Curriculum Vitae for Karin Melnick

Professor
Department of Mathematics
University of Luxembourg
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Personal Information

Education

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

Employment

- Department of Mathematics, University of Luxembourg, 2023–*present*: Professor
- Department of Mathematics, University of Maryland, College Park: Assistant Professor, 2009–2014; Associate Professor 2014–2021; Professor and Associate Chair for Faculty Affairs 2021–2023
- 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

Visiting Positions

- Institut Henri Poincaré–Sorbonne Université, June 2024
- Max-Planck-Institut für Mathematik, January–March 2016; September 2018-July 2019
- Universität Heidelberg, Gastprofessorin, January–May 2017
- Université de Strasbourg, Professeur Invitée, April–May 2016
- Mathematical Sciences Research Institute, Research Member, January–March 2015
- University of Chicago, February–March 2013
- Institut Henri Poincaré, February–March 2012
- Australian National University, January 2012, February 2014
- Erwin Schrödinger Institut, April–June 2009
- Department of Mathematics, University of Maryland, College Park, Summer 2006
- École Normale Supérieure de Lyon, May 2005, December 2005

Language Skills: Fluent in spoken and written German and French.

Articles in Refereed Journals:

1. K. Melnick and K. Neusser: An Embedding Theorem for tractor bundles, and an application in conformal psuedo-Riemannian geometry, *Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)* **22** (2026) 061.

2. R. Lee and K. Melnick: Classification of closed conformally flat Lorentzian manifolds with unipotent holonomy, *Journal of Topology* **19** no. 3 (2026) e70085.

3. D. Fisher and K. Melnick: Smooth and analytic actions of $\mathrm{SL}(n, \mathbf{R})$ and $\mathrm{SL}(n, \mathbf{Z})$ on closed n-manifolds, *Kyoto Journal of Mathematics* **64** no. 4 (2024) 873–904.

4. C. Frances and K. Melnick: The Lorentzian Lichnerowicz Conjecture for real-analytic, 3-dimensional manifolds, *Journal für die reine und angewandte Mathematik (Crelle)* **803** (2023) 183–218.

5. K. Melnick, V. Pecastaing: The conformal group of a compact, simply connected Lorentzian manifold, *Journal of the American Mathematical Society* **35** no. 1 (2022) 81–122.

6. K. Melnick: Rigidity of transformation groups in differential geometry, *Notices of the American Mathematical Society* **68** no. 5 (2021) 721–732.

7. A. Čap, K. Melnick: C^1 deformations of almost-Grassmannian structures with strongly essential symmetry, *Transformation Groups* **26** no. 4 (2021) 1169–87.

8. C. Frances and K. Melnick: Topology of automorphism groups of parabolic geometries, *Geometry & Topology* **23** (2019), no. 1, 135-169.

9. K. Melnick: Nonstationary smooth geometric structures for contracting measurable cocycles, *Ergodic Theory and Dynamical Systems* **39** no. 2 (2019) 392-424; published online in 2017 at `https://doi.org/10.1017/etds.2017.38`.

10. K. Melnick, K. Neusser: Strongly essential flows on irreducible parabolic geometries, *Transactions of the American Mathematical Society* **368** no. 11 (2016) 8079-8110.

11. S. Dumitrescu, K. Melnick: Quasihomogeneous three-dimensional real-analytic Lorentz metrics do not exist, *Geometriae Dedicata* **179** no. 1 (2015) 229-253

12. A. Čap, K. Melnick: Essential Killing fields of parabolic geometries: projective and conformal structures, *Central European Journal of Mathematics* **11** no. 12 (2013) 2053-2061.

13. A. Čap, K. Melnick: Essential Killing fields of parabolic geometries, *Indiana University Mathematics Journal* **62** no. 6 (2013) 1917-1953.

