JACOB W. MASHBURN

Department of Mathematics,
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EDUCATION

Texas A&M University, College Station, TX **Aug 2016 - Aug 2022**
Ph.D., Mathematics (Advisor: Dr. Michael Anshelevich)
Dissertation: *Distributions and von Neumann Algebras over Fock Spaces with Depth-Two Action*

Texas A&M University, College Station, TX **Aug 2012 - May, 2016**
Bachelor of Arts, Mathematics

RESEARCH INTERESTS

Free Probability Theory, Stochastic Processes, Operator Algebras

TEACHING EXPERIENCE

TAMU Instructional Assistant Professor **Aug 23 - present**

- **Engineering Calculus I**, Spring 2026.
  - Taught three classes of 73 students on average.
  - Topics included vectors, limits, derivatives, integrals, and applications to physics and engineering.
  - Tools used include Python, WebAssign, and Canvas.

- **Engineering Calculus II**, Fall 2025.
  - Taught one class of 65 students.
  - Topics included integration, series, and further applications to physics and engineering.
  - Tools used include Python, WebAssign, and Canvas.

- **Linear Algebra**, Spring 2025, Summer 2025, Fall 2025.
  - Taught four classes of 57 students on average.
  - Topics included linear systems, vector spaces, linear transforms, inner products, eigenvalues, and applications to data science, physics, and engineering.
  - Tools used include Python, Zoom, and Canvas.
  - Summer 2025 was held online, synchronously, with lectures broadcast via Zoom, with exams proctored via Honorlock and Canvas.

- **Mathematical Probability**, Summer 2024, Fall 2024.
  - Taught three classes of 56 students on average.
  - Topics included combinatorial probability, Bayesian inference, single/multivariable distributions, expected value, the Laws of Large Numbers and Central Limit Theorem, and applications to data science and engineering.
  - Tools used include Zoom and Canvas.
  - Summer 2024 was held online, synchronously, with lectures broadcast via Zoom, with exams proctored via Honorlock and Canvas.

- **Business Mathematics**, Fall 2023, Spring 2024, Fall 2024, Spring 2025.
  - Taught nine classes of 102 students on average.
  - Topics included linear systems, optimization, probability, functions, and applications to cost, revenue, and profit models.
  - Tools used include Zoom, YouTube, WebAssign and Canvas.
  - Two classes (Spring 2024 and Fall 2024) were held online, asynchronously, with lectures recorded and posted to YouTube, and remote participation via Zoom, Honorlock proctoring, and Canvas.

TAMU Graduate Instructor of Record **Jan 20 - Aug 22**

- **Explorations in Mathematics**, Summer 2022 (in-person), Spring 2022 (hybrid), Spring 2021 (remote), and Spring 2020 (see below).
  - Taught four classes of 40 students on average.
  - Topics included graph theory, task scheduling, statistics, information science, cryptography, fair division, apportionment, and voting theory.
  - Tools used include Zoom, WebAssign, and Canvas.
  - Spring 2020 class started in-person, but switched to remote due to emergency lockdowns during the COVID-19 pandemic.
- **Business Calculus**, Summer 2021 (remote).
  - Taught a class of 26 students. Topics included limits, derivatives, integration, and applications to business and finance.
  - Tools used include Zoom, Edfinity, and Canvas.

