DR. CHRISTIAN CAMMAROTA

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EDUCATION

PhD, Biological Physics **2023**
University of Rochester, New York, USA

Master of Arts, Physics **2019**
University of Rochester, New York, USA

Bachelor of Science, Physics – Summa Cum Laude **2017**
- Minor in Mathematics
Rochester Institute of Technology, New York, USA

RESEARCH EXPERIENCE

Postdoctoral Researcher – CASTLE at RIT **8/2023 – Present**
Rochester Institute of Technology, New York, USA
My research aims to understand the role computational and quantitative literacy play in STEM and specifically to study computational and quantitative education in the life sciences.

PhD student – Bergstralh Lab **8/2017 – 8/2023**
University of Rochester, New York, USA
Thesis title: Mechanical Factors Promote Epithelialization and Regulate Reintegration
My research addresses the role of physical properties and tissue scale forces in epithelial development and cell reintegration.

Research Assistant – Zwickl Lab **5/2017 – 8/2017**
Rochester Institute of Technology, New York, USA
I worked in a physics education research laboratory relating student perceptions of physics to a set of physics standards put forth by the American Association of Physics Teachers.

Senior Research Project – Pierce Lab **8/2016 – 5/2017**
Title: In-Situ X-Ray Photon Correlation Spectroscopy of Ag Nanocubes in Electrolyte on the Pt (111) Surface
I analyzed diffraction patterns and mobility of silver nanocubes on a platinum crystal to study catalysis and adsorption/desorption at various applied potentials.

Undergraduate Research Assistant – Pierce Lab **5/2016 – 8/2016**

I worked in a solid state physics laboratory running samples through an Auger Electron Spectrometer and through an x-ray diffractometer for various lab projects including building a vacuum deposition chamber.

Undergraduate Research Assistant – Das Lab **8/2015 – 1/2016**
I worked with a computational biological physicist modelling two populations of cells in 3D with varying physical parameters

AWARDS

CASTLE Recognition of Excellence Award – RIT 2024
Barnard Personal Fellowship – University of Rochester 2020
Awarded to one graduate student per department in the School of Arts, Science, and Engineering each year.
Department of Physics Tamor Fund Travel Award – University of Rochester 2019
Department of Biology Travel Award – University of Rochester 2019
Graduate Student Teaching Award – University of Rochester 2018
John Wiley Jones Award – RIT 2017
Awarded to one graduating physics student each year.
Outstanding Undergraduate Scholar – RIT 2017
Research Scholar – RIT 2017

TEACHING AND OUTREACH EXPERIENCE

Co-taught upper-level undergraduate Genetics **Fall 2024**
Rochester Institute of Technology, New York, USA
I co-taught a 50 student 300- level genetics course at RIT to both majors and nonmajors. I worked with my advisor Dr. Dina Newman to develop assessments and alter our lectures and in-class activities for our students. In addition to giving half of the lectures, we each took one 25 student recitation to work problem solving with our students.

Mentored Undergraduate STEM Education Researcher **Summer 2024**
Rochester Institute of Technology, New York, USA
I worked as a day-to-day advisor for an NSF REU student studying computational literacy in the life sciences. Our work culminated in the production of a computational activity to teach python to Genetics students over the course of one lecture.

Created and taught introductory image analysis course **Jan 2021**
University of Rochester, New York, USA
I taught a one credit undergraduate course in image analysis and quantitative measures in biology, to biology undergraduates during

the winter term. I created the lecture and coursework material as the sole instructor for the course.

Lab supervisor for undergraduate and high school students **2018-2023**
University of Rochester, New York, USA
I assisted in the teaching of undergraduates in lab techniques as well as critical thinking during the school year as well as summers. During summers I also help to introduce high school students to a collegiate lab environment through the upward bound program, and the Montgomery Blair Magnet program.

Graduate Teaching Assistant – Introductory Physics: Mechanics **2018**
University of Rochester, New York, USA
I was a graduate TA to first through fourth year undergraduates learning the physics surrounding Newtons laws and their rotational analogs. I operated as head TA and created assignments and helped created exams for students.