14. C. Frances, K. Melnick: Formes normales pour les champs conformes pseudo-riemanniens [Normal forms for conformal pseudo-Riemannian vector fields], *Bulletin de la Société Mathématique de France* **141** no. 3 (2013) 377-421.

15. K. Melnick: A Frobenius theorem for Cartan geometries, with applications, *L'Enseignement Mathématique (Sér. II)* **57** no. 1-2 (2011) 57-89.

16. C. Frances, K. Melnick: Nilpotent groups of conformal flows on compact pseudo-Riemannian manifolds, *Duke Mathematical Journal* **153** no. 3 (2010) 511-550.

17. U. Bader, C. Frances, K. Melnick: An embedding theorem for automorphism groups of Cartan geometries, *Geometric and Functional Analysis* **19** no. 2 (2009) 333-355.

18. K. Melnick: Compact Lorentz manifolds with local symmetry (dissertation), *Journal of Differential Geometry* **81** no. 2 (2009) 355-390.

19. T. Barbot, V. Charette, T. Drumm, W. Goldman, K. Melnick: 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.

20. M. Deffaf, K. Melnick, A. Zeghib: Nonproper isometric actions of semisimple groups on Lorentz manifolds, *Geometric and Functional Analysis* **18** no. 2 (2008) 463-488.

21. K. Melnick: Isometric actions of Heisenberg groups on compact Lorentz manifolds, *Geometriae Dedicata* **126** no. 1 (2007) 131-154.

Chapters in Books: *This paper was refereed.*

- K. Melnick: Dynamique sur les variétés lorentziennes [Dynamics on Lorentzian manifolds] (trans. D. Smaï), 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.

Preprints:

- S. Dumitrescu, C. Frances, K. Melnick, V. Pecastaing, A. Zeghib: A local Lorentzian Ferrand-Obata theorem for conformal vector fields (28 pp.) `https://arxiv.org/abs/2511.03713` *submitted.*

Grants

- Fonds National de la Recherche OPEN Grant: RiGA, PI 2025–2027.
- Fonds National de la Recherche PRIDE Grant: GRACE, co-PI 2024–2030.
- National Science Foundation Individual Resarch Grant: 2021–2024.
- National Science Foundation CAREER Grant, 2013–2018 (*extended to 2020*).
- National Science Foundation REU Grant: Mathematics, Applied Mathematics, and Statistics Research Experience for Undergraduates, 2014-2016; Kasso Okoudjou was the Principal Investigator, and I was one of 15 Senior Personnel.
- National Science Foundation Grant for Participant Support: Workshop on Cartan Connections, Geometry of Homogeneous Spaces, and Dynamics, 2011 (*extended to 2013*).

- National Science Foundation Individual Research Grant: 2010-2013 (*extended to 2014*).

Fellowships and Honors

- Insitut Grand-Ducal of Luxembourg, Section des Sciences, *Membre Effective* 2026–
- Simons Fellowship in Mathematics: *declined*, 2023.
- Joan and Joseph Birman Fellowship for Women Scholars: held 2020–2021.
- American Mathematical Society Centennial Fellowship: held 2013–2014.
- Erwin Schrödinger Institut Junior Research Fellowship: April–June 2009
- National Science Foundation Postdoctoral Research Fellowship: mentor Gregory Margulis, 2006–2009.
- National Science Foundation International Research Fellowship: *declined*, 2006
- National Science Foundation Graduate Research Fellowship Program honorable mention: 1999, 2000
- Phi Beta Kappa (national honor society): Beta of Oregon, May 1999

