

CURRICULUM VITAE
CALINA A. COPOS
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ASSISTANT PROFESSOR
Mathematics & Biology
Northeastern University

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EDUCATION

- *Ph.D. Applied Mathematics (Advisor: Robert Guy)* 2014 – 2017
University of California Davis, Davis, CA
- *M.S. Applied Mathematics* 2011 – 2013
University of California Davis, Davis, CA
- *B.S. Mathematics and Physics* 2006 – 2010
University of Richmond, Richmond, VA

EMPLOYMENT HISTORY

2021 - Assistant Professor, Biology Department, Northeastern University, Boston MA
2021 - Assistant Professor, Mathematics Department, Northeastern University, Boston MA
2020 - 2021 Assistant Professor, Mathematics Department, University of North Carolina Chapel Hill, Chapel Hill NC
2020 - 2021 Assistant Professor, Computational Medicine Program, University of North Carolina Chapel Hill, Chapel Hill NC
2017 - 2020 Courant Instructor, Courant Institute, New York University, New York, NY

RESEARCH INTERESTS

Theoretical Biology, Computational and Applied Mathematics
Numerical Methods, Fluid and Solid Mechanics, Data Driven Model Discovery

PUBLICATIONS

Full list of publications at: <https://scholar.google.com/citations?user=53wW8GkAAAAJ>
Google Scholar: h-index 9, citations: 330

Glossary:

* indicates Northeastern student;

† indicates authors contributed equally;

§ indicates contributor to mathematical modeling;

PEER-REVIEWED JOURNAL ARTICLES

15. W. Shi, S. Gupta, **C. Copos**, A. Mogilner. 2024. *Collective mechanics of small migrating cell groups*, Seminars in Cell & Developmental Biology (In review);
14. **C. Copos**, Y. Sun, K. Zhu, Y. Zhang, B. Reid, B.W. Draper, F. Lin, H. Yue, Y. Bernadskaya, M. Zhao, A. Mogilner. 2024. *Galvanotactic directionality of cell groups depends on group size*. (In review);

13. K. Levandosky*, **C. Copos**. 2024. *Model supports asymmetric regulation across the intercellular junction for collective cell polarization*. (In review);
- Corresponding author.
12. M. W. Rostami, B. E. Bannish, K. Gasior, R. L. Pinals, **C. Copos**, A. T. Dawes. 2023. *Inferring local molecular dynamics from the global actin network structure: A case study of 2D synthetic branching actin networks*, *Journal of Theoretical Biology*, 111613;
- Co-corresponding author.
11. Y. Sun B. Reid, Y. Zhang, K. Zhu, F. Ferreira, A. Estrada, Y. Sun, B. W. Draper, H. Yue[§], **C. Copos**[§], F. Lin, M. Zhao, A. Mogilner. 2023. *Electric field-guided collective motility initiation of large epidermal cell groups*, *Molecular Biology of the Cell*, 34, ar48;
10. **C. Copos**[†], W. Strychalski[†]. 2022. *Actin turnover required for adhesion-independent bleb migration*, *Fluids*, 7, 173;
- Co-corresponding author.
9. Y. Y. Bernadskaya, H. Yue[§], **C. Copos**[§], Y. Bernadskaya, L. Christiaen A. Mogilner. 2021. *Supracellular organization confers directionality and mechanical potency to migrating pairs of cardiopharyngeal progenitor cells*, *eLife*, 10, e70977;
8. T. Vignaud, **C. Copos**[§], Q. Tseng, L. Blanchoin, A. Mogilner, M. Thery, L. Kurzawa. 2021. *Stress fibers are embedded in a contractile cytoplasmic meshwork*, *Nature Materials*, 20, 410-420;
- Selected as a News & Views article in *Nature Materials*.
7. **C. Copos**, A. Mogilner. 2020. *A hybrid stochastic-deterministic mechanochemical model of cell polarization*, *Molecular Biology of the Cell*, 31, 1637-1649;
- Corresponding author.
- Selected as a Featured Article in *Molecular Biology of the Cell*.
6. **C. Copos** and R. D. Guy,. 2018. *A porous viscoelastic model for the cell cytoskeleton*, *ANZIAM Journal*, 59, 472-498;
- Co-corresponding author.
5. **C. Copos** S. Walcott, J. C. del Álamo, E. Bastounis, A. Mogilner, R. D. Guy. 2017. *Mechanosensitive adhesion explains stepping motility in amoeboid cells*, *Biophysical Journal*, 112(12), 2672-2682;
- Corresponding author.
- Selected as a New & Notable Article in *Biophysical Journal*.
4. W. Strychalski, **C. Copos**, O. L. Lewis, R. D. Guy. 2015. *A poroelastic immersed boundary method with applications to cell biology*, *Journal of Computational Physics*, 282, 77-97;
3. F.G. Kondev, et al. 2013. *Spectroscopy of neutron-deficient nuclei near the Z = 82 closed shell via symmetric fusion reactions*, *EPJ Web of Conferences*, 63, 01013;
2. C. Bodea, **C. Copos**, M. F. Der, D. O'Neal, J. A. Davis. 2011. *Shared autocorrelation property of sequences*, *IEEE: Transactions on Information Theory*, 57(6), 3805-809;
1. V. Werner et al. 2008. *Evidence for the microscopic formation of mixed-symmetry states from magnetic moment measurements*, *Physical Review C*, 78(3), 031301-305;