Graduate Teaching Assistant – Introductory Physics: Electricity and Magnetism 2017
University of Rochester, New York, USA
I was a graduate TA to first through fourth year undergraduates learning the physics of electric and magnetic fields as well as circuits and EM waves.

Undergraduate Teaching/Learning Assistant **2015 -2017**
Rochester Institute of Technology, New York, USA
I helped to teach other undergraduates' introductory physics as well as a major specific electronics laboratory where I revised one particularly difficult experiment using pedagogical methods.

Celebrate Science Day **2015**
Rochester Institute of Technology, New York, USA
I was involved in creating exhibits for the first Celebrate Science Day for RIT's College of Science during Homecoming weekend.

PUBLICATIONS AND PAPERS

13. **Cammarota C** et al. (2025) *Exploring Polygenic Inheritance with Computers.* In Review as CourseSource Lesson.

12. **Cammarota C** et al. (2025) *Social computational literacy in practice: a framework describing STEM researchers' communication.* In Review.

11. Foster M, **Cammarota C,** Dunham M, Zwickl B, Wong TE (2025) *A framework for assessing students' computational literacy: case studies in undergraduate mathematics.* In Review.

10. Foster M, Dunham M, **Cammarota C**, Verostek M, Zwickl B, Wong TE (2024) *Toward an Assessment of Students' (Social) Computational Literacy.* Proceedings of the 17th International Conference on Computer-Supported Collaborative Learning. 10.22318/cscl2024.398177 – **Conference Proceeding**

9. **Cammarota C** et al. (2024) *Automated Layer Analysis (ALAn): An Image Analysis Tool for the Unbiased Characterization of Mammalian Epithelial Architecture in Culture.* Bio-Protocol. 10.21769/BioProtoc.4971

8. Finegan TM, **Cammarota C**, Andrade OM, Garoutte AM, Bergstralh DT (2024) *Fas2[EB112]: a tale of two chromosomes.* G3 Genes|Genomes|Genetics. 10.1093/g3journal/jkae047

7. **Cammarota C** et al. (2024) *The mechanical influence of densification on epithelial architecture.* PLOS Computational Biology. 10.1371/journal.pcbi.1012001

6. Dawney NS* and **Cammarota C*** et al. (2023) *A novel tool for the unbiased characterization of epithelial monolayer development in culture.* Molecular Biology of the Cell. 10.1091/mbc.E22-04-0121

5. **Cammarota C*** and Finegan TM* et al. (2020) *An Axon-Pathfinding Mechanism Preserves Epithelial Tissue Integrity.* Current Biology. 10.1101/2020.04.29.068387.

4. **Cammarota C** and Bergstralh DT (2020) *Cell Division: Interkinetic Nuclear… Mechanics.* Current Biology. 10.1016/j.cub.2020.05.028. – **Dispatch**

3. Finegan, TM, Na, D., **Cammarota, C,…** and Bergstralh DT (2019) *Tissue tension and not interphase cell shape determines cell division orientation in the Drosophila follicular epithelium.* The EMBO Journal ***38,*** *336–18.*

2. Kawaguchi, T, Liu, Y, Reiter, A, **Cammarota, C**, Pierce, M, and You, H. (2018) *Direct determination of one-dimensional interphase structures using normalized crystal truncation rod analysis.* J. Appl. Cryst. 51, 679-684.

