Topology I.

–Fall 2014: MATH 241\*, Calculus III, (two sections, 538 students).

–Spring 2014: No teaching.

–Fall 2013: MATH 241, Calculus III, (two sections, 460 students).

–Spring 2013: MATH 241, Calculus III, (two sections, 480 students).

–Fall 2011: MATH 231,249, Honors Calculus II; MATH 595\*, Topics course in Geometry Topology.

–Spring 2011: MATH 428\*, Honors topics, Knot theory; MATH 231\*, 249, Honors Calculus II.

–Fall 2010: MATH 427\*, Honors Abstract Algebra.

–Spring 2010: MATH 519\*, Differentiable Manifolds II.

–Fall 2009: MATH 221, Calculus I; MATH 595, Mapping class groups and curve complexes.

–Spring 2009: MATH 425, Honors Advanced Analysis; MATH 219, Differentiable Manifolds II.

–Fall 2008: MATH 218, Differentiable Manifolds I.

–Spring 2008: MATH 231, 249, Honors Calculus II; MATH 595\*, Differential Geometry II.

–Spring 2007: MATH 231\*, 249, Honors Calculus II.

–Fall 2006: MATH 520, Differentiable Manifolds; MATH 415, Linear Algebra;

–Spring 2006: MATH 230\*, Honors Calculus II.

–Fall 2005: MATH 243, Calculus III+.

• Columbia/Barnard:

–Fall 2004: Groups and Symmetry

–Fall 2003: Algebraic Topology I

–Spring 2003: Calculus II

–Fall 2002: Calculus III.

• U.T.–Pre-calculus/Calculus, Fall 2001.

## SUPERVISION and MENTORING

• POSTDOCS: I have served as mentor/co-mentor for the following postdocs, Spencer Dowdall (NSF postdoc, 2011–2015, tt at Vanderbilt), Grant Lakeland (2012-2014, tt at EIU), Babak Modami (2013–2015, pd at Yale), Funda Gultepe (2013–present), Jenya Sapir (2014–present).

• GRADUATE STUDENTS: I have supervised the five graduate students to completion of their Ph.D degree: Chia-yen Tsai (5/2010) and Pradthana Jaipong (5/2011), Rasimate Maungchang (5/2013), Anja Bankovic (8/2013), and Ser-Wei Fu (5/2014). I am currently supervising five more Caglar Uyanik (co-supervising w/ I. Kapovich), Witsarut Pho-on, Sarah Mousley, Marissa Loving, and Shixuan Li. In addition I have supervised numerous reading courses and reading seminars with graduate students and postdocs.

## MISCELLANEOUS

- CO-ORGANIZER: Young Geometric Group Theory Workshop, Karlsruhe, Germany 2016 (Scientific committee); Geometry, Groups, and Dynamics Day, Purdue, 2015; Workshop and conference on mapping class groups and  $\text{Out}(F_N)$ , Austin, TX 2015; AMS Special Session on Geometric Group Theory and Topology, March 2015 meeting 1109; GEAR Retreat, UIUC, August 2012; AMS Special Session on Geometric topology and group theory, March 2012 meeting 1081; AMS Special Session on Hyperbolic geometry and Teichmüller theory, March 2004 meeting 1047; UIUC Geometry seminar, 2011–present; UIUC Differential geometry seminar, 2006–present; Geometric-topology seminar, Columbia U., 2004–2005 academic year; *Braids, Links, and Mapping Class Groups*, a conference in honor of Joan Birman, Spring 2005; Seminars at UIUC continuously since 2006 (Differential Geometry; Geometry; Geometry, Groups, and Dynamics/GEAR).
- REFEREE WORK: *Annales de L'Institut Fourier*, *Algebr. Geom. Topol.*, *Comm. Anal. Geom.*, *Duke Math J*, *Experiment. Math.*, *Geom. Dedicata*, *Geom. Funct. Anal.*, *Geometry & Topology*, *Israel J. Math.*, *JRMS*, *Math. Ann.*, *Mathematica Scandinavica*, *Math. Z.*, *NSF and NSA* (grant app. reviewer), *NSF panalist*, *Pacific J. Math.*, *Topology Appl*, *Trans. Amer. Math. Soc.*, *J. London Math. Soc.*
- SELECTED COMMITTEES: *AMS-Simons Travel Grants Committee*, April 2015–January 2018; Executive Committee Dept. of Math. UIUC (2012–2014); Colloquium Committee (Chair, 2009–2011); Teaching Awards Committee (Chair, 2008–2009).