

Dylan McKnight

dylan.mcknight@huskers.unl.edu

Department of Mathematics

University of Nebraska-Lincoln

327 Avery Hall

Lincoln, NE 68588-0130

Education

- **University of Nebraska-Lincoln** Lincoln, NE
Ph.D. in Mathematics Aug. 2017 - Aug. 2023 (expected)
 - Thesis Advisors: George Avalos & Mohammad Rammaha
- **University of Nebraska-Lincoln** Lincoln, NE
M.S. in Mathematics Aug. 2017 - May 2019
- **Saginaw Valley State University** University Center, MI
B.S. in Mathematics, B.S. in Physics; Magna Cum Laude Aug. 2012 - May 2017

Skills

Programming Experience in: Python, MATLAB, Octave, Visual Basic

Typesetting Languages: L^AT_EX

Software: Gmsh, Webwork, Maple, Minitab, Mathematica, LabVIEW, Visual Studio, Microsoft Office Package

Operating Systems: Windows, Linux

Foreign Languages: German

Work Experience

- **University of Nebraska-Lincoln** Lincoln, NE
Graduate Research Assistant Three Summers
 - Researched topics critical to dissertation under Dr. George Avalos
 - May 2021 - Aug. 2021: Analytic semigroups for fluid-structure interaction and thermoelastic systems (Funded by NSF Grant 1907823)
 - May 2020 - Aug. 2020: Multi-dimensional finite element methods for fluid structure systems and vector valued Poisson problems (Funded by NSF Grant 1907823)
 - May 2019 - Aug. 2019: Finite element methods and elliptic boundary value problems (Funded by NSF Grant 1616425)
- **University of Nebraska-Lincoln** Lincoln, NE
Graduate Teaching Assistant Aug. 2017 - Current
 - Associate Convener: Trigonometry
 - Instructor of Record: Ordinary Differential Equations, College Algebra & Trigonometry, Contemporary Mathematics, Trigonometry, College Algebra
 - Recitation Leader: Calculus I, Calculus II, Calculus III
 - Courses Graded: Differential Equations I
 - Graduate Qualifying Exam Workshop Coordinator: Ordinary/Partial Differential Equations
- **Saginaw Valley State University** University Center, MI
Math & Physics Resource Center Tutor Aug. 2013 - July 2017
 - Tutored students in physics, calculus, differential equations, algebra, statistics, and usage of Maple and Minitab in these subjects

Research Experience

- Graduate Research

- Finite element analysis of systems of PDEs modelling fluid-structure interaction
- Analytic Semigroup generation for FSI systems
- Control Theory for Analytic Semigroups

• Undergraduate Research

- Algorithms development (implemented in Maple) for analyzing the group structure of elliptic curves over $\mathbb{Z}/p\mathbb{Z}$ (p prime) with operation “chord and tangent” point addition, Saginaw Valley State University
- Education research on students’ understanding of Taylor Series in junior level electricity & magnetism, NSF REU at K-State: Interactions of Matter, Light and Learning
- Measured electrical properties of solids via a Colpitts oscillator, Saginaw Valley State University

Selected Coursework

Course Number	Title	Textbook
Math 934	Navier-Stokes Equations	N/A
Math 997	Numerical Differential Equations	<i>Numerical Treatment of Partial Differential Equations</i> , Grossman, Roos, & Stynes
Math 997	Finite Element Analysis	<i>Finite Element Solution of Boundary Value Problems: Theory and Computation</i> , Axelsson & Barker
Math 937	Nonlinear Partial Differential Equations	<i>Partial Differential Equations</i> , 2nd ed, Evans
Math 941	Partial Differential Equations	<i>Partial Differential Equations</i> , 2nd ed, Evans
Metr 811/812	Dynamic Meteorology I/II	<i>An Introduction to Dynamic Meteorology</i> , 5th ed, Holton
Math 928/929	Functional Analysis I/II	<i>A Course in Functional Analysis</i> , 2nd ed, Conway
Math 921/922	Real Analysis I/II	<i>Real Analysis</i> , 2nd ed, Folland
Math 924	Theory of Analytic Functions I	<i>Real & Complex Analysis</i> , 3rd ed, Rudin

