Kari Eifler | Curriculum Vitae

Department of Mathematics, Texas A&M University
College Station, TX USA 77843-3368
keifler@math.tamu.edu • www.math.tamu.edu/~keifler

Education

2021 **Doctor of Philosophy, Mathematics**, *Texas A&M University (College Station, USA).*
Dissertation in Preparation
Supervisor: Michael Brannan

2016 **Master of Mathematics**, *The University of Waterloo (Waterloo, Canada).*
Thesis: Graph C^*-algebras and the Abelian Core
Supervisors: Laurent Marcoux and Matthew Kennedy

2015 **Honors Bachelor of Science, Mathematics**, *The University of Alberta (Edmonton, Canada).*

Research Interests

Operator Algebras, Quantum Information Theory (QIT), and Quantum Algebras, Operator algebras play an integral role in quantum mechanics, quantum information, and quantum field theory and I study this interplay of operator algebras with the quantum world. My research focuses on applying tools from operator algebras and quantum algebras to attack problems arising in QIT.

Publications and Preprints

Refereed Journal Articles

Bigalois extensions and the graph isomorphism game, *M. Brannan, A. Chirvasitu, K. Eifler, S. Harris, V. Paulsen, X. Su, and M. Wasilewski*, Communications in Mathematical Physics, 2019, 33 pages.
Available at arXiv:1812.11474

Papers in Preparation

Quantum Cuntz Krieger C^*-algebras, *(joint with M. Brannan, C. Voigt, and M. Weber).*

Quantum Symmetries of Quantum Metric Spaces.

Research Reports

Operator Algebraic Quantum Groups, *K. Eifler*, Oberwolfach Report 45 (2019), DOI: 10.4171/OWR/2019/45.

Grants

2020 **NSF Grant: DMS-2000335**, *Conference grant for Young Mathematicans in C^*-algebras 2020 (YMC*A)*, $31,454.
(Co-PI jointly with Michael Brannan and Ian Charlesworth)

Research Talks and Colloquia

Invited

Jan. 2021   **Joint Mathematics Meetings (JMM): Special Session on Advances in Multivariable Operator and Function Theory in both Commutative and Non-commutative Settings**, *Washington D.C..*

Aug. 2020   **The Online Operator Theory and Related Topics Seminar Series**, *The University of Florida (online).*

Jan. 2020   **Joint Mathematics Meetings (JMM): Special Session on Advances in Operator Algebras**, *Denver.*

Nov. 2019   **Mathematical Physics and Operator Algebras seminar**, *Michigan State University.*

Nov. 2019   **AMS Sectional Meeting: Special Session on Advances in Operator Algebras**, *University of California, Riverside.*

Oct. 2019   **Mini-Workshop: Operator Algebraic Quantum Groups**, *Oberwolfach.*

June 2019   **Research Experience for Undergraduates Summer Programs: Grad Research Talks**, *Texas A&M University.*

March 2019   **Brazos Analysis Seminar**, *University of Houston.*

March 2018   **A Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University.*

Dec. 2017   **Graduate Student Seminar**, *The University of Houston.*

May 2014   **The Alberta Mathematics Dialogue Meeting**, *Camrose.*

Contributed

May 2020   **Canadian Operator Symposium**, *The Fields Institute (online).*

Feb. 2020   **Texas Women in Math Symposium**, *Texas A&M University.*

Aug. 2019   **Young Mathematicians in C*-Algebras (YMC*A)**, *University of Copenhagen.*

June 2019   **Summer Research Program on Quantum Symmetries**, *The Ohio State University.*

May 2019   **Great Plains Operator Theory Symposium (GPOTS)**, *Texas A&M University.*

April 2019   **Linear Analysis Seminar**, *Texas A&M University.*

Aug. 2018   **Young Mathematicians in C*-Algebras (YMC*A)**, *KU Leuven.*

Aug. 2018   **Young Women in C*-Algebras (YWC*A)**, *KU Leuven.*

Nov. 2017   **Mathematics Graduate Students Organization**, *Texas A&M University.*

June 2015   **Canadian Undergraduate Mathematics Conference 2015**, *University of Alberta.*

Poster Presentations

Jan. 2020   **Connections for Women: Quantum Symmetries**, *Mathematical Sciences Research Institute (MSRI).*

Nov. 2014   **The Undergraduate Research Initiative's Annual Undergraduate Symposium**, *University of Alberta.*

Nov. 2013   **The Undergraduate Research Initiative's Annual Undergraduate Symposium**, *University of Alberta.*