TAMU Graduate Teaching Assistant **Aug 16 - Aug 22**

- **Recitation/Coding Lab Teaching Assistant for Engineering Calculus II**
  - Fall 2021 (hybrid), Dr. Constantin Onica, Python instruction.
  - Spring 2019, Amy Austin, Python instruction.
  - Fall 2018, Dr. Tamas Erdélyi, MATLAB instruction.
  - Spring 2018, Joe Kahlig, MATLAB instruction.
- **Grader for Explorations in Mathematics**, Summer 2021, Amanda Hoisington.
- **Recitation/Coding Lab Teaching Assistant for Engineering Calculus I**
  - Fall 2020 (remote), Dr. Sang Rae Lee, Python instruction. Held office hours.
  - Fall 2019, Dr. Sinjini Sengupta, Python instruction. Held office hours.
  - Fall 2017, Arthur Belmonte, MATLAB instruction.
- **Help Session Assistant for Advanced Calculus I**, Summer 2020.
- **Coordinator for Explorations in Mathematics**, Summer 2020.
  - Supervised a first-time graduate instructor of record and provided feedback on all written assessments.
  - Communicated through regular Zoom meetings and email.
- **Help Session Assistant for Engineering Calculus II**, Summer 2019.
- **Grader for Mathematical Probability**, Summer 2018, Kamran Reihani.
- **Help Session Assistant for Business Calculus**, Summer 2017.
- **Grader for Mathematics of Contingent Claims**, Spring 2017, Dr. Gregory Berkolaiko.
- **Grader for Mathematical Probability**, Fall 2016, Drs. Mike Brannan and Grigoris Paouris.

SERVICE

TAMU Instructional Assistant Professor **Aug 23 - present**

- **Python Coding Lab Coordinator**, Fall 2023 to present.
  - Designed weekly coding assignments and refined existing curriculum for engineering students to apply the concepts of calculus in algorithms written in Python. Packages used include NumPy, SymPy, and Matplotlib.
  - Coordinated instruction for about 50 graduate teaching assistants per semester.
  - Developed assessment framework in response to an evolving educational environment due to artificial intelligence.
  - Conducted Python workshops for faculty and graduate teaching assistants, to encourage Python integration into courses. Topics included SymPy, NumPy, Matplotlib, and Manim.

- **Course Coordinator for Explorations in Mathematics**, Spring 2024.
  - Supervised two graduate instructors of record and provided feedback on all written assessments.
  - Guided them through learning management system use, university policies, and student accommodations.
  - Communicated through weekly meetings and email.

EXTRA-CURRICULAR

TAMU Mathematics Graduate Student Organization Aug 2019 - May 2022

- Coordinated weekly seminar for graduate students to share their research interests through 50 minute talks and 10 minute Q&A sessions.
- Curated each semester's schedule by inviting faculty and graduate students alike.
- Managed change during the COVID-19 pandemic by moving the seminar to Zoom and scheduling around many conflicts caused by the pandemic.

PUBLICATIONS

- Anshelevich, M.; and Mashburn, J. "Some Fock spaces with depth two action." Accepted to the *Canadian Journal of Mathematics*, pending final review. arXiv:2103.13936.
- Anshelevich, M.; and Mashburn, J. "Fock representation of free convolution powers." *Journal of Operator Theory*, 92:1 (2024), pg. 77-99.

TALKS GIVEN

- April 2022: **Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University (invited)*
- November 2021: **Pure Mathematics Seminar**, *Lancaster University (invited, remote)*
- October 2021: **Graduate Student Organization (GSO) Seminar**, *Texas A&M University*
- October 2021: **Probabilistic Operator Algebra Seminar (POAS)**, *University of California, Berkeley (invited, remote)*
- September 2021: **GSO Seminar**, *Texas A&M University*
- August 2021: **Young Mathematicians in C*-Algebras**, *Westfälische Wilhelms-Universität Münster (poster, remote)*
- May 2021: **Great Plains Operator Theory Symposium**, *Washington University in St. Louis (remote)*
- January 2020: **GSO Seminar**, *Texas A&M University*
- February 2019: **Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University*

CONFERENCES ATTENDED

- April 2022: **Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University*
- August 2021: **Young Mathematicians in C*-Algebras**, *Westfälische Wilhelms-Universität Münster (remote)*
- June 2021: **Online Workshop on Stochastic Analysis**, *University of New Mexico (remote)*
- May 2021: **Great Plains Operator Theory Symposium (GPOTS)**, *Washington University in St. Louis (remote)*
- March 2021: **Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University*
- October 2019: **East Coast Operator Algebra Symposium (ECOAS)**, *The Ohio State University*
- May 2019: **Great Plains Operator Theory Symposium (GPOTS)**, *Texas A&M University*

- February 2019: **Gathering In Graduate Expository Mathematics (GIG'EM) Conference**, *Texas A&M University*
- May 2018: **IPAM Workshop on Random Matrices and Free Probability**, *University of California, Los Angeles*