Anna C. Nelson

CONTACT INFORMATION

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RESEARCH INTERESTS

Dynamical systems, mathematical biology (polymerization, gelation, cell physiology), mathematical modeling

ACADEMIC APPOINTMENTS

Duke University, Durham, NC — 2021 – present
William W. Elliott Assistant Research Professor (postdoctoral position)
Department of Mathematics
Mentor: Maria-Veronica Ciocanel

EDUCATION

University of Utah, Salt Lake City, UT — May 2021
Ph.D., Mathematics
Advisor: Aaron Fogelson

Boise State University, Boise, ID — December 2012
B.S., Applied Mathematics, *Summa Cum Laude*
Minor: Computer Science

PUBLICATIONS & PREPRINTS

7. **A. C. Nelson**, M. M. Rolls, M. V. Ciocanel, and S. A. McKinley. "Minimal mechanisms of microtubule length regulation in living cells." *Submitted*. arXiv:2310.13666.
6. A. Kent, K. Leiderman, **A. C. Nelson**, S. Sindi, M. M. Stadt, L. Xiong, and Y. Zhang. "Studying the effects of oral contraceptives on coagulation using a mathematical modeling approach." *Submitted*.
5. **A. C. Nelson** and A. L. Fogelson. "Towards understanding the effect of fibrinogen interactions on fibrin gel structure." *Physical Review E*, 107(2):024415, 2023.
4. A. L. Fogelson, **A. C. Nelson**, C. Zapata-Allegro, and J. P. Keener. "Development of fibrin branch structure before and after gelation." *SIAM Journal on Applied Mathematics*, 82(1), 2022.
3. **A. C. Nelson**, M. A. Kelley, L. M. Haynes, and K. Leiderman. "Mathematical models of fibrin polymerization: past, present, and future." *Current Opinion in Biomedical Engineering*, 20 (100350), 2021.
2. **A. C. Nelson**, J. P. Keener, and A. L. Fogelson. "Kinetic model of two-monomer polymerization". *Physical Review E*, 101(2), 2020.
1. J. L. Herlin, **A. C. Nelson** and M. Scheepers. "Using ciliate operations to construct chromosome phylogenies". *Involve*, 9(1), 2016.

AWARDS

Lewis Blake Award for Excellence in Teaching, Mathematics, Duke University — 2023
Annual postdoctoral award given for excellence in teaching.

BioFire Scholar Award, Mathematics, University of Utah — 2020
Annual award to one graduate student in department; includes stipend, tuition, and travel.

AWM Student Chapter Award for Scientific Excellence — 2020
One of four national awards given by the Association for Women in Mathematics while as Student Chapter Vice President.

FUNDING

Seed Grant, Duke Office for Faculty Advancement — February 2022 – March 2023
$14,000 award for Faculty-Student (FaSt) Math Series to build bridges and community among students and faculty. Grant aims include organizing events and programs such as book clubs, student professional development panels, faculty mentorship training, and invited speakers.

Travel grants

AWM Travel Grant — 2023
$3500 to attend ICIAM 2023 in Tokyo, JP

AIM SQuaRE Grant — 2024, 2025, 2026
Travel funding for collaboration at Pasadena, CA on "Mathematical modeling and analysis to understand mechanisms of thrombosis and oral contraceptives" for three years

University Teaching Assistantship, Graduate College, University of Utah — 2018 – 2019
Co-awarded for the mathematics Graduate Teaching Mentorship (GTM) program.

