

CURRICULUM VITAE

CALINA A. COPOS

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ASSISTANT PROFESSOR
Mathematics & Computational Medicine
University of North Carolina, Chapel Hill

CONTACT INFORMATION:
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PROFESSIONAL POSITIONS

September 2020 – present: *University of North Carolina Chapel Hill*

Assistant Professor of Mathematics

Assistant Professor of Computational Medicine, Lineberger Research Cancer Center

September 2020 – January 2021: *Courant Institute, New York University*

Visiting Assistant Professor

EDUCATION & TRAINING

- **Courant Instructor / Assistant Professor** 09/2017 – 08/2020
Courant Institute, New York University
Mentor: Alex Mogilner
Field of study: Biophysics of collective cell movement and polarization
- **Ph.D. Applied Mathematics** 01/2014 – 8/2017
University of California Davis (Davis, CA)
Thesis advisor: Robert Guy
Field of study: Fluid-structure interaction, polymer mechanics, cell migration
- **M.S. Applied Mathematics** 07/2011 – 12/2013
University of California Davis (Davis, CA)
Thesis advisors: Robert Guy, John Owens
Field of study: Parallelized solvers for low Reynolds number fluid flows
- **B.S. Mathematics and Physics** 09/2006 – 5/2010
University of Richmond (Richmond, VA)

RESEARCH INTERESTS

Cell biology, Applied computational mathematics, Fluid and solid dynamics,
Machine learning model discovery, Numerical methods

SELECTED AWARDS & HONORS

- NSF Mathematical Biology Grant, PI 2020 – 2023
- Courant Institute NYU Cathleen Morawetz Fellow 2018 – 2019
- University of California Davis Research Travel Award (\$500) 2016
- Top Poster Award of SIAM Computational Science & Engineering 2015
- NSF Graduate Student Fellow 2011 – 2014
- NSF Fellow for Opportunities Worldwide (France) 2014
- SIAM Conference Travel Award 2016, 2015, 2014
- Jackson J. Taylor Best Senior Seminar in Physics, University of Richmond 2010
- Science Scholarship, University of Richmond 2006 – 2010

PUBLICATIONS

13. 3D mechanical model of simple case of collective migration of two heart progenitor cells in early *Ciona* embryo
H. Yue, **C. Copos**, Y. Bernadskaya, L. Christiaen, A. Mogilner, in review on *PLoS Comp Biology* (2020).
12. PI3K inhibition reverses migratory direction of single cells but not cell groups in electric fields
Y.-H. Sun, H. Yue, **C. Copos**, K. Zhu, Y. Zhang, X. Gao, Y. Sun, B. Reid, F. Lin, M. Zhao, A. Mogilner, in review in *Biophysical Journal* (2020).
11. Stress fibers are embedded in a contractile cytoplasmic meshwork
T. Vignaud, **C. Copos**, Q. Tseng, L. Blanchoin, A. Mogilner, M. Thery, L. Kurzawa, in press in *Nature Materials* (2020).
10. A hybrid stochastic-deterministic mechanochemical model of cell polarization
C. Copos, A. Mogilner, *Molecular Biology of the Cell*, 31, 1637-1649 (2020).
Selected as a Featured Article in *Molecular Biology of the Cell*.
9. Connecting actin polymer dynamics across multiple scales
C. Copos, B. Bannish, K. Glasior, R. Pinals, M. Rostami, A. Dawes, R. Segal et al. (eds)
Using Mathematics to Understand Biological Complexity (1-19), Springer (2020).
8. Modeling insights into the mechanical coordination in the collective locomotion of heart progenitor cells
C. Copos, Y. Bernadskaya, L. Christiaen, A. Mogilner, *Conf. Proc. of the Biophysical Society*, 114(3), 653a (2018).
7. Collective cell migration in electric fields
A. Mogilner, Y.-H. Sun, **C. Copos**, M. Zhao, *Conf. Proc. of the APS Meeting* (2018).
6. A porous viscoelastic model for the cell cytoskeleton
C. Copos and R.D. Guy, *ANZIAM Journal*, 59, 462-498 (2018).
5. Mechanosensitive adhesion explains stepping motility in amoeboid cells
C. Copos, S. Walcott, J.C. del Álamo, E. Bastounis, A. Mogilner, R.D. Guy, *Biophysical Journal*, 112(12), 2672-2682 (2017).
Selected as a New & Notable Article in *Biophysical Journal*.
4. A poroelastic immersed boundary method with applications to cell biology
W. Strychalski, **C. Copos**, O.L. Lewis, R.D. Guy, *Journal of Computational Physics*, 282, 77-97(2015).
3. A GPU-accelerated method of regularized Stokeslets for computational fluid dynamics
C. Copos, R.D. Guy, W. Strychalski, J.D. Owens, *Conf. Proc. of NVIDIA GPU Technology Conference* (2013).
2. Shared autocorrelation property of sequences
C. Bodea, **C. Copos**, M.F. Der, D. O'Neal, J.A. Davis, *IEEE: Transactions on Information Theory*, 57(6), 3805-809 (2011).
1. Evidence for the microscopic formation of mixed-symmetry states from magnetic moment measurements
V. Werner et al., *Physical Review C*, 78(3), 031301-305 (2008).

