

# Anna C. Nelson

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## CONTACT INFORMATION

Department of Mathematics  
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## RESEARCH INTERESTS

Mathematical biology, dynamical systems, polymerization, cell physiology

## 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

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.

## GRANTS

**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.

## AWARDS

**NSF Research Training Grant Fellowships**  
DMS-2038056 2021 – 2023  
DMS-1148230 2014 – 2015

**BioFire Scholar Award**, Department of 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.

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

**Travel awards**

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

<i>Mathematical Biology Seminar</i>	October 2023
University of Pennsylvania	
<i>Mathematical Biology Seminar</i>	February 2023
Brandeis University (virtual)	
<i>Applied and Computational Mathematics Seminar</i>	November 2022
Tulane University, New Orleans, LA	
<i>Claremont Center for Mathematical Sciences Applied Math Seminar</i>	October 2022
Harvey Mudd College (virtual)	
<i>Mathematical Biology Seminar</i>	October 2021
University of California, Davis (virtual)	
<i>Mathematical Biology Seminar</i>	September 2021
Duke University, Durham, NC	
<i>Mathematical Biology Seminar</i>	March 2021
Joint with University of British Columbia and University of Utah (virtual)	
<i>Boise State University Mathematics REU Program</i>	July 2019
Boise State University, Boise, ID	

**INVITED & CONTRIBUTED CONFERENCE TALKS**

<i>AWM Research Symposium, Clark Atlanta University, Atlanta, GA</i>	September 2023
Early Career Researchers in Mathematical Biology and Differential Equations	
<i>MAA MathFest, Tampa, FL</i>	August 2023
Invited Paper Session on Frontiers in Differential Equations and Applications	
<i>SMB Annual Meeting, The Ohio State University, Columbus OH</i>	July 2023
Data-driven, modeling, and topological techniques in cell and developmental biology	
<i>SIAM Conference on Applications of Dynamical Systems, Portland, OR</i>	May 2023
<i>AMS Spring Central Sectional Meeting, University of Cincinnati, Cincinnati, OH</i>	April 2023
Special Session on Mathematical Modeling in Biosciences	
<i>Joint Mathematics Meeting, Boston, MA</i>	January 2023
AMS Special Session on Modeling Collective Behavior in Biology	
<i>Southeastern-Atlantic Regional Conference on Differential Equations</i>	November 2022
NC State University, Raleigh, NC	
<i>SIAM Conference on the Life Sciences, Pittsburgh, PA</i>	July 2022
Mathematical Modeling of Blood Clotting and its Application Minisymposium	
<i>AWM Research Symposium, University of Minnesota, Minneapolis, MN</i>	June 2022
Recent Advances in Mathematical Biology Special Session	
<i>SMB Annual Meeting (virtual)</i>	June 2021
Mathematical Modeling of Blood Clotting: From Surface-Mediated Coagulation to Fibrin Polymerization Minisymposium	
<i>SIAM Conference on the Life Sciences (virtual)</i>	June 2020
Mathematical and Computational Modeling of Blood Clotting Minisymposium	

	<i>Joint Mathematics Meeting, Denver, CO</i>	January 2020
	AMS-AWM Special Session on Women in Mathematical Biology	
	<i>AMS Fall Western Sectional Meeting, UC Riverside, Riverside, CA</i>	November 2019
	Special Session on Mathematical Modeling in Developmental Biology	
<b>WORKSHOPS &amp; SHORT COURSES</b>	Complex Social Systems	June 2023
	Topological data analysis and resource coverage, opinion dynamics and disease spread	
	AMS Mathematical Research Communities, Java Center, NY	
	Sex differences in physiology: Mathematical modelling and analysis	March 2023
	<i>Invited participant</i>	
	Banff International Research Station, Banff, AB	
	Collaborative Workshop for Women in Mathematical Biology:	June 2022
	Mathematical Approaches to Support Women's Health	
	<i>Invited participant, project co-lead</i>	
	Institute for Mathematics and its Applications, Minnetonka, MN	
	Workshop for Women in Mathematical Biology	May 2018
	Institute for Mathematics and its Applications, Minneapolis, MN	
<b>SELECT POSTER PRESENTATIONS</b>	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
<b>MENTORSHIP</b>	<b>SPIRE Fellows Postdoctoral Assistant and Faculty Mentor</b>	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.	
	<b>AWM Undergraduate Mentor</b>	
	Paired with undergraduate students to meet monthly to discuss semester, future plans, and build community.	
	University of Utah	2019 – 2021
	Duke University	2021 – present
	<b>Undergraduate Research</b>	
	Carson Dudley, Duke University	Spring 2022 – present
	Maycol Vilchez, University of Utah (with Aaron Fogelson)	Spring 2020
	<b>Undergraduate Directed Reading Program, University of Utah</b>	Spring 2019
	Chase Stolworthy, use machine learning for predictions on voting data in Utah	
<b>TEACHING EXPERIENCE</b>	<b>Duke University</b>	
	MATH 577, Mathematical Modeling (graduate course)	Spring 2023
	BIOLOGY 218, Biological Clocks: How Organisms Keep Time	Fall 2022, Fall 2023
	MATH 75, Being Human in STEM for First Year SPIRE Fellows	Spring 2022, Spring 2023
	MATH 353/753, Ordinary and Partial Differential Equations	Spring 2022
	MATH 353/753, Ordinary and Partial Differential Equations	Fall 2021
	<b>University of Utah</b>	
	MATH 2250, Differential Equations and Linear Algebra	Spring 2019
	MATH 1030, Intro to Quantitative Reasoning (online)	Summer 2018
	MATH 1220, Calculus II	Spring 2018
	MATH 1100, Business Calculus	Fall 2017

