

## CURRICULUM VITAE

# CALINA A. COPOS

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

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### PROFESSIONAL POSITIONS

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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

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- **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

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

### SELECTED AWARDS & HONORS

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- 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

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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

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- 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

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### 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

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### • 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

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- **Professor Alex Mogilner** – Postdoctoral supervisor  
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251 Mercer Street, New York, NY 10012  
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- **Professor Robert D. Guy** – Ph.D. advisor  
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- **Associate Professor Adriana Dawes**  
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- **Associate & Sinclair Professor Sam Walcott**  
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- **Professor Miranda Holmes-Cerfon** – Teaching & Mentorship  
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