NSF Research Training Grant Fellowships

DMS-2038056 (Training Tomorrow's Workforce in Analysis and Applications) — 2021 – 2023
DMS-1148230 (Research Training in Mathematical and Computational Biology) — 2014 – 2015

Travel awards

Duke University Arts & Science Travel Fund — 2024
$1000 to attend JMM 2024 in San Francisco CA

AWM/NSF Travel Award — 2023
$1500 to attend AWM Research Symposium in Atlanta GA

SIAM Early Career Travel Award — Spring 2023
$650 to attend SIAM Dynamical Systems 2023 in Portland, OR

MAA Project NExT Fellow — 2021 – 2023
$5000 to attend MAA Mathfest 2022 & 2023 and JMM 2023

SIAM Student Travel Award — Spring, Summer 2020
$650 to attend SIAM Annual 2020 & Life Sciences 2020 (cancelled due to COVID)

University of Utah Graduate School Travel Award — Spring 2020
$345 to attend JMM 2020 in Denver, CO $500 to attend JMM 2020 in Denver, CO

INVITED & CONTRIBUTED TALKS

Building connections and community in mathematics

Math For All Conference in Clemson, SC (**Plenary**) — April 2024

Mathematical models of polymerization processes in physiology

Applied Mathematics Colloquium, University of North Carolina, Chapel Hill — April 2024
Biomath Seminar, Virginia Commonwealth University — March 2024
Mathematics Colloquium, University of Cincinnati — January 2024
Mathematical Biology Seminar, University of Illinois Urbana-Champaign* — December 2023
Biomath Seminar Series, NC State University — November 2023
Mathematical Biology Seminar, University of Pennsylvania — October 2023
Mathematical Biology Seminar, Brandeis University* — February 2023
Applied and Computational Mathematics Seminar, Tulane University — November 2022
Applied Math Seminar, Claremont Center for Mathematical Sciences* — October 2022

Modeling mechanisms of microtubule dynamics and polarity in neurons

Joint Mathematics Meeting, AWM Special Session — January 2024
10th ICIAM, Invited Minisymposium — August 2023
MAA MathFest, Invited Paper Session — August 2023
SMB Annual Meeting, Invited Minisymposium — July 2023
SIAM Conference on Applications of Dynamical Systems, Contributed Session — May 2023
AMS Spring Central Sectional Meeting, Special Session — April 2023
Joint Mathematics Meeting, AMS Special Session — January 2023

Towards a model of platelet aggregation and fibrin polymerization

Joint Mathematics Meeting, AMS Special Session — January 2024
AWM Research Symposium, Special Session — September 2023
AWM Research Symposium, Special Session — June 2022

Understanding the effects of fibrinogen interactions on fibrin gel structure

40th SEARCDE Conference, Contributed Session — November 2022
SIAM Conference on the Life Sciences, Special Session — July 2022

SMB Annual Meeting, Invited Minisymposium* June 2021
SIAM Conference on the Life Sciences, Special Session* June 2020

Kinetic polymerization models and the roles of fibrinogen in fibrin gel formation
Mathematical Biology Seminar, University of California, Davis* October 2021
Mathematical Biology Seminar, Duke University September 2021
Mathematical Biology Seminar, U. of British Columbia & U. of Utah* March 2021

A kinetic model of two-monomer polymerization
Joint Mathematics Meeting, AMS-AWM Special Session January 2020
AMS Fall Western Sectional Meeting, Special Session November 2019
Boise State University Mathematics REU Program, Boise State University July 2019
* Remote talk

SELECT POSTER PRESENTATIONS

Triangle Computational and Applied Mathematics Symposium, Durham NC⋆ November 2023
AWM Research Symposium Poster Session, Minneapolis MN June 2022
AWM Graduate Student Poster Session at JMM (virtual) January 2021
AWM Graduate Student Workshop at SIAM Annual (virtual) July 2020
IMA Workshop for Women in Mathematical Biology, Minneapolis MN May 2018
Modeling Complex Fluids for Biological Applications, Salt Lake City UT May 2017
⋆ Postdoc poster award winner

MENTORSHIP

SPIRE Fellows Postdoctoral Assistant and Faculty Mentor 2021 – present
Assists in organizing and running academic support/mentoring system for high achieving undergraduates from historically excluded backgrounds. Responsibilities include organizing monthly events for fellows and teaching First Year Seminar course titled "Being Human and Flourishing in STEM," which is a discussion-based course on identity and humanity in STEM.