Awards and Honors

Fellowships and Scholarships

2017/18	**The Carl Pearcy and Heep Graduate Fellowship**, *Texas A&M University*.
2016/17	**The W.E. Coppage Fellowship in Mathematics**, *Texas A&M University*.
2016	**NSERC Alexander Graham Bell Canada Graduate Scholarship - Masters (CGS-M)**, *Natural Sciences and Engineering Research Council (declined)*.
2016	**President's Graduate Scholarship (PGS)**, *University of Waterloo (declined)*.
2015	**Provost Master's Entrance Award for Women**, *The University of Waterloo*.
2013, 2014, 2015	**Undergraduate Student Research Award**, *Natural Sciences and Engineering Research Council*.
2015	**The Dean's Silver Medal in Science**, *The University of Alberta*.
2015	**Dr Ali-Amir Husain Scholarship in Mathematics**, *The University of Alberta*.
2014	**Ernest Wilson Sheldon Memorial Prize in Mathematics**, *The University of Alberta*.
2013, 2014	**Murray Thomas Gibson Memorial Scholarship in Mathematics**, *The University of Alberta*.
2012, 2013, 2014	**Jason Lang Scholarship**, *Alberta Scholarship Programs*.
2012, 2013, 2014	**Dean's Honor Roll**, *The University of Alberta*.
2011	**Academic Excellence Scholarship**, *The University of Alberta*.
2011	**Alexander Rutherford Scholarship**, *Alberta Scholarship Programs*.

Travel Awards

Jan. 2020	**Travel support**, *Quantum Symmetries Workshop at Mathematical Sciences Research Institute (MSRI), Berkeley*.
Nov. 2019	**American Mathematical Society Graduate Student Travel Grant**, *Fall Sectional Meeting at University of California, Riverside*.
Oct. 2019	**US Junior Oberwolfach Fellow**, *Operator Algebraic Quantum Groups at Oberwolfach, Germany*, NSF-grant DMS-1641185.
Aug. 2019	**Young Mathematicians in C*-Algebras (YMC*A)**, *University of Copenhagen, Denmark*, NSF-grant DMS-1900134.
May 2019	**Summer Research Program on Quantum Symmetries**, *The Ohio State University, Ohio*, NSF-grant DMS-1654159.
May 2019	**Thematic Program on Operator Algebras, Groups, and applications to Quantum Information**, *the Instituto de Cincias Matematicas (ICMAT), Madrid, Spain*, NSF-grant DMS-1901290.
March 2019	**New Developments in Free Probability and Applications**, *Centre de Recherches Mathematiques (CRM), Montreal, Canada*, NSF-grant DMS-1900856.
June 2017	**Operator Algebras: Dynamics and Interactions**, *Centre de Recerca Matematica, Barcelona, Spain*, NSF-grant DMS-1901290.

Teaching Experience

Instructor (5)

Spring 2020
Spring 2019
Fall 2018

Instructor of Record, *Math 141: Finite Mathematics.*
Texas A&M.
- Classes of 65-75 students
- Linear equations and applications; systems of linear equations, matrix algebra and applications, linear programming, probability and applications, statistics, finance.
- Spring 2020: first seven weeks in person, second six weeks online due to COVID-19
- Spring 2019 and Fall 2018 were completely in person

Summer 2019
Summer 2018

Instructor, *Real Analysis Qualifier Exam Preparation Course.*
Texas A&M.
- Six-week intensive course aimed at first year graduate students.
- Elementary theory, general measures, measurable functions and integration, product measures, signed measures, differentiation, topology, normed linear spaces, topological vector spaces, important banach spaces and their properties.

Mentoring (5)

2018/2019,
2019/2020

American Women in Math (AWM) Texas A&M Graduate Student Chapter's Peer Mentoring Program.
Mentor

2014/2015

Science Mentor Program through the Faculty of Science at the University of Alberta.
Mentor

2014

Students' Union at the University of Alberta.
Orientation Programs Assistant

2013/2014

Science Mentor Program through the Faculty of Science at the University of Alberta.
Science Ambassador

Recitations / Labs (4)

Fall 2017

Recitations, *Math 150: Functions, Trigonometry and Linear Systems.*
Texas A&M.
- Functions, Trigonometry and Linear Systems. Graphs, functions, college algebra and trigonometry, linear systems and vectors.

Summer 2016

Recitations, Grading, *Math 207: Calculus 3 for non-specialists.*
University of Waterloo.
- Multivariable functions and partial derivatives. Gradients. Optimization including Lagrange multipliers. Polar coordinates. Multiple integrals. Surface integrals on spheres and cylinders. Introduction to Fourier Series.

Summer 2016

Recitations, Grading, *Math 115: Calculus 2 for Sciences.*
University of Waterloo.
- Linear equations, matrices and determinants. Introduction to vector spaces. Eigenvalues and diagonalization. Applications. Complex numbers.

Fall 2015

Recitations, *Math 127: Calculus 1 for Sciences.*
University of Waterloo.
- Functions of a real variable: powers, rational functions, trigonometric, exponential and logarithmic functions, their properties and inverses. Intuitive discussion of limits and continuity. Definition and interpretation of the derivative, derivatives of elementary functions, derivative rules and applications. Riemann sums and other approximations to the definite integral. Fundamental theorems and antiderivatives; change of variable. Applications to area, rates, average value.

