

CURRICULUM VITAE for KARIN MELNICK

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Department of Mathematics  
Assistant Professor  
Appointed 2009  
University of Maryland  
College Park, MD

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**Education**

University of Chicago	Mathematics	Ph.D. 2006	Advisor Benson Farb
University of Chicago	Mathematics	M.S. 2000	
Reed College	Mathematics	B.A. 1999	

**Previous Employment**

- Department of Mathematics, Yale University, New Haven, CT: Gibbs Assistant Professor, 2006-2009
- Stafford Trading, Chicago, IL: Quantitative Analyst, December 2000-August 2001
- Bell Labs, Murray Hill, NJ: Senior Technical Associate, Summer 1999, Summer 2000  
Cryptanalyst developing an attack on a proposed public-key cryptosystem

**Visiting Positions Held**

- Institut Henri Poincaré, France, *planned for February-March 2012*
- Erwin Schrödinger Institute, Vienna, Austria, April-June 2009
- Département de Mathématiques, Université Paris-Sud XI, France, December 2006
- Department of Mathematics, University of Maryland, College Park, Summer 2006
- Unité de Mathématiques Pures et Appliquées, École Normale Supérieure de Lyon, France, May 2005, December 2005, November 2006

RESEARCH AND SCHOLARLY ACTIVITIES

**Chapters in Books:** *This paper was refereed.*

- Dynamique sur les variétés lorentziennes [Dynamics on Lorentzian manifolds], in *Algèbre, dynamique, et analyse pour la géométrie: Actes des Écoles de Géométrie et Dynamique au Maghreb 2004-2007* (eds. T. Barbot, H. Belbachir, S. Mehdi, D. Smai, and R. Souam) Paris: Ellipses (2010) 307-342.

**Research Papers in Refereed Journals** : *In mathematics, authors are considered on equal footing and are always listed in alphabetical order.*

- Isometric actions of Heisenberg groups on compact Lorentz manifolds, *Geometriae Dedicata* **126** no. 1 (2007) 131-154.
- (with Mohamed Deffaf and Abdelghani Zeghib) Nonproper isometric actions of semisimple groups on Lorentz manifolds, *Geometric and Functional Analysis* **18** no. 2 (2008) 463-488.
- (with Thierry Barbot, Virginie Charette, Todd Drumm, and William Goldman) A primer on the (2+1)-Einstein universe, in *Recent developments in pseudo-Riemannian Geometry: Proceedings of the special semester, "Geometry of pseudo-Riemannian manifolds with applications to physics," Erwin Schrödinger Institute, Vienna, September - December 2005* (eds. D. Alekseevsky and H. Baum) Vienna: European Mathematical Society (2008) 179-229.
- Compact Lorentz manifolds with local symmetry (dissertation), *Journal of Differential Geometry* **81** no. 2 (2009) 355-390.
- (with Uri Bader and Charles Frances) An embedding theorem for automorphism groups of Cartan geometries, *Geometric and Functional Analysis* **19** no. 2 (2009) 333-355.
- (with Charles Frances) Nilpotent groups of conformal flows on compact pseudo-Riemannian manifolds, *Duke Mathematical Journal* **153** no. 3 (2010) 511-550.
- A Frobenius theorem for Cartan geometries, *L'Enseignement Mathématique (Sér. II)* **57** no. 1-2 (2011) 57-89.

#### **Invited Conference Talks**

- Bloomington Geometry Workshop, Bloomington, IN, April 2006
- In Honor of Bob Zimmer's 60th Birthday, Chicago, IL, September 2007
- Groupement pour la Géométrie et la Topologie au Maghreb, École CIMPA-UNESCO, Marrakech, Morocco, May 2008
- Analysis and Geometry of Pseudo-Riemannian Manifolds, Greifswald, Germany, July 2009
- Texas Geometry and Topology Conference, Houston, TX, November 2009
- Discrete Groups and Geometric Structures, with Applications IV (plenary talk), Oostende, Belgium, June 2011

### **Seminar and Conference Talks in the last two years**

- Workshop on Flat Conformal Lorentzian Structures, Princeton, NJ, February 2010
- Temple University: Geometry-Topology Seminar, April 2010
- University of Maryland: Geometry-Topology Seminar, September 2010
- University of Chicago: Geometry-Topology Seminar, November 2010
- Howard University: Colloquium, November 2010
- Indiana University: Geometry Seminar, April 2011
- Workshop on Cartan Connections, Geometry of Homogeneous Spaces, and Dynamics, Vienna, Austria, July 2011

### **Grants**

- National Science Foundation Grant for Participant Support: DMS-1057798, Workshop on Cartan Connections, Geometry of Homogeneous Spaces, and Dynamics, 2011.
- National Science Foundation Individual Research Grant: DMS-1007136, 2010-2013.

