

ELIZABETH GILLASPY

Curriculum Vitae

Department of Mathematical Sciences
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EDUCATION

Dartmouth College

Ph.D., Mathematics April 2014
Advisor: Erik van Erp
Thesis: *K-theory and homotopies of 2-cocycles for twisted groupoid C^* -algebras*

Master of Arts, Mathematics June 2010

Macalester College

Bachelor of Arts, Mathematics (*Summa Cum Laude*) May 2007

ACADEMIC APPOINTMENTS

Assistant professor, University of Montana August 2017 - present

Postdoc, Universität Münster (Germany) August 2016 - July 2017

Burnett Meyer Instructor, University of Colorado - Boulder August 2014 - May 2016

PUBLICATIONS

1. “ K -theory and homotopies of 2-cocycles on transformation groups,”
J. Operator Theory vol. 73 (2015), pp. 465–490.
2. “ K -theory and homotopies of 2-cocycles on higher-rank graphs,”
Pacific J. Math. vol. 78 (2015), pp. 407–426. DOI:10.2140/pjm.2015.278.407.
3. (with C. Farsi, S. Kang and J. Packer)
“Separable representations, KMS states, and wavelets for higher-rank graphs,”
J. Math. Anal. Appl. vol. 434 (2016), pp. 241–270. DOI:10.1016/j.jmaa.2015.09.003.
4. “ K -theory and homotopies of 2-cocycles on group bundles,”
Rocky Mountain J. Math. vol. 46 (2016), pp. 1207–1229.

5. (with C. Farsi)
“Twists over étale groupoids and twisted vector bundles,”
Proc. Amer. Math. Soc. vol. 144 (2016), pp. 3767–3779.
6. (with C. Eckhardt)
“Irreducible representations of nilpotent groups generate classifiable C^* -algebras,”
Münster J. Math. vol. 9 (2016), pp. 253–261.
7. (with C. Farsi, S. Kang, A. Julien, and J. Packer)
“Wavelets and spectral triples for fractal representations of Cuntz algebras,” in *Problems and recent methods in operator theory*, Contemp. Math. vol. 687 (2017), pp. 103–133.
8. (with C. Farsi, S. Kang, and J. Packer)
“Wavelets and graph C^* -algebras,” *Excursions in Harmonic Analysis* vol. 5 (2017), pp. 35–86.
9. (with C. Eckhardt and P. McKenney)
“Finite decomposition rank for virtually nilpotent groups,”
Trans. Amer. Math. Soc. vol. 371 (2019), pp. 3971–3994.
10. (with A. Kumjian)
“Cohomology for small categories: k -graphs and groupoids,”
Banach J. Math. Anal. vol. 12 (2018), pp. 572–599.
11. (with C. Farsi, P. Jorgensen, S. Kang, and J. Packer)
“Representations of higher-rank graph C^* -algebras associated to Λ -semibranching function systems,” *J. Math. Anal. Appl.* 468 (2018), 766–798.
12. (with C. Farsi, P. Jorgensen, S. Kang, and J. Packer)
“Purely atomic representations of higher-rank graph C^* -algebras,”
Integral Equations Operator Theory 90 (2018), 90:67.
13. (with C. Farsi, P. Jorgensen, S. Kang, and J. Packer)
“Monic representations of finite higher-rank graphs,”
Ergodic Theory Dynam. Systems, to appear (arXiv:1804.03455).
14. (with J. Wu)
“Isomorphism of the cubical and categorical cohomology groups of a higher-rank graph,”
Trans. Amer. Math. Soc., to appear (arXiv:1807.02245).
15. (with C. Farsi, A. Julien, S. Kang, and J. Packer)
“Spectral triples and wavelets for higher-rank graphs,” *J. Math. Anal. Appl.* 482 (2020), 123572.

