Kathryn Mulholland

Curriculum Vitae

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Education

Jan 2021	**Ph.D.**, *University of Notre Dame*, Notre Dame, IN. Mathematics
2016	**M.S.**, *University of Notre Dame*, Notre Dame, IN. Mathematics
2014	**B.S.**, *California Polytechnic State University*, San Luis Obispo, CA. Mathematics, *summa cum laude*

Teaching Experience

Notre Dame

Spring 2021	**Primary Instructor**, *Elements of Calculus I*. Elements of Calculus I is a one semester calculus course designed for students in arts and letters, architecture, or business.
Spring 2017, 2018, & 2021	**Primary Instructor**, *Calculus II*. Calculus II is a second-semester calculus course designed for students in science and engineering.
Fall 2020	**Primary Instructor**, *Calculus I*. Calculus I is a first-semester calculus course designed for students in science and engineering.
2019 - 2020	**Graduate Associate**, *Kaneb Center for Teaching and Learning*. In this role, I designed and delivered workshops on effective teaching, write practical, research-based blogs, and started the Graduate Peer Observation Program.
2019 - 2020	**Mentor**, *Directed Reading on Number Theory*. As a graduate mentor for the Math Department's undergraduate directed reading program, I guided a freshman in computer science through an introductory book on Number Theory.
Summer 2018, 2019, & 2020	**Primary Instructor**, *Online Calculus B for the Life and Social Sciences*. Online Calculus B is a flipped version of the second-semester calculus course designed for biology and social science majors.
Spring 2019	**Tutor**, *Academic Services for Student-Athletes*. I helped two student athletes, a football player and a fencer, better understand "The Magic of Numbers"—a University Seminar on the mathematics of cryptography.
Summer 2017	**Facilitator**, *Seminar of Undergraduate Mathematical Research*. I facilitated an 8-week graduate-level seminar on Computational Algebraic Geometry for junior and senior honors students who intend to do post-graduate work in the mathematical sciences.
2015-2017	**Teaching Assistant**, *Calculus*.

Research

2014-2021   **Graduate Research**.
"Generalized Cluster Structures Compatible with the Cremmer-Gervais Poisson Bracket on Rectangular Matrices"
Advisor: Michael Gekhtman
The field of Cluster Algebra is very new–created in 2002 and gaining popularity as a useful algebraic and combinatorial tool in mathematical research. The field of Poisson Geometry dates back to two centuries ago–originating as a tool for studying classical mechanics in physics. My dissertation applied Cluster Algebra to Poisson Geometry by constructing a generalized cluster structure on rectangular matrices compatible with the restriction of the Cremmer-Gervais Poisson bracket on the general linear group.

Invited Talks

Dec 2018   Cluster structures in geometry, physics, combinatorics and representation theory, Jerusalem, Israel

Oct 2018   AMS Sectional Meeting, University of Michigan, Ann Arbor, MI

Conferences and Workshops

Jan 2021   Joint Mathematics Meetings

Jul 2020   MAA Project NExT Sessions

Jan 2020   Joint Mathematics Meetings, Denver, CO

Oct 2018   Women in Science Conference, Notre Dame, IN

Apr 2018   Midwest WIMS, Purdue University, West Lafayette, IN

March 2018   Cluster Algebras: Twenty Years On, CIRM, Marseille, France

Sept 2017   Discrete Models in Geometry and Mathematical Physics Summer School, TU Berlin, Germany

May 2017   Cluster Algebra Spring School, University of Connecticut, CT

May 2017   "Gone Fishing" Poisson Geometry, Notre Dame, IN

Oct 2016   Workshop on Lie Theory and Cluster Algebras, Rome, Italy

Apr 2016   ALGECOM, Notre Dame, IN

Mar 2016   Hot Topics: Cluster algebras and wall-crossing, MSRI, Berkeley, CA

Apr 2015   USTARS, Fort Myers, FL

Mar 2015   Midwest WIMS, Dominican University, Chicago, IL

Professional Organizations

Jul 2020 - Present   **Fellow**, *MAA Project NExT*.
Project NExT is a professional development program for new faculty in the mathematical sciences that promotes "New Experiences in Teaching".

2014-Present   **Member**, *Association for Women in Science*.

2014-Present   **Member**, *Association for Women in Math*.

2014-Present   **Member**, *American Mathematical Society*.

2019-2020   **Fellow**, *Applied Academic Leadership Program*, Notre Dame.

| 2014-2020 | **Member**, *Mathematics Graduate Student Association*, Notre Dame. |
| 2015-2016 | **Department Representative**, *Graduate Student Union*, Notre Dame. |

University Service

2020-Present **Science & Engineering Scholars program**.

I have redesigned Calculus I and II for the Science & Engineering Scholars to
- increase consistency across sections (same schedule, WebAssign homework, and exams),
- facilitate productive collaboration (during the biweekly tutorials),
- incorporate applications of the course content, and encourage clear and professional communication of student ideas and solutions (in the form of student projects).

2020-Present **Associate, ND Learning | Kaneb Center**.

As a graduate student, I worked as a Graduate Associate of the Kaneb Center. This year I have continued in a similar role, designing and delivering workshops on teaching. This semester, I created a new certificate program for graduate students and will be facilitating biweekly meetings of this Collaborative Teaching & Learning cohort.

Jan 2021-Present **LMS Pilot**.

Notre Dame plans to replace Sakai completely by the Fall 2022 semester. The Faculty LMS Succession Committee selected me as part of a representative group of faculty to participate in testing Canvas, one of the two finalist platforms, in live instruction, supported by the OIT Teaching and Learning Technologies team.

2020-Present **Digital Development**.

I have advised and collaborated with Course Chairs on dual-delivery mode, created digital content for remote students (Panopto videos), and encouraged the use of new technologies (scanning apps, GradeScope, CalcPlot3D, etc.)

Community Service

2017-2020 **Mentor**, *STEMentorship Program*.

Each year I am connected with an undergraduate woman in STEM for professional development, networking, and an exchange of ideas.

Spring 2019 **Volunteer**, *Germain Math Circle*.

The Germain Math Circle is a program intended for 8-11 year olds who want to have mathematical discussion with like-minded peers. This semester, the kids explored divisibility rules and Islamic geometric patterns. (1 hour; once a week).

2017-2019 **Tutor**, *Upward Bound*.

Upward Bound is a college preparatory program that targets students who demonstrate a need and desire for academic support from the South Bend Community School Corporation. As a tutor, I offer academic support and help equip South Bend high school students to enter and succeed in higher education.

2017-2019 **Judge**, *Northern Indiana Regional Science & Engineering Fair*.

April 2017 & 2019 **Workshop Leader**, *Expanding Your Horizons*.

Expanding Your Horizons is a STEM conference for middle school girls to meet STEM role models and learn more about careers in those fields. In 2017, I motivated girls to become innovative and creative thinkers using a craft-based geometric project. In 2019, I led a "Learn About College" session and introduced the girls to various STEM careers.

Feb 2018 **Activity Leader**, *Science Alive, St. Joseph County Public Library*.

Fellowships, Awards, and Distinctions

2014-2019	Dean's Fellowship, Notre Dame
2018	Outstanding Graduate Student Teaching Award, The Graduate School and the Kaneb Center for Teaching and Learning, Notre Dame
2017	Striving for Excellence in Teaching Certificate, Kaneb Center for Teaching and Learning, Notre Dame
2014	Outstanding Senior in Mathematics, Cal Poly