

# Anna C. Nelson

## CONTACT INFORMATION

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## RESEARCH INTERESTS

Applied dynamical systems, mathematical biology, polymerization, mathematical modeling

## ACADEMIC APPOINTMENTS

<b>University of New Mexico</b> , Department of Mathematics & Statistics Assistant Professor of Mathematics	Albuquerque, NM January 2025 – present
<b>Duke University</b> , Department of Mathematics Adjunct Assistant Professor Phillip Griffiths Assistant Research Professor (postdoctoral) William W. Elliott Assistant Research Professor (postdoctoral)	Durham, NC January 2025 – May 2025 August 2024 – December 2024 August 2021 – July 2024

## EDUCATION

<b>University of Utah</b> , Salt Lake City, UT Ph.D., Mathematics Thesis: Kinetic Polymerization Models and the Roles of Fibrinogen in Fibrin Gel Formation Advisor: Aaron Fogelson	May 2021
<b>Boise State University</b> , Boise, ID B.S., Applied Mathematics, <i>Summa Cum Laude</i> Minor: Computer Science	December 2012

## PUBLICATIONS

8. **A. C. Nelson**, S. A. McKinley, M. M. Rolls, and M. V. Ciocanel. "Emergent microtubule properties in a model of turnover and nucleation." *In press, Journal of Theoretical Biology*, arXiv:2504.11466.
7. **A. C. Nelson**, M. M. Rolls, M. V. Ciocanel, and S. A. McKinley. "Minimal mechanisms of microtubule length regulation in living cells." *Bulletin of Mathematical Biology*, 86(58), 1-33, 2024.
6. **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.
5. 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.
4. **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.
3. **A. C. Nelson**, J. P. Keener, and A. L. Fogelson. "Kinetic model of two-monomer polymerization". *Physical Review E*, 101(2), 2020.
2. J. L. Herlin, **A. C. Nelson** and M. Scheepers. "Using ciliate operations to construct chromosome phylogenies". *Involve*, 9(1), 2016.

## BOOK CHAPTERS

1. A. Kent, K. Leiderman, **A. C. Nelson**, S. S. Sindi, M. M. Stadt, L. Xiong, and Y. Zhang. "Studying the effects of oral contraceptives on coagulation using a mathematical modeling approach." *In Mathematical Modeling for Women's Health: Collaborative Workshop for Women in Mathematical Biology*, pages 83–132. Springer Nature, 2024.

## PREPRINTS

- H. G. Scanlon, G. Mahata, **A. C. Nelson**, S. A. McKinley, M. M. Rolls, and M. V. Ciocanel. "Nucleation feedback can drive establishment and maintenance of biased microtubule polarity in neurites." *In review*, arXiv:2506.12209
- A. C. Nelson**, E. Yao, Y. Zhang, C. V. Cook, S. Fischer-Holzhausen, L. K. Bruce, P. Dutta, S. Gholami, and A. N. Ford Versypt. "Mathematical Modeling of Bone Remodeling in Surgical Menopause." *In preparation*.

AWARDS	<b>Top 5% of Duke University undergraduate instructors, Trinity College</b>	Fall 2023
	For at least two of the following categories: Overall quality of course, overall quality of instructor, intellectual stimulation of course.	
	<b>Lewis Blake Award for Excellence in Teaching</b> , Mathematics, Duke University	2023
	Annual postdoctoral award given for excellence in teaching.	
	<b>BioFire Scholar Award</b> , Mathematics, University of Utah	2020
FUNDING	Annual award to one graduate student in department; includes stipend, tuition, and travel.	
	<b>AWM Student Chapter Award for Scientific Excellence</b>	2020
	One of four national awards given by the Association for Women in Mathematics while as Student Chapter Vice President.	
	<b>Seed Grant</b> , 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.	
CONTRIBUTED & INVITED TALKS	<b>Travel Grants</b>	
	<i>AIM SQuaRE Grant</i>	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	
	<i>AMS MRC Collaboration Travel Grant</i>	2024
	\$800 to travel for Mathematical Research Community collaboration	
	<i>AWM Travel Grant</i>	2023
	\$3500 to attend ICIAM 2023 in Tokyo, JP	
	<b>NSF Research Training Grant Fellowships</b>	
	DMS-2038056 (Training Tomorrow’s Workforce in Analysis and Applications)	2021 – 2023
	DMS-1148230 (Research Training in Mathematical and Computational Biology)	2014 – 2015
	<b>University Teaching Assistantship</b> , Graduate College, University of Utah	2018 – 2019
	Co-awarded for the mathematics Graduate Teaching Mentorship (GTM) program.	
	<b>Travel Awards</b>	
	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	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
	\$500 to attend JMM 2020	
	<i>Building connections and community in mathematics</i>	
	Equity Forum, Montana State University	April 2025
	Math For All Conference, Clemson, SC ( <b>Plenary</b> )	April 2024
	<i>Mathematical models of polymerization processes in physiology</i>	
	Applied Mathematics Seminar, Montana State University	April 2025
	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 living neurons*