16. (with C. Farsi, A. Julien, S. Kang, and J. Packer)
 “Spectral triples for higher-rank graph C^* -algebras,” *Math. Scand.*, to appear (arXiv:1804.05209).
17. (with C. Farsi, N. Larsen, and J. Packer)
 “Generalized gauge actions on k -graph C^* -algebras: KMS states and Hausdorff structure,”
Indiana Univ. Math. J., to appear (arXiv:1807.08665).
18. (with J. Fletcher and A. Sims)
 “Homotopy of product systems and K -theory of Cuntz–Nica–Pimsner algebras,”
Indiana Univ. Math. J., to appear (arXiv:1911.00959).
19. (with A. Duwenig, R. Norton, S. Reznikoff, and S. Wright)
 “Cartan subalgebras for non-principal twisted groupoid C^* -algebras,” *J. Funct. Anal.*,
 to appear (arXiv:2001.08270).
20. (with C. Eckhardt, K. Fieldhouse, D. Gent, I. Gonzales, and D. Pask)
 “Moves on k -graphs preserving Morita equivalence,” submitted (arXiv:2006.13441).

HONORS AND AWARDS

National Science Foundation

“Structural invariants for higher-rank graphs” (\$269,994) September 2018 - August 2021

“Groundwork for Operator Algebras Lecture Series” (\$42,000) June 2020 - September 2020

“Young Mathematicians in C^* -Algebras 2019” (\$41,012) June 2019 - September 2019

University of Montana Small Grants Program

“ K -theory for concrete C^* -algebras” (\$4,800) May 2018 - August 2019

Simons Foundation

Simons Visiting Professorship (in conjunction with attendance at Oberwolfach) August 2019

Mathematical Sciences Research Institute

Summer Research for Women in Mathematics (fully funded research stay) July 2019

Journal of Mathematical Analysis and Applications

2018 Ames JMAA prize (\$2,500)

for “Separable representations, KMS states, and wavelets for higher-rank graphs” 2018

Association for Women in Mathematics

Travel Grant to “Cuntz–Pimsner Cross-Pollination” workshop (\$2,589) June 2018

Pacific Northwest Section of the MAA

Project NExT fellow April 2018

American Mathematical Society

Travel Grant to International Congress of Mathematicians (\$3,300) August 2018

Travel Grant to Mathematical Congress of the Americas (\$1,350) July 2017

Graduate Student Travel Grant (\$250) October 2013

Dartmouth College

<i>Dartmouth Graduate Studies Travel Award</i> (\$1,000)	August 2013
<i>Graduate Assistance in Areas of National Need Fellowship</i>	September 2011 - June 2012
<i>Dartmouth College Graduate Fellowship</i>	September 2008 - September 2011 July 2013 - June 2014

Macalester College

<i>Konhauser Award for Mathematical Achievement</i>	May 2007
<i>Capstone Prize</i>	May 2007
<i>Phi Beta Kappa membership</i>	May 2006
<i>Pi Mu Epsilon membership</i>	April 2006

INVITED LECTURES

- Future invited talks
 - Brazos Analysis Seminar (Texas A&M) October 2020
 - Noncommutative Geometry Fest (Dartmouth College) August 2021
- *Moves on higher-rank graphs preserving Morita equivalence*
 - COSy (Canadian Operator Algebras Symposium) June 2020
 - Operator Algebras Seminar, University of Colorado - Boulder January 2020
 - BIRS: Topology and Measure in Dynamics and Operator Algebras September 2019
- *Cartan subalgebras in the C^* -algebras of non-principal groupoids*
 - JMM: Special Session “Rep’ns of Finite Groups and Related Structures” January 2020
- *Spectral triples and wavelets for higher-rank graphs*
 - Great Plains Operator Theory Symposium (Texas A&M) May 2019
- *Generalized gauge actions, KMS states, and Hausdorff dimension for k -graphs*
 - Nebraska-Iowa Functional Analysis Seminar (Lincoln, NE) November 2018
 - COSy (Canadian Operator Algebras Symposium) June 2018
 - OHIO (Operators on Hilbert Spaces in Ohio) April 2018
 - Mathematical Congress of the Americas, Joint Special Session TDOA/NCG July 2017
 - Workshop: Applications of Operator Algebras (ICMS, Edinburgh) June 2017
- *Cubical versus categorical (co-)homology for k -graphs*
 - Operator Algebras Seminar, University of Colorado - Boulder October 2018
 - ICM Satellite Conference on Operator Algebras (Florianopolis, Brazil) July 2018
- *Monic representations of higher-rank graphs*
 - West Coast Operator Algebras Symposium (Seattle) October 2018
 - NCGOA Summer School, Universität Münster (Germany) May 2018

