

Contact Information

Department of Mathematics
University of Chicago
331 Eckhart Hall
5734 S. University Ave
Chicago, IL 60637

Phone: (773) 962-1995
email: dc@math.uchicago.edu
www.math.uchicago.edu/~dc

Positions

2009-present L.E. Dickson Instructor
Department of Mathematics
University of Chicago
Sponsor: Benson Farb

Fall 2009 visiting postdoc
Hausdorff Institute for Mathematics
Bonn, Germany

Education

2004-2009 **University of Michigan**
Ph.D. in Mathematics
Advisor: Ralf Spatzier

2000-2004 **Eastern Nazarene College**
B.S. in Mathematics
B.S. in Physics

Research

- **Research Interests:** Riemannian geometry, dynamics, rigidity, homogeneous dynamics, Lie groups, symmetric spaces
- **Summer 2003 REU, Temple University:** Program in representation theory. Advisor: Ed Letzter
- **Summer 2001 and 2002 REU, Harvard University:** Materials science, superconductivity. Advisors: Michael Tinkham and Nina Markovic

Publications

1. *Compact Clifford-Klein forms – geometry, topology and dynamics*, (in preparation; to be published among the proceedings of the conference Geometry, Topology and Dynamics in Negative Curvature, London Math Society Lecture Notes series).
2. Joint with Jon Chaika, *Quantitative shrinking target properties for rotations, interval exchange transformations and billiards*, (31 pages, submitted).
3. *Compact forms of homogeneous spaces and higher-rank group actions*, (39 pages, submitted).
4. *2-Frame flow dynamics and hyperbolic rank-rigidity in nonpositive curvature*, Journal of Modern Dynamics **2** (2008), no. 4, 719-740.
5. *Lengths of finite dimensional representations of PBW algebras*, with M. Darnall, Linear Algebra and its Applications **395** (2005) 175-181.

Honors and Awards

- National Science Foundation Graduate Research Fellowship, 2004-2009
- Alice Webber Glover in Math Scholarship, University of Michigan, Summer 2006

Professional Activities**Invited Talks:**

- Ohio State University, Topology Seminar, Dec 2, 2011
- *Cartan connections, geometry and topology of homogeneous spaces*, Erwin Schrödinger Institute, Vienna, Austria, July 18-22, 2011.
- University of Illinois at Chicago, Geometry, Topology and Dynamics Seminar, Mar 14, 2011
- University of Chicago Geometry Seminar, Apr. 13, 2010

- Princeton University Group Actions Seminar, Apr. 6 2010
- Indiana University Geometry Seminar, Mar. 25, 2010
- University of Illinois Urbana-Champaign, Differential Geometry Seminar, Mar 18, 2010
- Northwestern University Dynamical Systems Seminar, Feb. 2, 2010 & Nov 27, 2007
- *Geometry, Topology and Dynamics in Negative Curvature*, Raman Research Institute, Bangalore, India, satellite to ICM, August 2-7, 2010.
- University of Chicago Dynamics Seminar, Feb. 24, 2009 & Oct. 31, 2007
- University of Michigan Geometry Seminar, Jan. 13, 2009 & Mar. 13, 2007
- *AMS Special Session on Group Actions on Homogeneous Spaces and Applications*, Joint Mathematics Meetings, Washington, DC, Jan 5-9, 2009
- Binghamton University Geometry and Topology Seminar, Oct. 23, 2008
- *Dynamical Systems: Geometric Structures and Rigidity Workshop* (Banach Center, Będlewo, Poland) July 7-26, 2008
- *Special Session in Differential Geometry and Its Applications*, AMS Sectional Meeting, Chicago, IL, Oct. 6 2007
- Ohio State University Geometric Group Theory Seminar, May 9, 2007
- Oklahoma University Geometry and Topology Seminar, April 18, 2007
- *Special Session in Metric Geometry*, Joint AMS-MMS Meeting, Zacatecas, Mexico, May 23-26, 2007
- *Special Session in Geometric Topology*, AMS Sectional Meeting Oxford, OH, Mar. 17, 2007
- Indiana University Differential Geometry Seminar, Feb. 15, 2007

Selected Conferences Attended:

- *Cartan connections, geometry and topology of homogeneous spaces*, Erwin Schrödinger Institute, Vienna, Austria, July 18-22, 2011
- *International Conference on Ergodic Geometry*, University Paris-Sud, Orsay, France, May 23-27, 2011
- *Geometry, Topology and Dynamics in Negative Curvature*, Raman Research Institute, Bangalore, India, satellite to ICM, August 2-7, 2010
- *Dynamical Systems: Geometric Structures and Rigidity* Banach Center, Będlewo, Poland, July 7-26, 2008
- *Equidistribution on Homogeneous Spaces* Ohio State University, June 9-13, 2008
- *Geometry, Rigidity and Group Actions: In Honor Of Robert J. Zimmer's 60th Birthday* University of Chicago, Sept. 7-9, 2007
- *Clay Summer School on Homogeneous Flows, Moduli Spaces and Arithmetic* Pisa, Italy, June 11 - July 6 2007
- *Geometry, Topology and Their Interactions* Morelia, Mexico, Jan. 8-13, 2007
- *Workshop in Dynamical Systems* Penn State University, Nov. 2-5, 2006
- *Future Directions in Riemannian Geometry* University of Maryland, Sept. 22-24, 2006
- *International Conference on Global Dynamics Beyond Uniform Hyperbolicity* Northwestern University, May 17-22, 2006
- *Bloomington Geometry Workshop* Indiana University, April 7-9, 2006

Committee Work:

- Outside reader for Natalie McGathey's Ph.D. Thesis *Invariant measures and homeomorphisms of boundaries*, University of Illinois at Chicago, 2011

Seminars Organized:

- Geometry/Topology Seminar, University of Chicago, 2010-present
- Student Topology/Geometry Seminar, University of Michigan 2007-2008

Memberships:

- American Mathematical Society, 2005-present

Teaching Experience

University of Chicago:

- Honors Abstract Algebra III, Spring 2012
- Honors Abstract Algebra II, Winter 2012
- Honors Abstract Algebra I, Fall 2011
- Point-Set Topology, Winter 2011 & Winter 2012
- Abstract Algebra I, Fall 2010
- Honors Abstract Algebra III, Spring 2011
- Analysis in \mathbb{R}^n III, Spring 2010
- Introduction to Analysis and Linear Algebra, Winter & Spring 2010
- Linear Algebra, Winter 2010

University of Michigan:

- Calculus I, Fall 2005
- Calculus II, Winter 2006, Winter 2008
- Assistant Course Coordinator, PreCalculus, Fall 2007

Research with Undergraduates

University of Chicago REU:

- Lecture series (with D. Ben McReynolds), *Geometry and dynamics on tori*, Summer 2011

- Research mentor, Summer 2011

Michael Wong, *The Riemann-Roch Theorem and Abel's Theorem*

Daphne Kao, *Angle Rigidity for \mathbb{T}^2*

Jahan Claes, *Spectral rigidity on \mathbb{T}^n*

Alexander Tolish, *The Effect of Gravitational Radiation on the Observational Period of Pulsars*

Petar Yanakiev, *The Uniformization Theorem and Universal Covers*

Ian Alevy, *Expander Graphs and Property (T)*

Kao Zi Chong, *Classical Mechanics: the Three-Body Problem*

- Research mentor, Summer 2010

Watee Srinin, *Measure theoretic aspects of dynamical systems*