### **Fellowships and Honors**

- Phi Beta Kappa: Beta of Oregon, May 1999
- National Science Foundation Graduate Research Fellowship Program: honorable mention, 1999, 2000
- National Science Foundation International Research Fellowship: *declined*, 2006
- National Science Foundation Postdoctoral Research Fellowship: 2006-2009
- Erwin Schrödinger Institute Junior Research Fellowship: April-June 2009

### **Refereeing**

- *Advances in Mathematics*
- *Geometriae Dedicata* (6 articles)
- *Geometric and Functional Analysis*
- *Proceedings of the London Mathematical Society*
- *SIGMA (Symmetry, Integrability and Geometry: Methods and Applications)*
- *Transactions of the American Mathematical Society* (3 articles)

## Conference Organizing

- Co-organizer, Special Session on Conformally Flat Lorentz Manifolds, *American Mathematical Society-Mathematical Association of America Joint Meetings*, San Diego, CA, January 2008
- Co-organizer, *Workshop on Cartan Connections, Geometry of Homogeneous Spaces, and Dynamics*, Erwin Schrödinger Institute, Austria, July 2011.

## TEACHING, MENTORING, AND ADVISING

### Courses Taught in last 5 years

- Yale University, New Haven, CT:  
*Ordinary Differential Equations*, Fall 2007 (20 students)  
*Multivariable Calculus*, Fall 2007 (30 students)  
*Introduction to Differential Geometry (graduate)*, Fall 2008 (15 students)  
*Automorphisms of Geometric Structures (graduate)*, Spring 2009 (5 students)  
*Undergraduate Independent Study*, Spring 2009 (1 student)
- University of Maryland, College Park, MD:  
*Riemannian Geometry (graduate)*, Fall 2009 (15 students) and Fall 2011  
*Euclidean and non-Euclidean Geometry*, Spring 2010 (35 students) and Fall 2011  
*Calculus I*, Fall 2010 (150 students)  
*Algebraic Topology (graduate)*, Spring 2011 (9 students)

### Undergraduate Advising

- Directed Reading Program, University of Chicago, Chicago, IL:  
Mentor for undergraduate independent study in mathematics, Winter 2003, Summer 2003, Spring 2004, Winter 2006
- Ezra Stiles College, Yale University, New Haven, CT:  
Freshmen Advisor for 7 students, 2008
- Yale University, New Haven, CT :  
Sophomore Advisor for 1 student 2008
- University of Maryland, College Park, MD:  
Academic Advisor for 2 Math Education majors 2010  
Justin Simmons and Jacob Weinstein

### Graduate Advising

- Leader of Lang Lunch discussions with graduate student teachers, Yale University, 2009

- Leader of Writing Workshop for graduate students, University of Maryland, 2011
- Co-advisor for Domingo Ruiz, doctoral student of William Goldman, Spring 2011-
- Faculty Advisor for Directed Reading Program, University of Maryland, Fall 2011-

### **Outreach**

- Seminars for Elementary Specialists and Mathematics Educators, Chicago, IL:  
Instructor in *Geometry* for Chicago Public Schools teachers, Fall 2004
- École de Géométrie Différentielle et Systèmes Dynamiques, Oran, Algeria: Lecturer on “Dynamics on Lorentz manifolds” in French and English, November 2006
- Summer school for women on Examples of Group Actions, Columbus, OH:  
Lecturer, May-June 2010

### SERVICE

### **Professional**

- National Science Foundation Panelist: reviewing research grant applications, 2011
- Guest Editor: *Central European Journal of Mathematics*, special issue on “Finite dimensional integrable systems, dynamics, and Lie theoretic methods in geometry and mathematical physics,” to appear 2012

### **Mathematics Department**

- Organizer of Dynamics of Group Actions Seminar, Yale University, 2007-2009
- Colloquium Chair, Yale University, 2007-2008
- Organizer of Geometry-Topology Seminar, University of Maryland, 2009-2010
- Co-organizer of Geometry-Topology Seminar, University of Maryland, 2010-2011, Fall 2011
- Member of Policy Committee, University of Maryland, 2010-2011
- Member of Merit Pay Committee, University of Maryland, Spring 2011

### **Community**

- Advocates for Women in Science, Engineering, and Mathematics, Portland, OR:  
Volunteer, October 1998-March 1999  
Group leader in science and math activities for middle-school girls
- District of Columbia Earned Income Tax Credit Campaign, Washington, DC:  
Volunteer Tax Preparer, January-April 2010
- Reed College Alumni Association, Washington, DC, Chapter: Member of Steering Committee, 2011-