- *Wavelets and spectral triples for directed graphs*
 - Pure Math Seminar, Montana State University October 2019
 - Colloquium, University of Wyoming February 2018
 - Colloquium, Arizona State University February 2018
 - Colloquium, University of Colorado - Boulder March 2017
- *Finite decomposition rank for virtually nilpotent groups*
 - Workshop on K -theory for C^* -algebras (Texas A&M) February 2018
 - Operator Algebras Seminar (University of Arizona) February 2018
 - Operator Algebras Seminar (University of Oslo) January 2018
 - Satellite Conference on Operator Algebras (Fields Institute, Toronto) August 2017
 - Operator Algebras: Dynamics and Interactions (CRM, Barcelona) June 2017
- *Universal Coefficient Theorem for nilpotent groups*
 - Masterclass: Applications of the UCT (Copenhagen University) October 2017
- *Wavelets and spectral triples for higher-rank graphs*
 - Analysis Seminar (Bonn University) July 2017
 - Operator Algebras Seminar (Copenhagen University) May 2017
 - Operator Algebras Seminar (NTNU, Norway) February 2017
 - Scottish Operator Algebras Research Symposium (Glasgow) December 2017
 - Mathematical Physics Seminar (Erlangen, Germany) October 2016
 - MATRIX Workshop: KK -theory and Dynamics (Melbourne) July 2016
- *Irreducible representations of nilpotent groups generate classifiable C^* -algebras*
 - Operator Algebras Seminar (KU Leuven, Belgium) May 2017
 - Ergodic and Geometric Group Theory Seminar (EPFL, Switzerland) February 2017
 - East Coast Operator Algebra Symposium (Loyola University Chicago) October 2016
- *Twists over étale groupoids and twisted vector bundles*
 - Structure and Classification of C^* -Algebras (IMPAN, Warsaw) November 2016
 - Differential Geometry Seminar (University of Adelaide, Australia) July 2016
- *Cubical = categorical*
 - AMS Western Sectional, NCG Special Session (University of Denver) October 2016
 - Operator Algebras Seminar (University of Wollongong, Australia) August 2016
- *K -theory and homotopies of 2-cocycles for twisted groupoid C^* -algebras*
 - Colloquium (University of Maine) May 2016

- Colloquium (Miami University of Ohio) September 2015
- Colloquium (Kansas State University) May 2015
- Colloquium (University of Nevada - Reno) February 2015

TEACHING EXPERIENCE

Assistant Professor, University of Montana

- M 472: Introduction to Complex Analysis* Spring 2019, Spring 2020
- M 273: Multivariable Calculus* Fall 2019, Fall 2017
- M 473: Intro to Real Analysis* Fall 2019
- M 172: Calculus II* Fall 2018, Spring 2019
- HUSC 194: Freshman Seminar* Fall 2018
- M 551: Analysis (graduate)* Fall 2018
- M 564: Graph C^* -algebras (graduate topics)* Spring 2018
- M 555: Functional Analysis (graduate)* Fall 2017