Talks

Colloquia, Named Lectures, and Plenary Conference Talks

- Recent Trends in Differential Geometry, Banach Center, Bedlewo, Poland, July 2026.
- Geometry and Quantum Theory Colloquium, Nijmegen, Netherlands, August 2025
- Inauguration de la Fédération MaGE (de recherche en mathématiques de la région Grand-Est), Nancy, France, May 2025
- Universität Regensburg: SfB "Higher Invariants" Lecture (online) , November 2024
- Universität Hamburg: Kolloquium über Reine Mathematik, October 2024
- Differential Geometry and its Applications, Hradec Králové, Czechia, July 2022
- Virginia Topology Conference, Charlottesville, Virginia, November 2021
- George Mason University: Colloquium, February 2020
- Abel Symposium: Ålesund, Norway, June 2019
- Universität Duisburg-Essen: Kolloquium, July 2018
- No Boundaries, in honor of Benson Farb's 50th Birthday, Chicago, Illinois, October 2017
- Graduiertenkolleg "Asymptotic Invariants and Limits of Groups and Spaces" Colloquium, Universität Heidelberg, February 2017
- Wesleyan University: Colloquium, December 2016

- Geometries, surfaces and representations of fundamental groups, in honor of William Goldman's 60th Birthday, College Park, Maryland, June 2016
- Friedrich-Schiller-Universität Jena: Colloquium, May 2015
- Smoky Great Plains Geometry Workshop, Wichita, Kansas, March 2015
- Australian National University: Colloquium, February 2014
- University of Illinois, Chicago: Colloquium, February 2014
- Winter School in Geometry and Physics, Srní, Czechia, January 2014
- University of Wisconsin: Colloquium, January 2014
- University of Chicago: Department/AWM Colloquium, March 2013
- Evans Lectures, Cornell University, January 2013
- Discrete Groups and Geometric Structures, with Applications, Oostende, Belgium: June 2011
- Howard University: Colloquium, November 2010
- Texas Geometry and Topology Conference, Houston, Texas, November 2009
- Analysis and Geometry of Pseudo-Riemannian Manifolds, Greifswald, Germany, July 2009
- In Honor of Bob Zimmer's 60th Birthday, Chicago, Illinois, September 2007
- Bloomington Geometry Workshop, Bloomington, Indiana, April 2006
- Reed College: Mathematics Colloquium, April 2006

Invited Seminar Talks and Conference Talks since 2024

- Université Aix-Marseille: Séminaire de Géométrie et Topologie, January 2026.
- Université de Strasbourg: Séminaire Géométrie et applications, June 2025.
- Séminaire Géométrie et groupes discrets, Institut des Hautes Études Scientifiques, February 2025.
- Isaac Newton Institute for Mathematical Sciences: Program on Twistor Theory, September 2024.
- Institut Henri Poincaré: Actions of large groups, geometric structures, and the Zimmer Program, June 2024.
- Max-Planck-Insitute for Mathematics in the Sciences: Geometry Seminar, February 2024.

Expository Lecture Series

- Winter School in Geometric Analysis, Geilo, Norway: Lecturer in mini-course "Rigid geometric structures and their automorphism groups," March 2025

- Thematic program "Group actions and rigidity: Around the Zimmer Prorgram", Institut Henri Poincaré, Paris: Lecturer in mini-course "Rigid geometric structures and their automorphism groups," June 2024
- CIRM-IHP Program Research School "Group actions and rigidity: Around the Zimmer Program," Luminy, France: Lecturer in mini-course "Automorphisms of rigid geometric structures à la Zimmer-Gromov," April 2024
- Graduiertenkolleg "Asymptotic Invariants and Limits of Groups and Spaces", Universität Heidelberg/Karlsruher Institut für Technologie: Lecturer in mini-course on "Parabolic Geometries," April–May 2017
- GEAR Junior Retreat, Urbana-Champaign, IL: Lecturer on "(G, X)-structures," July–August 2012
- Summer school for women on Examples of Group Actions, Columbus, OH: Lecturer on "Ergodic theory and algebraic hulls," May–June 2010
- École de Géométrie Différentielle et Systèmes Dynamiques, Oran, Algeria: Lecturer on "Dynamics on Lorentz manifolds" in French and English, November 2006

Teaching, Mentoring, and Advising

Undergraduate Courses taught since Ph.D.