NON-REVIEWED ARTICLES

1. Y.-H. Sun, H. Yue[§], **C. Copos**[§], K. Zhu, Y. Zhang, X. Gao, Y. Sun, B. Reid, F. Lin, M. Zhao, A. Mogilner. 2020. *PI3K inhibition reverses migratory direction of single cells but not cell groups in electric fields*. bioRxiv, doi: 10.1101/2020.08.05.238170;

BOOK CHAPTERS

1. **C. Copos**, B. Bannish, K. Glasior, R. Pinals, M. Rostami, A. Dawes. . 2021. *Connecting actin polymer dynamics across multiple scales*, R. Segal et al. (eds) *Using Mathematics to Understand Biological Complexity* (1-19), Springer;

PH.D. THESIS

1. **C. Copos**. 2017. *Modeling the mechanics of cell locomotion: the effects of cell-surface interaction and cytoskeleton*, University of California, Davis CA.

SELECTED INVITED TALKS (POST NEU HIRE, 2021 - PRESENT)

- October 2024, “The tug-of-war at cell-cell junctions: coordination of symmetry breaking event”, UC Riverside, The Interdisciplinary Center for Quantitative Modeling in Biology, CA.
- June 2024, “Negotiating the tug-of-war in the migration of cell doublets”, Society of Industrial and Applied Mathematics (SIAM) Life Science Meeting, Portland, OR.
- April 2024, “Differential regulation ensures synchrony of cellular symmetry breaking”, Boston University Dynamical Systems Seminar, Boston, MA.
- March 2024, “A tug-of-war determines the directionality of collective EF-guided cell motility”, Brandeis University MRSEC Seminar, Waltham, MA.
- December 2023: “Model supports mechanics-driven regulation of the Rho GTPase signaling pathway for collective cell polarization”, American Society of Cell Biology (ASCB) Annual Meeting, Boston, MA.
- November 2023: “Collective symmetry breaking: From pattern formation in individual cells to many cells”, UC Davis Mathematical Biology Seminar, Davis, CA.
- November 2023: “Collective symmetry breaking: From pattern formation in individual cells to many cells”, MIT Physical Mathematics Seminar, Boston, MA.
- November 2023: “Synchronization of protein pattern formation across cell groups”, New England Dynamics Seminar, Boston, MA.
- October 2023: “Synchronization of protein pattern formation across cell groups”, Great Boston Area Statistical Mechanics Meeting, Boston, MA.
- October 2023: “Collective symmetry breaking: From pattern formation in individual cells to many cells”, UMass Amherst Applied Mathematics and Computation Seminar, Amherst, MA.
- August 2023: “What is communicated across the cell-cell junction to initiate locomotion?”, OKO International Symposium Kyoto, Japan.
- August 2023: “Theory of the cell motility mechanism in the absence of adhesions”, 10th International Congress on Industrial and Applied Mathematics (ICIAM), Tokyo, Japan.
- June 2023: “A minimal model of symmetry breaking for cell movement”, Society of Mathematical Biology Diversity & Inclusion Seminar Series (virtual).
- January 2023: “Using math to solve biological problems”, Ph.D. Biology Recruitment, Northeastern University, Boston, MA.
- January 2023: “From direct measurements to models of collective cell migration”, Joint Mathematics Meetings (JMM), Boston, MA.
- December 2022: “Cortical turnover required for adhesion-independent bleb-based migration”, ASCB Annual Meeting, Washington DC.