Instructor, University of Colorado - Boulder

- MATH 3210: Euclidean and Non-Euclidean Geometry* Spring 2016
- MATH 6210: Introduction to Topology (graduate)* Fall 2015
- MATH 2001: Introduction to Discrete Mathematics* Spring 2015, Fall 2015
- MATH 3130: Introduction to Linear Algebra* Spring 2015
- MATH 3001: Analysis I* Fall 2014

Instructor, Dartmouth College

- Math 31: Topics in Algebra* Fall 2011
- Math 2: Calculus with Algebra and Trigonometry* Winter 2011

Substitute Instructor, Universidad Carlos III de Madrid (Spain)

- Mathematical Methods II: Linear Algebra* Fall 2012

Assistant Instructor, Dartmouth College

- Math 11: Calculus for First-Year Students with Two Terms of AP Credit* Fall 2013

Teaching Assistant, Dartmouth College

- Math 13: Calculus of Vector-Valued Functions* Spring 2009, Spring 2010
- Math 11: Calculus for First-Year Students with Two Terms of AP Credit* Fall 2009
- Math 8: Calculus of Functions of One and Several Variables* Fall 2008

OTHER PRESENTATIONS

- Cartan subalgebras of non-principal groupoid C^* -algebras* November 2019
Groupoidfest, University of Nevada - Reno
- Monic representations for higher-rank graphs* May 2018
Great Plains Operator Theory Symposium, Miami University
- Generalized gauge actions, KMS states, and Hausdorff dimension for k -graphs* August 2017
Young Mathematicians in C^* -algebras

- Spectral triples for graph C^* -algebras* May 2017
Kleines Seminar, WWU-Münster
- Twists over étale groupoids and twisted vector bundles* March 2017
Groupoidfest, University of Colorado - Boulder
- Wavelets and spectral triples for higher-rank graphs* January 2017
Oberseminar C^* -algebren, WWU-Münster
- Connectivity for C^* -algebras* October 2017
Kleines Seminar, WWU-Münster
- Cohomology for small categories: k -graphs, groupoids, and “widgets”* June 2016
Oberseminar C^* -Algebren, WWU-Münster (invited lecture)
- Irreducible representations of nilpotent groups generate classifiable C^* -algebras* May 2016
Great Plains Operator Theory Symposium, University of Illinois at Urbana-Champaign
- Cohomology for categories, k -graphs, and groupoids* October 2015
Groupoidfest/AMS Sectional Meeting, University of Memphis
- Wavelets, KMS states, and separable representations for higher-rank graphs (poster)*
Problems and Recent Methods in Operator Theory, University of Memphis October 2015
- Separable representations of k -graph C^* -algebras, and some applications* May 2015
Great Plains Operator Theory Symposium, Purdue University
- Quantum groups from the operator-algebraic perspective* December 2014
Lie Theory Seminar, University of Colorado - Boulder
- K -theory and homotopies of 2-cocycles for twisted groupoid C^* -algebras* November 2014
Groupoidfest, University of Colorado - Boulder
- K -theory for twisted groupoid C^* -algebras* September 2014
FRAGMENT Seminar, University of Colorado - Boulder
- C^* -algebras: Infinite-dimensional representations* July 2014
SMPosium, Carleton College
- K -theory and homotopies of 2-cocycles for higher-rank graphs* May 2014
Great Plains Operator Theory Symposium, Kansas State University
- K -theory and homotopies of 2-cocycles for twisted groupoid C^* -algebras* January 2014
Dartmouth College Colloquium (invited lecture)
- Notions of homotopy for C^* -algebras* January 2014
Graduate Education and Mentoring Workshop, Joint Mathematics Meetings (JMM)
- The effect of homotopies of groupoid 2-cocycles on C^* -algebraic K -theory* January 2014
JMM: Special Session “Classification Problems in Operator Algebras”
- K -theory and homotopies of 2-cocycles on higher-rank graphs* November 2013
New Hampshire Operator Theory Symposium, Dartmouth College