- University of Luxembourg:
  Géométrie des courbes et des surfaces, Summer 2024 (31 students), Summer 2025 (26 students), Summer 2026 (15 students)
  Bachelor Mémoire, Summer 2024 (1 student)
- University of Maryland, College Park:
  Euclidean and non-Euclidean Geometry, Fall 2022 (15 students), Fall 2021 (24 students), Fall 2019 (16 students), Fall 2016 (11 students), Fall 2011 (30 students), and Spring 2010 (34 students)
  Introduction to Mathematical Proof, Spring 2022 (13 students)
  Honors Multivariable Calculus (Math 340), Fall 2014 (30 students)
  Differential Geometry of Curves and Surfaces, Fall 2014 (7 students)
  Calculus II for the Life Sciences, Fall 2012 (100 students) and Fall 2013 (96 students)
  Calculus I, Fall 2010 (142 students)
- Yale University, New Haven, CT:
  Undergraduate Independent Study, Spring 2009 (1 student)
  Ordinary Differential Equations, Fall 2007 (20 students)
  Multivariable Calculus, Fall 2007 (30 students)

Graduate Courses taught since Ph.D.

- University of Luxembourg:
  Lie groups and Lie algebras, Winter 2025-26 (8 students)
  Riemannian Geometry, Summer 2026 (16 students), (Winter 2024-25 (8 students), Winter 2023-24 (4 students),

- University of Maryland, College Park:
  Lie Groups, Fall 2022 (17 students), Fall 2016 (15 students)
  Foundations of Topology, Fall 2021 (13 students)
  Foundations of Differential Geometry, Spring 2023 (11 students), Spring 2021 (14 students)
  Exterior Differential Systems, Spring 2020 (6 students)
  Geometric Analysis, Fall 2019 (9 students)
  Lorentzian Differential Geometry, Fall 2013 (7 students)
  Algebraic Topology, Spring 2011 (9 students)
  Riemannian Geometry, Fall 2011 (10 students), Fall 2009 (12 students)
- Yale University, New Haven, CT:
  Automorphisms of Geometric Structures, Spring 2009 (5 students)
  Introduction to Differential Geometry, Fall 2008 (15 students)

Research Advising

- Advisor for doctoral student Sahand Mahmoudian, Fall 2025–*present*.
- Advisor for doctoral student Geoffrey Sangston, Fall 2021–Ph.D. 2025.
- Advisor for doctoral student Spyridon Lentas, Spring 2021–Ph.D. 2025.
- Advisor for doctoral student Nakyung (Rachel) Lee, Fall 2020–Ph.D. 2023.
- Advisor for doctoral student Tianyu Ma, Fall 2013–Ph.D. 2018.
- Advisor for postdoctoral visitor Vincent Pecastaing, Fall 2016.
- Leader of module on "Local isometries of three-dimensional spacetimes" in MAPS-REU (Mathematics, Applied Mathematics, and Statistics Research Experience for Undergraduates), University of Maryland, Summer 2015.
- Advisor on summer research project for graduate student Jean-Philippe Burelle, Summer 2013.

Advising Student Groups

- Faculty advisor for Directed Reading Program, University of Maryland, 2011–2015
- Faculty advisor for Women in Math Club, University of Maryland, 2013–2015
- Leader of Lang Lunch discussions with graduate student teachers, Yale University, 2009

Extension Activities

- Girls Empowered by Math: Speaker and Panelist at annual Hunt event, March 2023
- Fulbright Foundation: Host of scholar Dr. Richard Boadi from the Kwame Nkrumah University of Science and Technology, Ghana, January–June 2022
- Women in Math Club, University of Maryland: π day talk, March 2014

