

Anna C. Nelson

CONTACT INFORMATION

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RESEARCH INTERESTS

Applied dynamical systems, mathematical biology, polymerization, mathematical modeling

ACADEMIC APPOINTMENTS

University of New Mexico, Department of Mathematics & Statistics
Assistant Professor of Mathematics
Albuquerque, NM
January 2025 – present

Duke University, 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

University of Utah, 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

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

PUBLICATIONS

9. **A. C. Nelson**, S. A. McKinley, M. M. Rolls, and M. V. Ciocanel. "Emergent microtubule properties in a model of turnover and nucleation." *Journal of Theoretical Biology*, 616:112254, 2026.
8. 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." *Mathematical Biosciences*, 389:109538, 2025
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

- 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." *Submitted*, [bioRxiv:10.1101/2025.10.19.683313v1](https://doi.org/10.1101/2025.10.19.683313v1)
- J. Cruts, **A. C. Nelson**, F. Gijssen, and A. L. Fogelson. "Platelet plug microstructure and flow modulate early fibrin gelation: insights from computational simulations." *In preparation*.

AWARDS	Top 5% of Duke University undergraduate instructors, Trinity College	Fall 2023
	For at least two of the following categories: Overall quality of course, overall quality of instructor, intellectual stimulation of course.	
	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
FUNDING	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.	
	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	
	<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	
	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
	University Teaching Assistantship , Graduate College, University of Utah	2018 – 2019
	Co-awarded for the mathematics Graduate Teaching Mentorship (GTM) program.	
	Travel Awards	
	ASCB Travel Fund	2025
	\$500 to attend Cell Bio 2025 in Philadelphia PA	
	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)	
CONTRIBUTED & INVITED TALKS	University of Utah Graduate School Travel Award	Spring 2020
	\$500 to attend JMM 2020	
	<i>Building connections and community in mathematics</i>	
	Bi-Co Math Colloquium, Bryn Mawr College and Haverford College	December 2025
	Equity Forum, Montana State University	April 2025
	Math For All Conference, Clemson, SC (Plenary)	April 2024
	<i>Mathematical models of polymerization processes in physiology</i>	
	Applied Mathematics Seminar, University of Notre Dame	April 2026
	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
Cell Bio 2025, Invited Minisymposium	December 2025
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

**INVITED
WORKSHOPS**

National Institute for Theoretical and Mathematical Biology, Chicago IL	June 2026
Extreme Events in Biological Functions	
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

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

AWM Undergraduate Mentor

2019 – 2024

Paired with undergraduate students to meet monthly to discuss semester, future plans, and build community at University of Utah and Duke University.

SPIRE Fellows Postdoctoral Assistant and Faculty Mentor

2021 – 2023

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[†]

Fall 2025

Duke University

MATH 353, Ordinary and Partial Differential Equations

Fall 2024, 2021

MATH 353, Ordinary and Partial Differential Equations

Spring 2024, 2022

MATH 270/BIO 218, Biological Clocks: How Organisms Keep Time

Fall 2023, 2022

MATH 577, Mathematical Modeling[†]

Spring 2023

MATH 75, Being Human in STEM for First Year SPIRE Fellows

Spring 2023, 2022

University of UtahMATH 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[‡], Spring 2017, Fall 2016

MATH 1030, Intro to Quantitative Reasoning

Summer 2016[‡], 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 TO THE
PROFESSION***Secretary*, Society for Mathematical Biology

November 2024 – present

Cell and Developmental Biology Subgroup

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 "Diversity in Mathematical Biology"	January 2025
Minisymposium, SIAM Annual Meeting, Spokane WA "Modeling Dynamics in Biological Systems"	July 2024
Minisymposium, AWM Research Symposium, Atlanta GA "Promoting children's and women's health with mathematical and computational approaches"	September 2023
Minisymposium, 10th ICIAM, Tokyo JP "Recent Advances in Modeling Complex Systems and Multiscale Problems in Mathematical Biology"	August 2023
Invited Paper Session, MAA MathFest, Tampa FL "Recent Advances in Mathematical and Computational Biology, Highlighting Contributions from Undergraduate Researchers."	August 2023
Minisymposium, SIAM Life Sciences, Pittsburgh PA "Mathematical Modeling of Blood Clotting and its Application"	July 2022
Minisymposium, SMB Annual Meeting, Virtual "Mathematical Modeling of Blood Clotting: From Surface-Mediated Coagulation to Fibrin Polymerization"	June 2021

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

SERVICE TO THE UNIVERSITY

<i>Organizer</i> , UNM Applied Mathematics Seminar Organization of biweekly research seminar for faculty, graduate students and postdocs.	2025 – present
<i>Co-organizer</i> , Duke Mathematical Biology Seminar Organization of weekly research seminar for faculty, graduate students and postdocs.	2022 – 2025
<i>Presenter</i> Grad-Fac Seminar, Department of Mathematics, Duke University "The mathematics of bell-ringing"	October 2023
Grad-Fac Seminar, Department of Mathematics, Duke University "Mathematical modeling of polymerization processes in physiology"	January 2023
SPIRE Speaker Series, Duke University "Who can do math?"	August 2021
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
<i>Organizer</i> , Biofluids research seminar, University of Utah Organization of weekly research seminar for faculty, graduate students and postdocs.	2020 – 2021

SERVICE TO THE COMMUNITY

<i>Committee member</i> , Mathematics DEI Team, Duke University	August 2022 – May 2024
<i>Panelist</i> , GROW (Graduate Research Opportunities for Women), Duke University "From day 1 to PhD"	October 2022
<i>Co-organizer</i> , Duke Math Circles, Durham NC Manage volunteers and activities for Duke Math Circles program	August 2023 – January 2025
<i>Presenter</i> , Girls Exploring Math, Duke University "Math: We R_0 afraid to use it!"	June 2023
<i>Volunteer</i> , Duke Math Circles, Durham NC Provide exploratory instruction for K-6 students at Central Park School for Children	August 2022 – April 2024
<i>Panelist</i> , Society for Women in Mathematics (SWiM), Colorado School of Mines "Graduate school panel" (virtual)	October 2020

<i>Co-organizer</i> , Faculty-Student Weekly Tea, FaSt Grant Department of Mathematics, Duke University	February 2022 – December 2023
<i>Co-organizer</i> , Faculty-Student Math Book Club Department of Mathematics, Duke University	February 2022 – May 2023
<i>Volunteer</i> , Defining Your Path – Field Trip Program, University of Utah	February 2020
<i>Judge</i> , State of Utah Sterling Scholar Award, Mathematics, Salt Lake City UT	January 2020
<i>Panelist</i> , Clayton Middle School – Career Fair, Salt Lake City UT	January 2020
<i>Co-chair</i> , AWM Speaker series committee, Mathematics, University of Utah Invite and host mathematicians from underrepresented groups to give talks and network with department.	2020 – 2021
<i>Vice President</i> , AWM Student Chapter, University of Utah Organize monthly student events for undergraduates and graduate students, organize outreach events on and off campus, and meet with job candidates.	2019 – 2020
<i>Presenter</i> , Science Day at the U., University of Utah “Computing in Nature: Using DNA to solve math problems”	November 2019
<i>Presenter</i> , Girls Full STEAM Ahead Camp, Leonardo Museum, Salt Lake City UT “Math: We R_0 afraid to use it!”	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
 Society for Industrial and Applied Mathematics
 Society for Mathematical Biology
 American Society for Cell Biology