Grader (8)

Fall 2020	**Grader**, *Math 607: Real Variables I.* Texas A&M. Online course.
Fall 2019	**Grader**, *Math 645: A Survey of Mathematical Problems I.* Texas A&M. Online course.
Spring 2018	**Grader**, *Math 416: Modern Algebra II.* Texas A&M.
Summer 2017	**Grader**, *Math 142: Business Calculus.* Texas A&M.
Spring 2017	**Grader**, *Math 662: Seminar in (Abstract) Algebra.* Texas A&M.
Fall 2016	**Grader**, *Math 446: Principles of Analysis I.* Texas A&M.
Winter 2016	**Grader**, *Math 138: Calculus 2 for Honours Mathematics.* University of Waterloo.
Winter 2016	**Grader**, *Math 128: Calculus 2 for Sciences.* University of Waterloo.

Misc (1)

Fall 2018	**Private Tutor**, *Individually tutored engineering graduate student.*
Fall 2015	**Tutor, Grades Management**, *Math 135: Algebra for Honours Mathematics.* University of Waterloo.

Professional Development

Teaching Professional Development

In Progress	**[Certification] Academy for Future Faculty**, *The Center for the Integration of Research, Teaching, and Learning at Texas A&M University.* ○ Attended 6 teaching seminars offered by professors known for excellence in teaching ○ Was mentored to teach in higher education environments and was provided feedback on teaching
Spring 2020	**[Course] Special Topics in Professional Preparation**, *Texas A&M University.* A course on teaching, writing, and presenting mathematics. Grade received: A.
2015/16	**[Certification] Fundamentals of University Teaching Program**, *Centre for Teaching Excellence at the University of Waterloo.* ○ Attended 6 teaching workshops ○ Participated in 3 microteaching sessions to deliver mini lessons to peers and receive feedback on teaching

Industry Professional Development

Summer 2020	**Math-to-Industry Bootcamp**, *Institute for Mathematics and its Applications (IMA).* ○ An intense six-week summer program designed to provide graduate students with training and experience that is valuable for employment outside of academia. ○ Collaborated with a team under industry mentorship to optimize their warehouse system by coding in Python ○ Engaged in soft-skill, leadership, and teambuilding workshops ○ Completed short courses on Python, R, Statistics, Machine Learning, Stochastic modeling, Optimization

Research Professional Development

August 2014   **Summer School for Women in Math**, *The University of Waterloo.*
a two week residential mathematics enrichment program

**Summers
2013, 14, 15**   **Undergraduate Math Researcher**, *The University of Alberta*, funding through NSERC.
Research Supervisor: Dr. Giseon Heo

Summer 2012   **Undergraduate Physics Researcher**, *The University of Alberta*, funding through NSERC.
Research Supervisor: Dr. Carsten Krauss

Service Activities

Leadership

2019 - current   **Young Women in Operator Algebras Mentor Network**.
Co-founder and co-organizer
- Launched a worldwide mentoring network for young underrepresented students studying operator algebras
- Organized events including meet-ups, panels and round-table discussions

2018 - current   **Directed Reading Program (DRP)**, *Texas A&M University.*
Co-founder and co-organizer
- Developed a new 3-credit course to match undergraduates with graduate student mentors
- Organized monthly events
- Trained undergraduate participants on how to present mathematics

**2018/2019,
2019/2020,
2020/2021**   **American Matematical Society (AMS) Graduate Student Chapter**, *Texas A&M University.*
- Served as President in 2019/2020
- Served as Secretary in 2018/2019 and 2020/2021
- Co-organized two local conferences to highlight graduate students in Texas
- Coordinated monthly activities to contribute to departmental interactions

2020/2021   **TAMU Math Grad Diversity Committee**, *Texas A&M University.*
Committee Member
- Organize events to promote diversity within the mathematical community
- Member of the monthly book club which reads literature on diversity topics

2014/2015   **Mathematical Sciences Society**, *Official undergraduate student group of the Department of Mathematical and Statistical Sciences at the University of Alberta.*
Secretary and Treasurer

Conferences/Events Organized

Oct. 2020   **Career Panel at SIAM Texas-Louisiana Section Annual Meeting**, *Online.*
Co-organizer

April 2020   **Texas A&M Career Panel Series**, *Texas A&M University.*
Lead organizer. Cancelled last minute due to COVID-19.

April 2020   **A Gathering in Graduate Expository Mathematics (GIG'EM) 2020**.
Lead organizer. Cancelled last minute due to COVID-19.