- Nebraska Conference for Undergraduate Women in Mathematics: Panelist, January–February 2014
- Mu Alpha Theta Math Honor Society, Winston Churchill High School, Potomac, MD: Guest lecturer, November 2013
- Writing Workshop for mathematics graduate students, University of Maryland: Founder and director, Spring 2011, 2012, and 2013, Fall 2014
- Seminars for Elementary Specialists and Mathematics Educators, Chicago, IL: Instructor in *Geometry* for Chicago Public Schools teachers, Fall 2004
- Directed Reading Program, University of Chicago: Founding member of steering committee, 2002–2003

Professional Service

Editorships

- Member of Editorial Board for *Geometriae Dedicata*, 2024–*present.*
- Member of Editorial Board for *Annales de l'Institut Fourier*, 2023–*present.*
- Member of Editorial Board for *Forum Mathematicum*, 2021–2025.
- Subject Editor for *European Journal of Mathematics*, 2014–*present.*
- Subject Editor for *Central European Journal of Mathematics*, 2013–2014.

Fellowship, Grant and other External Reviewing

- Norway: External Reviewer for university promotion case, 2025
- Swiss National Science Foundation: Proposal review, 2025
- USA: External Reviewer for university promotion case, 2024
- Czech Science Foundation: Proposal review, 2023
- US National Science Foundation Panelist: Reviewer of research grant proposals, 2023
- Agence Nationale de la Recherche France: Proposal review, 2022
- AMS Centennial Fellowship Committee: 2015, Chair in 2016
- Fonds National de la Recherche Luxembourg: External Reviewer for AFR (Aide à la Formation-Recherche), 2014
- Ireland: External Reviewer for university promotion case, 2013
- US National Science Foundation Panelist: Reviewer of research grant proposals, 2011

Thesis Committees

- Malek Hanounah, Universität Greifswald (Advisor Ines Kath) Gutachterin, March 2026
- Geoffrey Sangston, University of Maryland (My student), August 2025
- Viola Giovannini, University of Luxembourg (Advisor Jean-Marc Schlenker), Chair of Committee, July 2025
- Blandine Galliay, Université Paris-Saclay (Advisor Fanny Kassel), June 2025
- Spyridon Lentas, University of Maryland (My student), April 2025
- Vincent Pecastaing, Université Côte d'Azur, France, *Habilitation à diriger des Recherches* Jury Member, March 2024
- Nakyung (Rachel) Lee, University of Maryland (My student), May 2023
- Alexis Garcia, Université Côte d'Azur, France (Advisor Sorin Dumitrescu), September 2022
- Matthew Salinger, University of Maryland (Advisor Daniel Cristofaro-Gardiner), May 2022
- Tianyu Ma, University of Maryland, (My student), May 2018
- Terrence Long, University of Maryland (Advisor Scott Wolpert), November 2014
- Son Lam Ho, University of Maryland (Advisor Bill Goldman), July 2014
- Weiqiang Wu, University of Maryland (Advisor Bill Goldman), June 2012
- Jeffrey Frazier, University of Maryland (Advisor Bill Goldman), December 2011

Conference Reviewing

- Judge of graduate student research posters for Association for Women in Mathematics Poster Competition at AMS-MAA Joint Meetings (Online), January 2021

Peer Reviewing

- Referee for *Advances in Geometry*, *Advances in Mathematics*, *American Journal of Mathematics*, *Annals of Mathematics*, *Annales de l'Institut Fourier*, *Annales Scientifiques de l'École Normale Supérieure*, *Directions for Mathematics Research Experiences for Undergraduates* (World Scientific, 2016), *Geometriae Dedicata* (9 articles), *Geometric and Functional Analysis* (2 articles), *Journal of Differential Geometry* (2 articles), *Journal of Lie Theory*, *Journal of Modern Dynamics*, *New York Journal of Mathematics*, *Proceedings of the American Mathematical Society* (2 articles), *Proceedings of the London Mathematical Society*, *Publicacions Mathemàtiques*, *SIGMA (Symmetry, Integrability and Geometry: Methods and Applications)*, *Transactions of the American Mathematical Society* (4 articles), *Transformation Groups* (2 articles), *Wiley Interdisciplinary Reviews*
- Author of 16 reviews for the AMS' MathSciNet