Presentations

(*) Invited presentations

36. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, April 27, 2022: “A Counterexample for Differentiability of a Perturbed Semigroup”
35. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, April 20, 2022: “Perturbation Theory for Semigroup Solutions of Evolution Equations”
34. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, February 8, 2022: “An Alternative Criterion for Analytic Semigroup Generation”
33. PDE & Applied Analysis Seminar, University of Nebraska-Lincoln, February 1, 2022: “Serrin’s Uniqueness Condition for Weak Solutions of Navier-Stokes”
32. PDE & Applied Analysis Seminar, University of Nebraska-Lincoln, November 16, 2021: “Well-posedness of a Compressible Flow Structure Model”
31. Saginaw Valley Math Club, Saginaw Valley State University, University Center, MI, October 19, 2021: “The Weak Derivative and Modern Differential Equation Theory”

30. Graduate Student Seminar, University of Nebraska - Lincoln, August 30, 2021: "Straight to the Point with Calculus of Variations"
29. Great Plains Alliance, Dordt University, April 9, 2021: "Straight to the Point with Calculus of Variations," 30 minutes
28. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, March 29, 2021: "Escaping the Annulus: Stochastic Solutions of Laplace's Equation"
27. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, March 16, 2021: "Analyticity of Semigroup Solutions of a Thermoelastic Plate System"
26. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, November 4, 2020: "Semigroup Solutions of PDEs and the Lumer-Phillips Theorem"
25. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, October 20, 2020: "Local Existence of Solutions of an FSI Model with Bad Sign"
24. Graduate Student Seminar, University of Nebraska - Lincoln, September 28, 2020: "Weak Derivatives & Modern PDE Theory"
23. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, September 16, 2020: "Weak Derivatives & Modern PDE Theory"
22. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, March 10, 2020: "Well-Posedness of Pressure in a Fluid Structure Interaction Model Part II"
21. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, March 3, 2020: "Well-Posedness of Pressure in a Fluid Structure Interaction Model Part I"
20. Great Plains Alliance, Benedictine College, February 21, 2020: "Euclid's Fifth Postulate & Non-Euclidean Geometry"
19. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, February 5, 2020: "Bochner Space Theory Part II: Some Weak* Convergence Results"
18. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, January 29, 2020: "Bochner Space Theory Part I: The Bochner Integral"
17. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, November 13, 2019: "Mathematical Foundations of Quantum Mechanics"
16. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, September 18, 2019: "Fractional Sobolev Spaces Part II: The Fractional Laplacian"
15. Student Applied Analysis Reading Seminar, University of Nebraska - Lincoln, September 4, 2019: "Fractional Sobolev Spaces Part I: Preliminaries"
14. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, March 11, 2019: "Technical Questions Frequently Asked by Graduate Students Part 4"
13. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, March 4, 2019: "Technical Questions Frequently Asked by Graduate Students Part 3"
12. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, November 13, 2018: "Further Preliminaries and Proof of the Theorem of Chueshov and Lasiecka"
11. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, November 6, 2018: "Necessary Conditions of Dynamical Systems to Attain Global Attractors"

10. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, September 18, 2018: "Stochastic Differential Equations and Fokker-Plack Equations"
9. PDE & Applied Analysis Seminar, University of Nebraska - Lincoln, September 11, 2018: "An Introduction to Brownian Motion and White Noise"
8. Mathematical Literature Seminar, University of Nebraska - Lincoln, July 6, 2018: "Inductive Limits of Finite Dimensional C^* -Algebras"
7. Mathematical Literature Seminar, University of Nebraska - Lincoln, June 19, 2018: "Inductive Limits of Finite Dimensional C^* -Algebras"
6. Graduate Student Seminar, University of Nebraska - Lincoln, April 23, 2020: "Groups of Elliptic Curves over $\mathbb{Z}/p\mathbb{Z}$," 15 minutes
5. (*) SVSU Fall 2016 SE&T Colloquium Series, Saginaw Valley State University, University Center, MI, October 18, 2016: "Exploring Elliptic Curves Using Maple"
4. MAA Mathfest, Columbus, OH, August 4, 2016: "Exploring Elliptic Curves Using Maple"
3. Summer Undergraduate Michigan Mathematics Research Conference (SUMMR), University of Michigan-Dearborn, Dearborn, MI, July 15, 2016: "Exploring Elliptic Curves Using Maple"
2. Kansas State University REU Poster Session, July 20, 2015: "Students' Understanding of Taylor Series in Electricity and Magnetism," Poster
1. Kansas State University Physics REU Final Presentation, July 23, 2015: "Mathematization: Student Resource Use in E&M 1"