- September 2022: “Breaking the Scallop Theorem: A cell motility example”, Brandeis University Mathematical Biology Seminar, Waltham, MA.
- July 2022: “From direct measurements to models of collective cell migration”, SIAM Annual Meeting, Pittsburgh, PA.
- July 2022: “Design principles for adhesion-independent cell movement”, 9th World Congress of Mechanobiology, Taipei, Taiwan (virtual)
- April 2022: “Network dynamics in cells: building connections across scales”, Northeastern University Applied and Interdisciplinary Mathematics Seminar, Boston, MA.
- April 2022: “How to move faster together than alone?”, Mathematical Biology Seminar, Harvard University, Boston, MA.
- April 2022: “How can math help us understand how cells move?”, Northeastern University Association of Women in Mathematics (AWM), Boston, MA
- March 2022: “Amoeboid cell migration through the lens of mechanics”, University of College London Biophysics Seminar (virtual)
- December 2021: “Amoeboid cell migration through the lens of mechanics”, Northeastern University Biophysics Seminar, Boston, MA
- November 2021: “A tale of a pair of migrating cells”, Northeastern University Biology Colloquium Boston MA
- June 2021: “Chimneying movement from the perspective of a cell”, Society of Mathematical Biology (SMB) Annual Conference (virtual)
- May 2021: “Cell symmetry breaking for movement through a mechanochemical mechanism”, University of British Columbia Mathematical Biology Seminar (virtual)

FUNDED GRANTS

EXTERNAL

1. *The biophysics of collective cell locomotion*

- Role: PI
- Funding Source: NSF Division of Mathematical Sciences
- Total Award: \$300,880
- Project Share: 100%
- Support: 18 months postdoctoral researcher, 1.2 months summer support
- Award Period: 09/2021 - 12/2024

INTERNAL

1. *Co-ops to On-Ramp into Research Endeavors (CORE)*

- Role: PI
- Funding source: Northeastern University
- Total Award: \$8,050
- Project Share: 100%
- Support: one coop student
- Award Period: 07/2024 - 12/2024

FELLOWSHIPS, GRANTS, AND AWARDS PRIOR TO JOINING NORTHEASTERN

Courant Institute NYU Cathleen Morawetz Fellow (2018)
 University of California Davis Research Travel Award (2016)

Top Poster Award of SIAM Computational Science & Engineering (2015)
NSF Fellow for Opportunities Worldwide (France, 2014)
SIAM Conference Travel Award (2016, 2015, 2014)
NSF Graduate Student Fellow (2011 – 2014)

TEACHING (POST NEU HIRE, 2021-PRESENT)

COURSES TAUGHT

- BIOL 3409: Special Topics in Biology (4 credits, undergraduate-level)
Spring 2024: 15 students
Fall 2024: 23 students
- MAT5131: Mathematical methods and models (4 credits, graduate-level)
Spring 2022: 15 students
Spring 2023: 15 students
- BIOL2299: Inquiries in Biological Sciences (4 credits, undergraduate-level)
Spring 2023: 22 students
- BIOL5100: Biology Department Colloquium (1 credit, any-level)
Fall 2022: 7 students
Spring 2023: 12 students
Fall 2023: 14 students
Spring 2024: 21 students
Fall 2024: 20 students
- MATH4991: Directed independent study (4 credits, undergraduate-level)
Fall 2022: 1 student
Fall 2023: 2 students
Spring 2024: 1 student

MENTORING (POST NEU HIRE, 2021-PRESENT)

POSTDOCTORAL SCHOLARS

- July 2023 - present: Dr. Ying Zhang
 - AMS-Simons Travel Grant recipient
 - SIAM Life Sciences Travel Award recipient

GRADUATE STUDENTS

- Sept 2024 - present: Egun Im (co-advised with James Monaghan)
- July 2023 - present: Samantha Finkbeiner (co-advised with James Monaghan)