SELECTED INVITED TALKS

- March 2021: To be given at the Applied Math Seminar at University of New Mexico
- November 2020: To be given at APS Division of Fluid Dynamics
- July 2020: Organized workshop titled “Dynamics of Biopolymers across Multiple Scales”, To be hosted at the Banff International Research Station for Mathematical Innovation and Discovery (cancelled due to COVID-19)
- June 2020: “Polarity establishment in a cell collective”, Given at SIAM Life Sciences Conference, Garden Grove CA (virtual)
- May 2020: “On how mechanics and biochemistry can work together to initiate cell polarization”, To be given at Cell Polarity Signaling Gordon Research Conference, New London NH (cancelled due to COVID-19)
- April 2020: “The mechanics of single and collective cell locomotion” Given at the Applied Math & Scientific Computation Seminar at Temple University, Philadelphia PA (cancelled due to COVID-19)
- February 2020: “Modeling and simulation of breaking symmetry in cells” Given at the Mathematics Colloquium at University of North Carolina, Chapel Hill NC.
- January 2020: “Modeling and simulation of breaking symmetry in cells” Given at the Mathematics Colloquium at Tulane University, New Orleans LA.
- November 2019: “A hybrid mechanochemical model for how cells initiate locomotion” Given at the Mathematical biology seminar, New Jersey Institute of Technology, Newark NJ.
- September 2019: “A model for how cells break their symmetry for locomotion” Given at the Biomath Seminar, Virginia Commonwealth University, Richmond VA .
- August 2019: “Modeling initiation of cell migration” Given at the Society for Mathematical Biology Annual Meeting, Montreal, Canada.
- July 2019: “Modeling insights into the mechanical coordination in the collective locomotion of heart progenitor cells” Given at the SIAM: Life Sciences Conference, Minneapolis MN.
- June 2019: “Modeling insights into the mechanical coordination in the collective locomotion of heart progenitor cells” Given at the SIAM Annual meeting, Portland OR.
- November 2018: “Models of the time-evolving rheology of the cell actin cytoskeleton” Given at the Applied Mathematics Seminar, Worcester Polytechnic Institute, Worcester MA.
- November 2018: “Mechanical insights into amoeboid motility – a theoretical approach” Given at the BioMath Seminar, Hunter CUNY College, New York NY.
- October 2018: “A model of the cell cytoplasm rheology in confined environments” Given at the American Mathematical Society Northeastern Sectional, University of Michigan, Ann Arbor MI.
- June 2018: “Mechanical coupling between stress fibers and the actin network” Given at the BIRS Workshop: Bridging Cellular and Tissue Dynamics from Normal Development to Cancer, Banff, Canada.
- October 2017: “A fluid-structure interaction model for a porous viscoelastic biopolymer network” Given at the Modeling & Simulation Seminar, Courant Institute, New York University, New York NY.