Aug. 2019   **Young Mathematicians in C*-algebras (YMC*A) 2019**.
Co-organizer

Feb. 2019   **A Gathering in Graduate Expository Mathematics (GIG'EM) 2019**.
Co-organizer

Miscellaneous Service

2016, 2017, 2018   **Texas High School Math Contest**, *Texas A&M University*.
Grader

2018   **First Year Graduate Student Seminar: "Preparing for Qualifying Exams"**, *Texas A&M University*.
Panelist

2017   **First Year Graduate Student Seminar: "Adjusting to Graduate School"**, *Texas A&M University*.
Panelist

2014/2015   **Undergraduate Research Initiative at the University of Alberta**.
Peer Undergraduate Research Liaison

May 2013   **41st Annual Meeting of the Statistical Society of Canada**.
Student Volunteer

▬▬▬ Conferences and Workshops Attended

Aug. 10-13, 2020   **Operator Theory with its Applications**, *2TART (online conference)*.

May 25-29, 2020   **Canadian Operator Symposium**, *The Fields Institute (online conference)*.

Feb.1-2, 2020   **Texas Women in Math Symposium**, *Texas A&M University*.

Jan.23-24, 2020   **Connections for Women: Quantum Symmetries**, *Mathematical Sciences Research Institute (MSRI), California*.

Jan.15-18, 2020   **Joint Mathematics Meetings**, *Denver, Colorado*.

Nov.14-16, 2019   **Quantitative Linear Algebra (QLA) meets Quantum Information Theory (QIT)**, *Purdue University, Indiana*.

Nov.9-10, 2019   **American Mathematical Society Sectional Meeting**, *University of California, Riverside*.

Oct.6-12, 2019   **Mini-Workshop: Operator Algebraic Quantum Groups**, *Oberwolfach, Germany*.

Aug.5-10, 2019   **Young Mathematicians in C*-Algebras (YMC*A)**, *University of Copenhagen, Denmark*.

July 26-28, 2019   **Summer Informal Regional Functional Analysis Seminar (SUMIRFAS)**, *Texas A&M University*.

June 2-7, 2019   **Summer Research Program on Quantum Symmetries**, *The Ohio State University, Ohio*.

May 28 - June 1, 2019   **Great Plains Operator Theory Symposium (GPOTS)**, *Texas A&M University*.

May 6-17, 2019   **Thematic Research Program: Operator Algebras, Groups, and Applications to Quantum Information**, *the Instituto de Cincias Matematicas (ICMAT)*, Madrid, Spain.
Workshop II: Mathematical Aspects of Quantum Information Theory
School II: Applications to Quantum Information Theory

Mar. 30-31, 2019   **Brazos Analysis Seminar**, *University of Houston*.

Mar. 4-8, 2019   **New Developments in Free Probability and Applications**, *Centre de Recherches Mathematiques (CRM)*, Montreal, Canada.

Feb. 16, 2019   **A Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University*.

Oct. 8-12, 2018	**Workshop on Cohomology of Quantum Groups and Quantum Automorphism Groups of Finite Graphs**, *Saarland University*, Saarbrücken, Germany.
Sept. 29-30,2018	**Brazos Analysis Seminar**, *Texas A&M University*.
Aug. 13-17,2018	**Young Mathematicians in C*-Algebras (YMC*A)**, *KU Leuven, Belgium*.
Aug. 11-12,2018	**Young Women in C*-Algebras (YWC*A)**, *KU Leuven, Belgium*.
June 4-8, 2018	**Canadian Operator Symposium (COSy)**, *University of Manitoba, Canada*.
May 29 - June 2, 2018	**Great Plains Operator Theory Symposium (GPOTS)**, *Miami University, Ohio*.
Mar. 24-25, 2018	**Brazos Analysis Seminar**, *Baylor University, Texas*.
June 19-23, 2017	**Barcelona Conference on C*-Algebras: Structure, Classification and Dynamics**, *Centre de Recerca Matematica, Spain*.
June 11-23, 2017	**Invited Researcher to the IRP on Operator Algebras: Dynamics and Interactions**, *Centre de Recerca Matematica, Spain*.
May 22-26, 2017	**Great Plains Operator Theory Symposium (GPOTS)**, *Texas Christian University*.
June 13-17, 2016	**Canadian Annual Symposium on Operator Algebras and their Applications (COSy)**, *Centre de Recherches Mathematiques (CRM)*, Montreal.

Additional Skills

Languages: English, basic Spanish

Programming Languages: C++, Python

Additional Software Experience: Anaconda, RStudio, Matlab, LaTeX, git, Microsoft Office

OS Experience: Mac, Unix/Linux, Windows

Professional Affiliations

2016-current	**American Mathematical Society (AMS)**.
2016-current	**Association for Women in Mathematics (AWM)**.
2016-current	**Mathematical Association of America (MAA)**.
2016-current	**Society for Industrial and Applied Mathematics (SIAM)**.