<i>K-theory and homotopies of 2-cocycles on groupoids</i>	October 2013
Groupoidfest (Special Session, AMS Fall Central Sectional Meeting)	
<i>K-theory and homotopies of 2-cocycles on higher-rank graphs</i>	September 2013
Analysis seminar, Universitat Autònoma de Barcelona (Spain)	
<i>K-theory and homotopies of 2-cocycles on groupoid C^*-Algebras</i>	September 2013
School & Workshop on Topics in Operator Algebras and Applications Institute for Mathematical Sciences, Madrid (Spain)	
<i>K-theory and 2-cocycles on transformation groups (poster)</i>	August 2013
Workshop on Groups, Dynamical Systems, and C^* -algebras University of Münster (Germany)	
<i>K-theory and twisted group(oid) C^*-algebras</i>	May 2013
Great Plains Operator Theory Symposium, University of California - Berkeley	
<i>The rotation algebras are not Kadison-Kastler close</i>	April 2013
Mathematical Physics seminar, Universidad Carlos III de Madrid (Spain)	
<i>An introduction to the Ext group for operator algebras</i>	January 2013
Institute for Mathematical Sciences / Universidad Carlos III de Madrid (Spain)	
<i>Groupoid C^*-algebras and KK-theory</i>	April 2012
New Hampshire Operator Theory Symposium, University of New Hampshire	
<i>Consecutive pattern avoidance</i>	September 2009
Women in Mathematics in New England (WIMIN), Smith College	
<i>Firefighting on a grid</i>	February 2011
Math Counts – SE Vermont Regional Competition	

OTHER CONFERENCES ATTENDED

WORKSHOPS

C^*-algebras	August 2019
Oberwolfach	
Pacific Northwest Section Meeting of the MAA	April 2019
University of Portland	
Women in Operator Algebras	November 2018
Banff International Research Station	
Pacific Northwest Section Meeting of the MAA	April 2018
Seattle University	
Advanced course on operator algebras: groupoids, crossed products, and Rokhlin dimension	March 2017
Centre de Recerca Matemàtica (Universitat Autònoma de Barcelona)	

- Noncommutative Geometry and KK -theory for the N-body Problem** August 2016
Universität Münster (Germany)
- Noncommutative Geometry and Spectral Invariants** June 2015
Centre de Recherches Mathématiques (Montreal, Canada)
- West Coast Operator Algebras Symposium** November 2014
University of Denver
- Focus Program on Noncommutative Geometry and Quantum Groups** June 2013
Fields Institute
- Masterclass on Semiprojectivity** August 2012
Copenhagen University
- Spring Institute on Noncommutative Geometry and Operator Algebras** May 2011
Vanderbilt University
- East Coast Operator Algebras Symposium** October 2010
Dartmouth College
- School and Workshop on Topics in Operator Algebras** September 2010
Madrid, Spain
September 2013
- Summer School on Operator Algebras and Noncommutative Geometry** June 2010
University of Victoria

COMBINATORICS

- Permutation Patterns**, Dartmouth College August 2010
- CoNE Revisited: Celebrating the Inspirations of Mike Albertson**,
Smith College March 2010
- Discrete Math Days**, University of Vermont June 2009
- Graduate Student Combinatorics Conference**, University of Kentucky March 2009
- Research Experience for Undergraduates**, DIMACS (Rutgers) 2006

WOMEN IN MATHEMATICS

- Young Women in C^* -Algebras**, August 2017
- SMPosium**, Summer Mathematics Program for Women Undergraduates July 2014
Alumnae conference August 2015
- Graduate Education and Mentoring Workshop**, January 2014
Joint Mathematics Meetings

Women in Mathematics in New England (WIMIN), Smith College	September 2009 September 2011 September 2013
Women in Science and Technology Forum, White Mountains Community College	April 2012
Sonia Kovalevsky Mathematics Day, Dartmouth College	November 2011 May 2014
Nebraska Conference for Undergraduate Women in Mathematics, University of Nebraska, Lincoln	February 2007
Summer Mathematics Program for Women Undergraduates, Carleton College	June - July 2005