UNDERGRADUATE STUDENTS

- 2024 - present: Nidhi Pillai (Co-op)
- 2024 - present: Xueqing Wang (REU)
- 2023 - 2024: Katherine Chapkis (Co-op, Independent study)
 - Graduate student at Northeastern University
- 2022 - 2024: Katherine Levandosky (Co-op, REU, Honors Thesis)
 - Graduate student at University of Wisconsin Madison
 - Joint Mathematics Meeting Travel Award recipient
 - Duke University GROW Program invitee
- 2022 - 2023 : Edward Berman (Independent study)

UNDERGRADUATE RESEARCH CO-OP STUDENTS (3)

- 2024: Nidhi Pillai
- 2023: Katherine Chapkis
- 2022: Katherine Levandosky

UNDERGRADUATE DIRECTED-STUDY STUDENTS (3)

- 2024: Nidhi Pillai
- 2023: Katherine Chapkis
- 2022: Edward Berman

SERVICE (POST NEU HIRE, 2021-PRESENT)

DEPARTMENTAL SERVICE

- Mathematics Graduate Program Committee Member (2024)
- Biophysics Ph.D. Program Biology Department Representative (2024)
- BIOL1000 Interviewee for new students (2024)
- Biology Weekly Colloquium Committee Member (2022, 2023, 2024)
- Biology Graduate Program Committee Member (2022, 2023, 2024)
- Career Panel for Inquiries in Biology Co-Organizer (2023)
- Mechanobiology Biology Faculty Search Committee Member (2022)
- Modeling Mathematics Faculty Search Committee Member (2021)

PHD ORAL EXAM COMMITTEE (4)

- Lindsay Julio (2024), Junxiang Huang (2023), Alon Duvall (2022), Jack Linehan (2021)

PHD THESIS COMMITTEE (2)

- Jack Linehan (2024), Junxiang Huang (2024)

MENTORING OF BIOLOGY CAPSTONE STUDENTS (4)

- Jose Avila (2024), Christina Kotsaninis (2023), Aysia Levy (2023), Caitlin Looney (2022)

COLLEGE AND UNIVERSITY SERVICE

- Biochemistry, Math, and Association of Women in Mathematics Clubs visiting faculty (2021, 2022, 2023)
- Reviewer: COS Excellence in Research Award (2023)
- Reviewer: TIER 1 Seed Grant (2022)
- **External PhD Oral Exam Committee:** Jack Linehan, Biology Dept. UNC Chapel Hill
- **External Thesis Committee:** Jack Linehan, Biology Dept. UNC Chapel Hill

SERVICE TO THE PROFESSION

Grant Review

- NSF, Mathematical Biology, Review Panelist (2024,2023)
- NSF, Mathematical Biology, Ad Hoc Reviewer (2021, 2022)
- American Society of Cell Biology Program Abstract Committee Member (2023, 2024)
- Poster Judge, Society of Mathematical Biology (2023)
- Mentor, Society of Mathematical Biology (2023)

Conference Organizing Committees

- Society of Industrial and Applied Mathematics Life Sciences (2022, 2024)

Peer Review

Nature

Nature Communications

Mol. Biol. of the Cell

Biophysical Journal

PLoS One

Journal of Computational Physics

Biomechanics and Modeling in

Mechanobiology

Journal of Mathematical Biology

Bulletin of Mathematical Biology

Physical Review E

Memberships

- Society of Mathematical Biology
- Society of Industrial and Applied Mathematics
- American Society of Cell Biology

COMMUNITY SERVICE

- Invited speaker in the “Diversity in Math Bio” series, a Diversity Inclusion and Equity series of the Society of Mathematical Biology (2023)
- Gave a career and research talk for the Math Club and Biochemistry club at Northeastern University (2022, 2023)
- Held an informational interview about career choices with the Northeastern chapter for the Association of Women in Mathematics (2022)
- Gave an introductory research talk for the Northeastern chapter for the Association of Women in Mathematics (2022)

PROFESSIONAL DEVELOPMENT

- Culturally Aware Mentoring Training workshop (2024)
- Establishing a STEM Publishing Pipeline workshop (2024)
- Preparing (for) an NSF CAREER workshop (2024)
- Conference for Advancing Evidence-Based Learning (2023)
- Voluntarily consultation CATLR Senior Associate Director (2022)