

Anna C. Nelson

CONTACT INFORMATION

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RESEARCH INTERESTS

Dynamical systems, mathematical biology (polymerization, cell physiology), stochastic processes

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 in the mathematics department. Grant aims include organizing events and programs such as faculty student book clubs, student professional development panels, workshops on mentorship training for faculty, and invited speakers.

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

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 2023
\$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
University of Utah Mathematics Department Travel Award Spring 2020
\$500 to attend JMM 2020 in Denver, CO

INVITED SEMINAR TALKS

Mathematical Biology Seminar December 2023
University of Illinois Urbana-Champaign (virtual)
Biomath Seminar Series November 2023
NC State University, Raleigh NC
Mathematical Biology Seminar October 2023
University of Pennsylvania, Philadelphia PA
Mathematical Biology Seminar February 2023
Brandeis University (virtual)
Applied and Computational Mathematics Seminar November 2022
Tulane University, New Orleans, LA
Claremont Center for Mathematical Sciences Applied Math Seminar October 2022
Harvey Mudd College (virtual)
Mathematical Biology Seminar October 2021
University of California, Davis (virtual)
Mathematical Biology Seminar September 2021
Duke University, Durham NC
Mathematical Biology Seminar March 2021
Joint with University of British Columbia and University of Utah (virtual)
Boise State University Mathematics REU Program July 2019
Boise State University, Boise ID

INVITED & CONTRIBUTED CONFERENCE TALKS

Math For All Conference in Clemson, SC (**Plenary speaker**) April 2024
Modeling mechanisms of microtubule dynamics and polarity in neurons
Joint Mathematics Meeting, AWM Special Session January 2024
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
 SIAM Conference on the Life Sciences, Special Session July 2022
 SMB Annual Meeting (virtual), Invited Minisymposium June 2021
 SIAM Conference on the Life Sciences (virtual), Special Session June 2020

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

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

Chase Stolworthy, use machine learning for predictions on voting data in Utah Spring 2019

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

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 September 2023
 “Promoting children’s and women’s health with mathematical and computational approaches”
 Clark Atlanta University, Atlanta GA
- Co-organizer*, Minisymposium for 10th ICIAM August 2023
 “Recent Advances in Modeling Complex Systems and Multiscale Problems in Mathematical Biology”
 Waseda University, Tokyo JP
- Judge*, MAA MathFest Student Poster Session, Tampa FL August 2023
- Co-organizer*, Invited Paper Session for MAA MathFest August 2023
 “Recent Advances in Mathematical and Computational Biology, Highlighting Contributions from Undergraduate Researchers.”
 Tampa FL
- Assistant*, AMS Mathematical Research Communities Week 3 June 2023
 “Complex Social Systems”
 Beaver Hollow Conference Center, Java Center NY
- Judge*, SIAM Dynamical Systems Red Sock Poster Session, Portland OR May 2023
- Judge*, MAA MathFest Student Poster Session, Philadelphia PA August 2022
- Co-organizer*, Minisymposium for SIAM Life Sciences July 2022
 “Mathematical Modeling of Blood Clotting and its Application”
 Pittsburgh PA
- Co-organizer*, Minisymposium at SMB Annual Meeting June 2021
 “Mathematical Modeling of Blood Clotting: From Surface-Mediated Coagulation to Fibrin Polymerization”
 Virtual
- Judge*, JMM Student Poster Session, Denver CO January 2020
- Presenter*, Center for Science and Mathematics Education Exchange November 2018
 “Teacher Training & Community Building:
 From Graduate Student to Colleague” (joint with Kelly MacArthur, Rebecca Terry)
 University of Utah, Salt Lake City UT
- Panelist*, Utah Math TA Training August 2016
 “Experienced graduate student panel”
 University of Utah, Salt Lake City UT
- Panelist*, Idaho Conference on Undergraduate Research July 2014
 “Applying to grad school”
 Boise State University, Boise ID

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 "Computing in the Natural World: <i>In vivo</i> and <i>in vitro</i> "	October 2020
Math Graduate Student Colloquium, University of Utah "The mathematics of bell-ringing"	February 2020
Undergraduate Math Colloquium, University of Utah "On the rheology of cats: Are cats fluids?"	April 2018
Math Graduate Student Colloquium, University of Utah "On the rheology of cats: Are cats fluids?"	November 2017
Math Graduate Student Colloquium, University of Utah "Computing in the Natural World: <i>In vivo</i> and <i>in vitro</i> "	September 2015
<i>Co-organizer</i> , Panel on Math Graduate School Admissions, FaSt Grant Department of Mathematics, Duke University	November 2022
<i>Co-organizer</i> , Faculty-Student Weekly Tea, FaSt Grant Department of Mathematics, Duke University	February 2022 – present
<i>Co-organizer</i> , Faculty-Student Math Book Club Department of Mathematics, Duke University	February 2022 – May 2023
<i>Organizer</i> , Biofluids research seminar Organization of weekly research seminar for faculty, graduate students and postdocs Department of Mathematics, University of Utah	2020 – 2021
<i>Co-chair</i> , AWM Speaker series committee Invite and host mathematicians from underrepresented groups to give talks and socialize with department. Department of Mathematics, University of Utah	2020 – 2021
<i>Professional Development Committee</i> , Graduate Student Advisory Committee Organize monthly professional development events for grad students/postdocs Department of Mathematics, University of Utah	2018 – 2021
<i>Recruitment Committee</i> , Graduate Student Advisory Committee Coordinate prospective graduate student recruitment activities and schedule. Department of Mathematics, University of Utah	2016 – 2017
<i>Panelist</i> , Utah Math TA Training "Experienced graduate student panel" Department of Mathematics, University of Utah	August 2016

Service to promote diversity, equity, and inclusivity:

<i>Committee member</i> , Diversity, Equity, and Inclusion Team	August 2022 – present
<i>Panelist</i> , GROW (Graduate Research Opportunities for Women) "From day 1 to PhD" Duke University, Durham NC Department of Mathematics, Duke University	October 2022
<i>Student mentor</i> , AWM Student Chapter Department of Mathematics, Duke University Department of Mathematics, University of Utah	2021 – 2022
<i>Panelist</i> , Society for Women in Mathematics (SWiM) "Graduate school panel" Department of Mathematics, Colorado School of Mines (virtual)	October 2020
<i>Vice President</i> , AWM Student Chapter Organize monthly student events for undergraduates and graduate students, organize outreach events on and off campus, and meet with job candidates. Department of Mathematics, University of Utah	2019 – 2020

**COMMUNITY
OUTREACH**

Volunteer , Duke Math Circles with Durham Children's Initiative Provide exploratory instruction for K-6 students Durham NC	August 2022 – present
Presenter , Girls Exploring Math, Duke University "Math: We R_0 afraid to use it!" Durham NC	June 2023
Volunteer , Defining Your Path – Field Trip Program University of Utah, Salt Lake City UT	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 “Computing in Nature: Using DNA to solve math problems” University of Utah, Salt Lake City UT	November 2019
Presenter , Girls Full STEAM Ahead Camp “Math: We R_0 afraid to use it!” Leonardo Museum, Salt Lake City UT	July 2016

**WORK
EXPERIENCE**

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

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