Joint Mathematics Meeting, Invited Special Session	January 2026
NSF-Simons NITMB, Invited Workshop Presentation	November 2025
SIAM/CAIMS Annual Meeting, Invited Minisymposium	August 2025
SMB Annual Meeting, Contributed Session	July 2025
SIAM Dynamical Systems, Invited Special Session	May 2025
AMS Spring Southeastern Sectional Meeting, Invited Special Session	March 2025
Joint Mathematics Meeting, Invited Special Session	January 2025
SIAM Annual Meeting, Invited Minisymposium	July 2024
Biology and Medicine Through Mathematics, Oral Presentation	May 2024
Joint Mathematics Meeting, Invited 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 Invited Special Session	April 2023
Joint Mathematics Meeting, Invited AMS Special Session	January 2023

*Towards a model of platelet aggregation and fibrin polymerization*

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

*Kinetic polymerization models and the roles of fibrinogen in fibrin gel formation*

Applied Mathematics Colloquium, University of North Carolina, Chapel Hill	April 2024
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

*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, Invited 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
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
SACNAS Poster on Graduate Research, Salt Lake City UT	October 2017
Modeling Complex Fluids for Biological Applications, Salt Lake City UT	May 2017
* Postdoc poster award winner	

**INVITED WORKSHOPS**

National Institute for Theoretical and Mathematical Biology, Chicago IL	November 2025
Machine Learning of Cytoskeletal Machines (Cell Migration and Mitosis)	
ICERM, Brown University, Providence RI	January 2025
Patterns, Dynamics, and Data in Complex Systems	
National Institute for Theoretical and Mathematical Biology, Chicago IL	November 2024
Random Dynamical Systems with Applications in Biology	
AMS Mathematical Research Community, Java Center NY	June 2023
Complex Social Systems	
Banff International Research Station, Banff AB	March 2023
Sex Differences in Physiology: Mathematical Modelling and Analysis	

Collaborative Workshop for Women in Mathematical Biology, Eden Prairie MN	June 2022
Mathematical Approaches to Support Women's Health,	
IMA Workshop for Women in Mathematical Biology, Minneapolis MN	May 2018

## MENTORSHIP

### Graduate Research

Hannah Scanlon, Duke University	Spring 2022 – present
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### Undergraduate Research

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

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

<b>AWM Undergraduate Mentor</b>	2019 – 2024
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Paired with undergraduate students to meet monthly to discuss semester, future plans, and build community at University of Utah and Duke University.

<b>SPIRE Fellows Postdoctoral Assistant and Faculty Mentor</b>	2021 – 2023
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Assisted in organizing monthly events. and running academic support/mentoring system for high achieving undergraduates from historically excluded backgrounds. Taught course titled “Being Human in STEM at Duke”, which is a discussion-based course on identity and humanity in STEM.