PROFESSIONAL DEVELOPMENT

Fellow, Pedagogy Project University of Montana	Fall 2017 - present
Minicourse: “Laying the foundations for positive group collaboration” Taught by Kathryn Leonard at PNW sectional meeting of MAA	April 2018
Workshop: “Working with students who struggle academically” Faculty Development Office, University of Montana	February 2018
Workshop: “How to invite and assess in-class participation” Faculty Development Office/Pedagogy Project, University of Montana	November 2017
Workshop: “Improving your syllabi” Faculty Development Office, University of Montana	August 2017
Workshop: “Making writing assignment descriptions more effective” Faculty Development Office, University of Montana	August 2017
Workshop: “Mentoring diverse student populations” Faculty Development Office, University of Montana	August 2017
Workshop: “Writing and Designing NSF Proposals” Grant Training Center	March 2015
Workshop: “Learning Goals and Course Design” Faculty Teaching Excellence Program, University of Colorado - Boulder	January 2015
Workshop: “Teaching in a Nutshell” Faculty Teaching Excellence Program, University of Colorado - Boulder	March 2015
Teaching Seminar, Dartmouth College Intensive summer-long course for post-qualifying exam graduate students. Includes reading and discussion about the philosophy and science of learning and teaching. Participants also design and execute two one-week-long mathematics workshops for high school students.	Summer 2010

OUTREACH & SERVICE ACTIVITIES

Co-organizer , Cartan Subalgebras in Operator Algebras MATRIX Mathematical Research Institute	August 2021
Co-organizer , Groundwork for Operator Algebras Lecture Series (GOALS)	2020
Mentor , Mentor Network in Operator Algebras	February 2020 - present
Panelist , National Science Foundation	2019
Presenter , Math Day University of Montana	October 2019
Mentor , (MT) ² : Montana Trains the Mathematicians of Tomorrow University of Montana	August 2018 - present
Mentor , Gondar-Montana Mentoring Program University of Montana	October 2018 - present
Chair , Colloquium Committee Department of Mathematical Sciences, University of Montana	August 2018 - present
Mentor , Learning Assistant Program University of Montana	August 2017 - present
Co-organizer , Young Women in C^* -Algebras KU Leuven (Belgium)	August 2018
Copenhagen University	August 2017
Co-organizer , Cuntz–Pimsner Cross-Pollination Lorentz Center (Netherlands)	June 2018
Co-organizer , AMS Special Session on Advances in Operator Algebras Joint Mathematics Meetings	January 2017
Judge , AWM Graduate Student Poster Session Joint Mathematics Meetings	January 2017
Member , Ad-hoc Committee on Discrete Mathematics University of Colorado - Boulder	October 2015 - May 2016
Founder/Organizer , UROP Summer Research Poster Session University of Colorado - Boulder	August 2015
Co-organizer , Groupoidfest University of Colorado - Boulder	November 2014
Instructor , Sonia Kovalevsky Day Dartmouth College	May 2014 November 2011

- Instructor**, Science Day April 2014
Dartmouth College
- Instructor**, Center for Talented Youth *Odyssey in Mathematics* October 2013
Dartmouth College May 2011
. May 2010
- Coordinator**, Graduate Student Seminar June 2013 - June 2014
Dartmouth College
- Webmaster**, Functional Analysis Seminar September 2010 - May 2012
Dartmouth College
- Panelist**, Technology and Mathematics Panel April 2012
Women in Science and Technology Forum, White Mountains Community College
- Panelist**, Graduate School Panel, WIMIN conference, Smith College September 2011
- Volunteer**, Math Counts Regional Competition (SE Vermont) February 2011

PROFESSIONAL AFFILIATIONS

American Mathematical Society
 Association for Women in Mathematics
 Mathematical Association of America