1. Leak, A, **Cammarota, C,** Cawley, N and Zwickl, B. (2018) *Examining students' perceptions of innovation and entrepreneurship in physics.* Presented at the Physics Education Research Conference 2017. 236-239. 10.1119/perc.2017.pr.054 – **Conference Proceeding**

* - Denotes Equal Contribution

CONFERENCES, SYMPOSIA, AND WORKSHOPS

American Society of Microbiology Conference for Undergraduate Educators

Pittsburgh Pennsylvania 2024
Poster Titled: Single-Lecture Modeling Activity to Introduce Students to Coding and Polygenic Inheritance
Society for the Advancement of Biology Education Research
Minneapolis, Minnesota 2024
Talk Titled: Interpreting Student Systematic Reasoning Processes with Pedigree Analysis
Society for the Advancement of Biology Education Research, East
Rochester, New York 2024
Shark Tank Talk Titled: Identifying Student Systematic Reasoning with Pedigree Analysis
Computational Literacy Across the Disciplines
Oslo, Norway 2024
Talks Titled: A Framework for Social Computational Literacy & Integrating Computational Modelling into Genetics Education
American Physical Society March Meeting
Las Vegas, Nevada 2023
Talk and Poster entitled: Mechanical Basis for Epithelialization
American Society of Cell Biology
Washington DC 2022
Poster entitled: Mechanical Basis for Epithelialization
Genetics Day 33rd Annual Scientific Symposium
Rochester, New York 2022
Poster entitled: Mechanical Basis for Epithelialization
American Physical Society March Meeting
Chicago, Illinois 2022
Talk and Poster entitled: Mechanical Basis for Epithelialization
American Society of Cell Biology
Virtual 2021
Poster entitled: Multinode Cell Model for Mechanical Regulation of Epithelialization
Society of Developmental Biology
Virtual 2021
Poster entitled: Multinode Cell Model for Mechanical Regulation of Epithelialization
Northeast Society of Developmental Biology Meeting
Virtual 2021
Poster entitled: Multinode Cell Model for Epithelial Polarity and Organization
American Society of Cell Biology
Virtual 2020
Poster entitled: Physical and Biological Basis for Cell Reintegration
Society of Developmental Biology
Virtual 2020
Poster entitled: Physical and Biological Basis for Cell Reintegration
Physics and Biology Confront Cell-Cell Adhesion
Aussois, France 2019

Talk and Poster entitled: Physical and Biological Basis for Cell Reintegration
Frontiers in Materials Science for the 21st Century Symposium
Rochester, New York 2019
Poster entitled: Evidence for a Conserved Adhesion Assembly in Proliferating Epithelia
Genetics Day 31st Annual Scientific Symposium
Rochester, New York 2019
Poster entitled: Evidence for a Conserved Adhesion Assembly in Proliferating Epithelia
Northeast Society of Developmental Biology Meeting
Woods Hole, Massachusetts 2019
Fast Track Talk, and Poster entitled: Epithelial Cell Reintegration: Stray Cells Find Their Way Home
Undergraduate Summer Research Symposium
Rochester, New York 2018
Poster entitled: Thin Film Formation and Measurement

MEMBERSHIPS

American Society of Microbiology (ASM) – Postdoctoral Member
Society for the Advancement of Biology Education Research (SABER) – Postdoctoral Member
American Physical Society DBIO/DSOFT – Former Member
Biophysical Society – Former member
American Society of Cell Biology – Former Member
Society of Developmental Biology – Former Member
Sigma Pi Sigma, Physics Honor Society – Rochester Institute of Technology Chapter
National Society of Collegiate Scholars

TECHNICAL SKILLS

Computational:

- Python – built a novel image analysis pipeline, a 2D cell-based model for epithelial development, and an educational activity
- Dedoose
- MATLAB
- FIJI (ImageJ)
- PRISM
- Adobe Illustrator

Spectroscopy / Imaging:

- Advanced Light Microscopy – Confocal live and fixed, Spinning Disc, Widefield
- Auger Electron Spectroscopy
- X-Ray Spectroscopy
- Wide and Small Angle X-Ray Scattering
- X-Ray Photon Correlation Spectroscopy

Cell culture:

- Maintain and Imaging MDCK cells.

Molecular Biology/Biochemistry:

- PCR.
- Bioinformatic sequence analysis.

***Drosophila* techniques:**

- Planning, designing, and performing genetic crosses.
- *Drosophila* dissections of ovaries.
- General *Drosophila* husbandry.

Machine Shop Training

Simple Electronics Training