## TEACHING EXPERIENCE

### University of New Mexico

MATH 583, Methods of Applied Mathematics I <sup>†</sup>	Fall 2025
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### Duke University

MATH 353/753, Ordinary and Partial Differential Equations	Fall 2024
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 <sup>†</sup>	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 <sup>#</sup>	Spring 2019
MATH 1030, Intro to Quantitative Reasoning <sup>‡</sup>	Summer 2018
MATH 1220, Calculus II	Spring 2018
MATH 1100, Business Calculus	Fall 2017
MATH 1050, College Algebra <sup>‡</sup>	Summer 2017
MATH 1050, College Algebra	Spring 2017
MATH 1050, College Algebra	Fall 2016
MATH 1030, Intro to Quantitative Reasoning <sup>‡</sup>	Summer 2016
MATH 1030, Intro to Quantitative Reasoning	Spring 2016

<sup>†</sup> Graduate level course, <sup>‡</sup> Asynchronous online course, <sup>#</sup> >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 TO THE PROFESSION

*Secretary*, Society for Mathematical Biology  
Cell and Developmental Biology Subgroup

November 2024 – present

*Journal referee*

Mathematical Biosciences, Journal of Theoretical Biology, PLOS Computational Biology

*Conference session organizer*

Special Session, Spring AMS Western Sectional Meeting, Boise ID March 2026  
“Modeling Complex Biological Systems on Multiple Scales”  
Minisymposium, Cell Bio 2025, Philadelphia PA December 2025  
“Quantitative Modeling Insights for Cytoskeleton Dynamics and Cell Polarity”  
Minisymposium, SIAM Annual Meeting, Montréal QB August 2025  
“Celebrating diversity in mathematical biology, with applications in medicine, physiology, and public health”  
Special Session, SMB Annual Meeting, Edmonton AB July 2025  
“From data to mechanisms: advancement in modeling in cell and developmental biology”  
Special Session, Joint Mathematics Meeting, Seattle WA January 2025  
“Diversity in Mathematical Biology”  
Minisymposium, SIAM Annual Meeting, Spokane WA July 2024  
“Modeling Dynamics in Biological Systems”  
Minisymposium, AWM Research Symposium, Atlanta GA September 2023  
“Promoting children’s and women’s health with mathematical and computational approaches”  
Minisymposium, 10th ICIAM, Tokyo JP August 2023  
“Recent Advances in Modeling Complex Systems and Multiscale Problems in Mathematical Biology”  
Invited Paper Session, MAA MathFest, Tampa FL August 2023  
“Recent Advances in Mathematical and Computational Biology, Highlighting Contributions from Undergraduate Researchers.”  
Minisymposium, SIAM Life Sciences, Pittsburgh PA July 2022  
“Mathematical Modeling of Blood Clotting and its Application”  
Minisymposium, SMB Annual Meeting, Virtual June 2021  
“Mathematical Modeling of Blood Clotting: From Surface-Mediated Coagulation to Fibrin Polymerization”

*Judge*

SMB Poster Session, Edmonton AB July 2025  
TriCAMS Poster Session, Chapel Hill NC October 2024  
SIAM Annual AWM Graduate Student Poster Session, Spokane WA July 2024  
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”

**SERVICE TO THE  
UNIVERSITY**

*Organizer*, UNM Applied Mathematics Seminar 2025 – present  
Organization of biweekly research seminar for faculty, graduate students and postdocs.

*Co-organizer*, Duke Mathematical Biology Seminar 2022 – 2025  
Organization of weekly research seminar for faculty, graduate students and postdocs.

*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”

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

## SERVICE TO THE COMMUNITY

*Committee member*, Mathematics DEI Team, Duke University August 2022 – May 2024  
*Panelist*, GROW (Graduate Research Opportunities for Women), Duke University October 2022  
“From day 1 to PhD”  
*Co-organizer*, Duke Math Circles, Durham NC August 2023 – January 2025  
Manage volunteers and activities for Duke Math Circles program  
*Presenter*, Girls Exploring Math, Duke University June 2023  
“Math: We  $R_0$  afraid to use it!”  
*Volunteer*, Duke Math Circles, Durham NC August 2022 – April 2024  
Provide exploratory instruction for K-6 students at Central Park School for Children  
*Panelist*, Society for Women in Mathematics (SWiM), Colorado School of Mines October 2020  
“Graduate school panel” (virtual)  
*Co-organizer*, Faculty-Student Weekly Tea, FaSt Grant February 2022 – December 2023  
Department of Mathematics, Duke University  
*Co-organizer*, Faculty-Student Math Book Club February 2022 – May 2023  
Department of Mathematics, Duke University  
*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  
*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.  
*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.  
*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  
Society for Industrial and Applied Mathematics  
Society of Mathematical Biology  
American Society for Cell Biology