Conference Organizing

- Co-organizer, *BeNeLux Mathematical Congress*, University of Antwerp, *April 2026*
- Co-organizer, *Lorentzian, Affine, and Hyperbolic Differential Geometry – in Memory of Todd Drumm*, Brin Mathematics Research Center, April 2025
- Co-organizer, *Actions of Large Groups, Geometric Structures, and the Zimmer Program*, Institut Henri Poincaré, June 2024
- Co-organizer, *Geometric Structures, Compactifications, and Group Actions*, Université de Strasbourg, June-July 2022
- Co-organizer, *Connections for Women: Dynamics on Moduli Spaces of Geometric Structures*, Mathematical Sciences Research Institute, January 2015
- Co-organizer, Special Session on Differential Geometry and Mathematical Physics, *American Mathematical Society Northeastern Sectional Meeting*, Halifax, NS, Canada, October 2014
- Co-organizer, *GEAR Senior Retreat*, University of Maryland, March 2014
- Co-organizer, *Workshop on Cartan Connections, Geometry of Homogeneous Spaces, and Dynamics*, Erwin Schrödinger Institut, July 2011
- Co-organizer, Special Session on Conformally Flat Lorentz Manifolds, *American Mathematical Society-Mathematical Association of America Joint Meetings*, San Diego, CA, January 2008

Campus: University of Luxembourg

- ADVANCE Circles leader, Winter 2024-25
- Member of Executive Board, Société Mathématique du Luxembourg
- Council Member for Faculty of Science, Technology and Medicine, Summer 2024–
- Member of the following committees in the Department of Mathematics:
  - Comité d'Encadrement de Thèse for Bruno Dular (Fall 2024–)
  - Jury of Master in Mathematics (Winter 2023-24—)
  - Jury of Master in Secondary Education – Mathematics (Winter 2023-24—)

Campus: University of Maryland

- Associate Chair for Faculty Affairs, Mathematics Department, Fall 2021–Summer 2023
- Founding organizer of AWM (Association for Women in Mathematics) Distinguished Colloquium Series, Spring 2021–Spring 2023
- Member of the following committees in the Department of Mathematics:
  - Chair of Lecturer Merit Pay Committee, Spring 2022, Spring 2023
  - Tenure Committee for Lei Chen (Fall 2022–Spring 2023)

  - Tenure Committee for Daniel Cristofaro-Gardiner (Fall 2021–Spring 2022)
  - Graduate Admissions Committee (Spring 2021, Spring 2022)
  - Hiring Committee (Fall 2014, Fall 2019–Spring 2020)
  - Postdoctoral Hiring Committeee (Fall 2016)
  - Chair Search Committee (Fall 2012)
  - Policy Committee (Fall 2010– Spring 2011, Fall 2020–Spring 2021, Fall 2021–Spring 2022, Fall 2022–Spring 2023)
  - Merit Pay Committee (Spring 2011)
- Co-organizer of Geometry-Topology Seminar, 2009–2014, 2019–2020
- Judge of graduate student presentations for campus-wide Graduate Research Interaction Day (GRID), April 2013

Scientific Community

- Member of the Conseil d'Administration of the Section des Sciences of the Insitut Grand-Ducal of Luxembourg

Community

- Association Parentale de l'École Maria Montessori, Strassen, Luxembourg: Treasurer, 2025–2026.
- Democrats Abroad Germany, Düsseldorf-Ruhr Chapter: Phonebanker promoting turnout of US voters abroad, 2018
- Reed College Alumni Association, Washington, DC, Chapter: Member of Steering Committee, 2011–2014
- District of Columbia Earned Income Tax Credit Campaign, Washington, DC: Volunteer tax preparer for low-income residents, January–April 2010