

Kari Eifler | Curriculum Vitae

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Education

- 2021 **Doctor of Philosophy, Mathematics, Texas A&M University (College Station, USA).**
Dissertation: Quantum Symmetries Studied Through the Lens of Non-Local Games
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.
Available at [arXiv:1812.11474](https://arxiv.org/abs/1812.11474)

Preprints

Non-local games and quantum symmetries of quantum metric spaces, K. Eifler.
Available at [arXiv:2011.03867](https://arxiv.org/abs/2011.03867)

Quantum Cuntz Krieger C^* -algebras, M. Brannan, K. Eifler, C. Voigt, and M. Weber.
Available at [arXiv:2009.09466](https://arxiv.org/abs/2009.09466)

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

- Feb. 2021 **Operator Theory Talks for Early Researchers (OTTER)**, (virtual).
- Feb. 2021 **Quantum Symmetries Student Seminar (QSSS)**, *The Ohio State University (virtual)*.
- Jan. 2021 **Joint Mathematics Meetings (JMM): Special Session on Advances in Multivariable Operator and Function Theory in both Commutative and Non-commutative Settings**, (virtual).
- Dec. 2020 **CMS Winter Meeting: Special Session on Operator Algebras**, (virtual).
- Nov. 2020 **Colloquium**, *California Sate University, Long Beach (virtual)*.
- Nov. 2020 **Operator Algebras Seminar**, *Purdue University (virtual)*.
- Aug. 2020 **The Online Operator Theory and Related Topics Seminar Series**, *The University of Florida (virtual)*.
- 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 (virtual)*.
- 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

- 2020/2021 **Ethel Ashworth-Tsutsui Memorial Award for Mentoring**, *Women in Science and Engineering at Texas A&M University*.
- 2020 **Dr. Joseph Newton Graduate Student Service Award**, *College of Science, Texas A&M University*.
- 2017/2018 **The Carl Percy and Heep Graduate Fellowship**, *Department of Mathematics, Texas A&M University*.
- 2016/2017 **The W.E. Coppage Fellowship in Mathematics**, *Department of 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**, *Faculty of Mathematics, 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**, *Faculty of Science, The University of Alberta*.
- 2015 **Dr Ali-Amir Husain Scholarship in Mathematics**, *Department of Mathematics, The University of Alberta*.
- 2014 **Ernest Wilson Sheldon Memorial Prize in Mathematics**, *Department of Mathematics, The University of Alberta*.
- 2013, 2014 **Murray Thomas Gibson Memorial Scholarship in Mathematics**, *Department of 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 Ciencias 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 **Instructor of Record**, *Math 141: Finite Mathematics*.
 Spring 2019 Texas A&M.
 Fall 2018
 - Responsible for all aspects of the course, including the creation of lecture notes, assignments, quizzes and exams, delivery of lectures, and office hours
 - 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 **Instructor**, *Real Analysis Qualifier Exam Preparation Course*.
 Summer 2018 Texas A&M.
 - Responsible for the creation of lecture notes and delivery of lectures
 - 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, **American Women in Math (AWM) Texas A&M Graduate Student Chapter's Peer**
 2019/2020 **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 / Lab Instructor (4)

- Fall 2017 **Recitations (Lab Instructor)**, *Math 150: Functions, Trigonometry and Linear Systems*.
 Texas A&M.
- Summer 2016 **Recitations (Lab Instructor), Grading**, *Math 207: Calculus 3 for non-specialists*.
 University of Waterloo.
- Summer 2016 **Recitations (Lab Instructor), Grading**, *Math 115: Calculus 2 for Sciences*.
 University of Waterloo.
- Fall 2015 **Recitations (Lab Instructor)**, *Math 127: Calculus 1 for Sciences*.
 University of Waterloo.

Grader (9)

- Spring 2021 **Grader, Math 608: Real Variables II.**
Texas A&M. Online course.
- 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 (2)

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

Service Activities

Leadership

- 2019 - current **Young Women in Operator Algebras Mentor Network.**
Co-founder, co-organizer, and board member
- Launched a worldwide mentoring network for young underrepresented students studying operator algebras
 - Was elected as a board member in 2020 and renewed the position through 2022
 - The network pairs young women PhD students together with a postdoc level junior mentor and tenured senior mentor to give her trusted allies and provide a advice
 - Organized events including meet-ups, panels and round-table discussions
 - oamentornetwork.wordpress.com/
- 2018 - 2021 **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 - 2021 **American Mathematical 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*.
Event Coordinator
- Lead organization of 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 **A Gathering in Graduate Expository Mathematics (GIG'EM) 2020**.
Co-organizer.
- 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

- 2020 **First Year Graduate Student Seminar: "Outreach Opportunities"**,
Texas A&M University.
Panelist
- 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

Professional Development

Teaching Professional Development

- 2019-2020 **[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.

- 2015-2016 **[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 three individually awarded NSERC USRAs.
Research Supervisor: Dr. Giseon Heo
- Summer 2012 **Undergraduate Physics Researcher**, *The University of Alberta*, funding through NSERC.
Research Supervisor: Dr. Carsten Krauss

Conferences and Workshops Attended

- Jan. 6-9, 2021 **Joint Mathematics Meetings**, *Virtual*.
- Dec. 4-8, 2020 **Canadian Mathematical Society (CMS) Winter Meeting**, *Virtual*.
- Nov. 7-8, 2020 **Brazos Analysis Seminar**, *Texas A&M University*.
- Oct. 10, 2020 **A Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University*.
- Aug. 10-13, 2020 **Operator Theory with its Applications**, *2TART (virtual conference)*.
- May 25-29, 2020 **Canadian Operator Symposium**, *The Fields Institute (virtual 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 Ciencias 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.*

Professional Affiliations

- 2016-2021 **American Mathematical Society (AMS).**
- 2016-2021 **Association for Women in Mathematics (AWM).**
- 2016-2021 **Mathematical Association of America (MAA).**
- 2016-2021 **Society for Industrial and Applied Mathematics (SIAM).**