MATH 1050, College Algebra  
MATH 1030, Intro to Quantitative Reasoning

Fall 2016, Spring 2017, Summer 2017 (online)  
Spring 2016, Summer 2016 (online)

### **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:**

*Assistant*, AMS Mathematical Research Communities Week 3 June 2023

“Complex Social Systems”

Beaver Hollow Conference Center, Java Center, NY

*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.”

Tokyo, JP

*Co-organizer*, Invited Paper Session for MAA MathFest August 2023

“Recent Advances in Mathematical and Computational Biology, Highlighting Contributions from Undergraduate Researchers.”

Tampa, FL

*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 January 2023

“Mathematical modeling of polymerization processes in physiology”

Department of Mathematics, Duke University

*Co-organizer*, Panel on Math Graduate School Admissions, FaSt Grant November 2022

Department of Mathematics, Duke University

<i>Committee member</i> , Diversity, Equity, and Inclusion Team Department of Mathematics, Duke University	August 2022 – present
<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 – present
<i>Presenter</i> , SPIRE Speaker Series “Who can do math?” Duke University	August 2021
<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>Presenter</i> , Graduate Student Colloquium “The mathematics of bell-ringing” Department of Mathematics, University of Utah	February 2020
<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>Presenter</i> , Undergraduate Math Colloquium “On the rheology of cats: Are cats fluids?” Department of Mathematics, University of Utah	April 2018
<i>Presenter</i> , Graduate Student Colloquium “On the rheology of cats: Are cats fluids?” Department of Mathematics, University of Utah	November 2017
<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
<i>Presenter</i> , Graduate Student Colloquium “Computing in the Natural World: <i>In vivo</i> and <i>in vitro</i> ” Department of Mathematics, University of Utah	September 2015

**Service to promote diversity, equity, and inclusivity:**

<i>Panelist</i> , GROW (Graduate Research Opportunities for Women) “From day 1 to PhD” Duke University, Durham, NC	October 2022
<i>Committee member</i> , Diversity, Equity, and Inclusion Team Department of Mathematics, Duke University	August 2022 – present
<i>Student mentor</i> , AWM Student Chapter Department of Mathematics, Duke University	2021 – 2022
<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>Panelist</i> , Society for Women in Mathematics (SWiM) “Graduate school panel” Department of Mathematics, Colorado School of Mines (virtual)	October 2020

*Vice President*, AWM Student Chapter 2019 – 2020  
 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

**COMMUNITY  
OUTREACH**

**Presenter**, Girls Exploring Math, Duke University June 2023  
 “Math: We  $R_0$  afraid to use it!”  
 Durham, NC

**Volunteer**, Duke Math Circles with Durham Children’s Initiative August 2022 – present  
 Provide exploratory instruction for K-6 students  
 Durham, NC

**Volunteer**, Defining Your Path – Field Trip Program February 2020  
 University of Utah, Salt Lake City, UT

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

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

**Presenter**, Science Day at the U., University of Utah November 2019  
 “Computing in Nature: Using DNA to solve math problems”  
 University of Utah, Salt Lake City, UT

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

**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