Leadership, Service, and Volunteer Roles

- Graduate Student Mentoring Program Coordinator: 2021-2022, University of Nebraska - Lincoln
 - Organizer of program aimed at connecting first year math graduate students with senior grad students to ease graduate life transition and promote success. Paired mentors and mentees based on personal interactions, and emphasized critical times (e.g. exams, first assignments) for mentors to check on mentees.
- Directed Reading Program Mentor: Spring 2021, University of Nebraska - Lincoln
 - Mentored senior undergraduate math student through topics not traditionally covered in UNL's undergraduate math curriculum.
- Interdisciplinary Contest in Modeling Judge: 2020, 2021
- Mathematical Contest in Modeling Judge, 2020, 2022
- Graduate Student Mentoring Program Mentor: 2019-2020, 2020-2021, University of Nebraska - Lincoln
 - Mentored first year math graduate students to ease grad life transition and promote success in course work and teaching.
- Student Applied Analysis Reading Seminar Co-organizer & Co-founder, University of Nebraska - Lincoln
- Students in Partial Differential Equations Reading Seminar Co-organizer: Fall 2019 - Spring 2021, University of Nebraska - Lincoln
- Graduate Student Seminar Co-organizer: Fall 2018, Spring 2019, University of Nebraska - Lincoln
- Math Day Volunteer: 2017, 2018, 2019, 2020, 2021 University of Nebraska-Lincoln
 - Annual event aimed at fostering interest among Nebraska high school students in mathematics and mathematics-based careers.

- Nebraska Conference for Undergraduate Women in Mathematics Volunteer: 2018, 2019, 2020, 2021
University of Nebraska - Lincoln
 - Conference aimed at promoting mathematics research and graduate study among women.
- Great Plains Alliance Volunteer: Fall 2018, Spring 2019, Fall 2019, Spring 2020, Spring 2021
 - Connects math graduate students with smaller universities in the region. Students give mathematics talks and answer questions about graduate student life.
- Saginaw Valley Math Club: President, Vice President
- SVSU Physics Club: Vice President

Academic Awards

- Emeritus Faculty Fellowship: 2020, University of Nebraska-Lincoln
 - Given each academic year to support graduate student research. Students must be nominated by faculty.
- Outstanding Graduate of Mathematics: 2017, Saginaw Valley State University
 - Given to graduating undergraduate math majors demonstrating aptitude and genuine interest in math. Awarded based on a vote among the math faculty.
- Braun Award for Writing Excellence: 2017, Saginaw Valley State University
- Robert S. P. Yien First Year Writing Award Finalist: 2013, Saginaw Valley State University
- SVSU Dean's Scholarship: 2012-2017, Saginaw Valley State University
- President's List: Fall 2016, Saginaw Valley State University
- Dean's List: Fall 2013, Winter 2014, Fall 2014, Winter 2015, Fall 2015, Winter 2016, Saginaw Valley State University

Conferences & Workshops Attended

(*) Speaker or Presenter

7. "MSRI-NCTS Joint Summer School: Recent Topic in Well Posedness," MSRI (Hosted at: University of Hawaii-Hilo), July 18-29, 2022, Workshop
6. "6th Annual SIAM Central States Section Conference," University of Kansas (Virtual), October 2-3, 2021
5. "Recent Developments in Fluid Dynamics," MSRI (Virtual), April 12-30, 2021, Workshop
4. "5th Annual SIAM Central States Section Conference," Iowa State University, October 19-20, 2019
3. "KUMUNU Conference on PDE, Dynamical Systems, and Applications," University of Missouri, April 27-28, 2019
2. "2017 Michigan MAA Section Annual Meeting," Ferris State University, March 31-April 1, 2017
1. (*) "MAA MathFest 2016," Columbus, OH, August 3-6, 2016, Speaker

Memberships and Affiliations

- American Mathematical Society