AWM Undergraduate Mentor
Paired with undergraduate students to meet monthly to discuss semester, future plans, and build community.
University of Utah 2019 – 2021
Duke University 2021 – present

Graduate Research
Hannah Scanlon, Duke University Spring 2022 – present

Undergraduate Research
Carson Dudley (undergraduate thesis), Duke University Spring 2022 – Spring 2023
Maycol Vilchez, University of Utah (with Aaron Fogelson) Spring 2020

Undergraduate Directed Reading Program, University of Utah Spring 2019
Chase Stolworthy, use machine learning for predictions on voting data in Utah

TEACHING EXPERIENCE

Duke University
MATH 353/753, Ordinary and Partial Differential Equations Spring 2024
BIO 218/MATH 183, Biological Clocks: How Organisms Keep Time Fall 2023
MATH 577, Mathematical Modeling† Spring 2023
MATH 75, Being Human in STEM for First Year SPIRE Fellows Spring 2023
BIO 218/MATH 183, Biological Clocks: How Organisms Keep Time Fall 2022
MATH 75, Being Human in STEM for First Year SPIRE Fellows Spring 2022
MATH 353/753, Ordinary and Partial Differential Equations Spring 2022
MATH 353/753, Ordinary and Partial Differential Equations Fall 2021

University of Utah
MATH 2250, Differential Equations and Linear Algebra♯ Spring 2019
MATH 1030, Intro to Quantitative Reasoning‡ Summer 2018
MATH 1220, Calculus II Spring 2018
MATH 1100, Business Calculus Fall 2017
MATH 1050, College Algebra‡ Summer 2017
MATH 1050, College Algebra Spring 2017

MATH 1050, College Algebra Fall 2016
MATH 1030, Intro to Quantitative Reasoning‡ Summer 2016
MATH 1030, Intro to Quantitative Reasoning Spring 2016

† Graduate level course, ‡ Asynchronous online course, ♯ >100 students

Project NExT Fellowship 2021 – 2023
Professional development program for early career mathematicians directed towards improving the teaching and learning of mathematics, fostering inclusivity in the mathematics community, and providing early career faculty strategies to engage in research, scholarship, and service opportunities.

Mathematics Instructor Training Facilitator, University of Utah 2017, 2018, 2019
Facilitated annual workshop for new teaching assistants in the mathematics department. Responsibilities include organizing/planning workshops, observing new teachers, and giving lectures on teaching pedagogy.

SERVICE & OUTREACH

Service to the profession:

Co-organizer

Minisymposium for AWM Research Symposium, Atlanta GA September 2023
"Promoting children's and women's health with mathematical and computational approaches"

Minisymposium for 10th ICIAM, Tokyo JP August 2023
"Recent Advances in Modeling Complex Systems and Multiscale Problems in Mathematical Biology"

Invited Paper Session for MAA MathFest, Tampa FL August 2023
"Recent Advances in Mathematical and Computational Biology, Highlighting Contributions from Undergraduate Researchers."

Minisymposium for SIAM Life Sciences, Pittsburgh PA July 2022
"Mathematical Modeling of Blood Clotting and its Application"

Minisymposium for SMB Annual Meeting, Virtual June 2021
"Mathematical Modeling of Blood Clotting: From Surface-Mediated Coagulation to Fibrin Polymerization"

Judge

JMM Undergraduate Student Poster Session, San Francisco CA January 2024
MAA MathFest Student Poster Session, Tampa FL August 2023
SIAM Dynamical Systems Red Sock Poster Session, Portland OR May 2023
MAA MathFest Student Poster Session, Philadelphia PA August 2022
JMM Undergraduate Student Poster Session, Denver CO January 2020

Assistant, AMS Mathematical Research Communities Week 3, Java Center NY June 2023
"Complex Social Systems"

Presenter, CSME Exchange, University of Utah November 2018
"Teacher Training & Community Building: From Graduate Student to Colleague" (joint with Kelly MacArthur, Rebecca Terry)

Panelist, Idaho Conference on Undergraduate Research, Boise State University July 2014
"Applying to grad school"

Referee, Mathematical Biosciences, Journal of Theoretical Biology

Service to the university and department:

Presenter

Grad-Fac Seminar, Department of Mathematics, Duke University October 2023
"The mathematics of bell-ringing"

Grad-Fac Seminar, Department of Mathematics, Duke University January 2023
"Mathematical modeling of polymerization processes in physiology"

SPIRE Speaker Series, Duke University August 2021
"Who can do math?"

