

# Kari Eifler | Curriculum Vitae

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## Professional Experience

2021 - Present **Data Scientist II**, *Microsoft*.

Summer 2020 **Math-to-Industry Bootcamp**, *Institute for Mathematics and its Applications (IMA)*.

## 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

**Non-local games and quantum symmetries of quantum metric spaces**, *K. Eifler*, *Indiana University Mathematics Journal*, 2021.

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*, *Transactions of the American Mathematical Society*, 2021.

Available at [arXiv:2009.09466](https://arxiv.org/abs/2009.09466)

**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)

### Articles & Research Reports

**Operator Algebras Mentor Network: supporting early-career women researchers**, *A. Duwenig, K. Eifler, P. Ganesan, L. Ismert, S. Plosker, K. Strung*, *European Women in Mathematics Newsletter* 35 (2022).

Available at [europeanwomeninmaths.org/operator-algebra/](https://europeanwomeninmaths.org/operator-algebra/)

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

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## Grants

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

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## 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*.

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## 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.

## Service Activities

### Leadership

- 2019 - Present **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/](http://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

- 2022 **Texas A&M SIAM Career Panel.**  
Panelist
- 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

## 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.

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## 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

### 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

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## 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 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.

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## 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)**.