- September 2017: “Understanding cell movement: a mechanical approach”
Given at the Biomathematics Seminar, Courant Institute, New York University, New York NY.
- January 2017: “Understanding cell movement: a mechanical approach”
Given at the Widely Applied Mathematics Colloquium, Harvard University, Boston MA.
- July 2016: “Multiscale Modeling of Cellular Dynamics”
Given at the SIAM: Life Sciences meeting, Boston, MA.
- February 2016: “Mechanical insights into the adhesion dynamics of amoeboid cells”
Given at the Mathematical Biology Seminar, University of California Davis, Davis CA.
- June 2015: “A model for porous viscoelastic cytoskeleton to study amoeboid migration”
Given at the Mathematical Biology Seminar, University of California Irvine, Irvine CA.
- January 2015: “A model for a porous viscoelastic cytoskeleton”
Given at the Gel Modeling Summit, University of Utah, Salt Lake City, UT.

PROFESSIONAL ACTIVITIES AND OUTREACH

Referee for journals

Nature, *Biophysical Journal*, *PLOS*, *Journal of Computational Physics*, *Biomechanics and Modeling in Mechanobiology*, *Journal of Mathematical Biology*, *Bulletin of Mathematical Biology*, *Physical Review E*.

Organizer/co-organizer of sessions at scientific meetings

- “Cytoskeletal Mechanics and Signaling” three part minisymposium, SIAM Life Sciences meeting, 2020
- “From Motors to Tissues: Models Reveal Control Mechanisms of Cellular Processes” two part minisymposium, SIAM Life Sciences meeting, 2018

Grant proposal reviewer

- NSF DMS Mathematical Biology program, 2020

Other service & outreach

- Lecturer at Meet-a-Scientist with BioBus, New York NY, 2020
- Participant in the WPI Faculty Launch Workshop, 2019
- Co-leader of research team in the Women Advancing Mathematical Biology Workshop, 2019–2020
- Participant in the Quantitative Cell Biology: Cell Modeling Hackathon IV, 2019
- Mentor with 1000 Girls 1000 Futures Program, 2018
- Organizer of Courant Postdoctoral & Researcher Tea, 2018–2019
- Lecturer at NYUrWIS Girls Mentoring Program, 2018–2020
- Lecturer at the European Molecular Biology Course, 2016
- Board member for the AWM University of California Davis Chapter, 2015–2017
- University of California Davis Chapter President of the Math Graduate Student Organization, 2015–2016
- University of California Davis Chapter Secretary of the Math Graduate Student Organization, 2014–2015
- Volunteer tutored weekly at the STEM Cafe at University of California Davis, 2013–2016

TEACHING & MENTORING

- **Course Instructor**

UNIVERSITY OF NORTH CAROLINA CHAPEL HILL:

- Linear Algebra and its Applications (Spring 2021)

NEW YORK UNIVERSITY:

- Linear Algebra (Spring 2019):
 - 43 students, Overall teaching ability: 4.44 (out of 5)
- Calculus I (Fall 2018):
 - 125 students, Overall teaching ability: 4.04 (out of 5)
- Calculus III (Spring 2018):
 - 51 students, Overall teaching ability: 4.45 (out of 5)
- Mathematics for Economists II (Fall 2017):
 - 35 students, Overall teaching ability: 4.18 (out of 5)

UNIVERSITY OF CALIFORNIA DAVIS:

- Calculus I for Biologists (Spring 2017)
- Calculus III for Biologists (Summers 2015, 2016)

- **Undergraduate student research mentored**

- June 2019 - August 2019: Paulina Czarnecki (Math, University of Michigan Ann Arbor, Summer undergraduate research; JMM travel awardee)
- June 2018 - May 2019: Taylor Meredith (Biology/Math, New York University, Senior thesis; NYU Dean's Undergraduate Research Fund awardee)
- June 2015 - June 2016: Season Yang (Math, University of California Davis, Senior thesis)

REFERENCES

- **Professor Alex Mogilner** – Postdoctoral supervisor

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- **Professor Robert D. Guy** – Ph.D. advisor

UNIVERSITY OF CALIFORNIA DAVIS, Mathematics
One Shields Avenue, Davis, CA 95616
email: guy@math.ucdavis.edu, Phone: (530) 754-9201

- **Associate Professor Adriana Dawes**

OHIO STATE UNIVERSITY, Mathematics & Molecular Genetics
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- **Associate & Sinclair Professor Sam Walcott**

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100 Institute Rd, Worcester, MA 01609
email: swalcott@wpi.edu, Phone: (508) 831-5000

- **Professor Miranda Holmes-Cerfon** – Teaching & Mentorship

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