Math Graduate Student Colloquium, University of Utah October 2020
"Computing in the Natural World: *In vivo* and *in vitro*"

Math Graduate Student Colloquium, University of Utah February 2020
"The mathematics of bell-ringing"

Undergraduate Math Colloquium, University of Utah April 2018
"On the rheology of cats: Are cats fluids?"
Math Graduate Student Colloquium, University of Utah November 2017
"On the rheology of cats: Are cats fluids?"
Math Graduate Student Colloquium, University of Utah September 2015
"Computing in the Natural World: *In vivo* and *in vitro*"

Co-organizer, Panel on Math Graduate School Admissions, FaSt Grant November 2022
Department of Mathematics, Duke University

Co-organizer, Faculty-Student Weekly Tea, FaSt Grant February 2022 – present
Department of Mathematics, Duke University

Co-organizer, Faculty-Student Math Book Club February 2022 – May 2023
Department of Mathematics, Duke University

Organizer, Biofluids research seminar 2020 – 2021
Organization of weekly research seminar for faculty, graduate students and postdocs.
Department of Mathematics, University of Utah

Co-chair, AWM Speaker series committee, Mathematics, University of Utah 2020 – 2021
Invite and host mathematicians from underrepresented groups to give talks and network with department.

Professional Development Committee, Mathematics, University of Utah 2018 – 2021
Organize monthly professional development events for grad students/postdocs

Recruitment Committee, Mathematics, University of Utah 2016 – 2017
Coordinate prospective graduate student recruitment activities and schedule.

Panelist, Utah Math TA Training, University of Utah August 2016
"Experienced graduate student panel"

Service to promote diversity, equity, and inclusivity:

Committee member, Mathematics DEI Team, Duke University August 2022 – present

Panelist, GROW (Graduate Research Opportunities for Women), Duke University October 2022
"From day 1 to PhD"

Student mentor, AWM Student Chapter, Duke University 2021 – 2022

Panelist, Society for Women in Mathematics (SWiM), Colorado School of Mines October 2020
"Graduate school panel" (virtual)

Vice President, AWM Student Chapter, University of Utah 2019 – 2020
Organize monthly student events for undergraduates and graduate students, organize outreach events on and off campus, and meet with job candidates.

COMMUNITY OUTREACH

Volunteer, Duke Math Circles, Durham NC August 2022 – present
Provide exploratory instruction for K-6 students at Central Park School for Children

Presenter, Girls Exploring Math, Duke University June 2023
"Math: We R_0 afraid to use it!"

Volunteer, Defining Your Path – Field Trip Program, University of Utah February 2020

Judge, State of Utah Sterling Scholar Award, Mathematics, Salt Lake City UT January 2020

Panelist, Clayton Middle School – Career Fair, Salt Lake City UT January 2020

Presenter, Science Day at the U., University of Utah November 2019
"Computing in Nature: Using DNA to solve math problems"

Presenter, Girls Full STEAM Ahead Camp, Leonardo Museum, Salt Lake City UT July 2016
"Math: We R_0 afraid to use it!"

WORK EXPERIENCE

Bioinformatics Summer Intern May 2019 – August 2019
Sera Prognostics, Salt Lake City, UT
Developed R scripts to remove batch and technical effects in proteomic data to aid in preterm birth prediction.

MEMBERSHIPS

American Mathematical Society
Association for Women in Mathematics
Mathematical Association of America
Society for Industrial and Applied Mathematics
Society of Mathematical Biology