# Rebecca McGillivary

*Curriculum Vitae*

## Education

**University of California, San Francisco** 2015 - 2021
Ph.D. in Cell Biology
Tetrad Graduate Program

**University of California, Los Angeles** 2011 - 2015
Molecular, Cell, and Developmental Biology, BS
Minor in Biomedical Research

## Research Experience

**Hartwell Postdoctoral Fellow** 2021 - Present
**University of California, Davis**
Department of Molecular and Cellular Biology
Advisors: Dr. Daniel Starr and Dr. GW Gant Luxton

- Utilized particle-tracking microrheology to discover that nesprin-2 maintains the mechanical properties of the cytoplasm in human airway smooth muscle cells
- Purified LINC complex proteins, developed mass photometry assays, and utilized differential scanning fluorimetry assays to study LINC complex assembly
- Identified LINC binding protein candidates using pooled yeast two hybrid screens
- Set up cell culture and biochemistry laboratory infrastructure as a part of a team

**Graduate Student** 2015 - 2021
**University of California, San Francisco**
Department of Biochemistry and Biophysics
Advisor: Dr. Wallace Marshall

- Identified the nuclear transport factor, CSE1, as the first molecular driver of the macronuclear shape change cycle during *Stentor coeruleus* regeneration
- Established *Stentor coeruleus* as a model organism for nuclear cell biology by developing multiple new methods to image and analyze the morphology of live *Stentor* nuclei during regeneration

**Industry Research Collaboration** 2017 – 2020
**University of California, San Francisco and IBM**

- Initiated collaboration with colleagues at IBM to develop a novel image analysis method
- Presented project at an NSF site visit for the Center for Cellular Construction
- Co-inventor on patent resulting from this project (Zimmerman et. al., 2020)

**Undergraduate Student Researcher** 2012 - 2015
**University of California, Los Angeles**
Department of Chemistry and Biochemistry
Advisor: Dr. Margot Quinlan

- Discovered metavinculin-mediated destabilization of actin filaments
- Performed actin binding, bundling, and severing experiments using differential centrifugation and total internal reflection fluorescence microscopy

## Publications

**McGillivary, R.M**., Starr, D.A., and Luxton, G.W.G. (2023). Building and breaking mechanical bridges between the nucleus and cytoskeleton: Regulation of LINC complex assembly and disassembly. Curr. Opin. Cell Biol. 85, 102260.

**McGillivary, R.M**., Sood, P., Hammar, K., and Marshall, W.F. (2023). The nuclear transport factor CSE1 drives macronuclear volume increase and macronuclear node coalescence in *Stentor coeruleus*. iScience, 107318.

Sood, P., Lin, A., Yan, C., **McGillivary, R.M**., Diaz, U., Makushok, T., Nadkarni, A.V., Tang, S.K.Y., and Marshall, W.F. (2022). Modular, cascade-like transcriptional program of regeneration in *Stentor*. Elife 11. 10.7554/eLife.80778.

Wan, K.Y., Hürlimann, S.K., Fenix, A.M., **McGillivary, R.M.,** Makushok, T., Burns, E., Sheung, J.Y., and Marshall, W.F. (2020). Reorganization of complex ciliary flows around regenerating *Stentor coeruleus*. Philos. Trans. R. Soc. Lond. B Biol. Sci. 375, 20190167.

Oztug Durer, Z.A., **McGillivary, R.M.,** Kang, H., Elam, W.A., Vizcarra, C.L., Hanein, D., De La Cruz, E.M., Reisler, E., and Quinlan, M.E. (2015). Metavinculin Tunes the Flexibility and the Architecture of Vinculin-Induced Bundles of Actin Filaments. J. Mol. Biol. 427, 2782–2798.

## Patents

Zimmerman, T.G., Bianco, S., **McGillivary, R.M**., Marshall, W.F. “Generating Three Dimensional Models of a Microscopic Subject from a Sequence of Images”
US Patent 10,810,759. Issued October 20, 2020.

## Funded Research Proposals

**Hartwell Biomedical Research Fellowship** 2023
Title: *TorsinA-mediated regulation of LINC complex assembly and cellular mechanics*
Funding source: Hartwell Foundation
Role: Postdoctoral Fellow
Award amount: $100,000

**Accepted Proposal for the Advanced Imaging Center at Janelia** 2020
Title: *Cellular Structure Dynamics During Single-Cell Regeneration in Stentor coeruleus*
Funding Source: Howard Hughes Medical Institute, Gordon and Betty Moore Foundation
Role: Visiting Scientist
*Visit scheduled for April 2020 was cancelled due to the COVID-19 pandemic*

**Accepted Proposal for the Advanced Imaging Center at Janelia** 2018
Title: *Imaging mitochondria in Stentor coeruleus.*
Funding Source: Howard Hughes Medical Institute, Gordon and Betty Moore Foundation
Role: Visiting Scientist

## Conference Presentations

**LINC complex assembly and its effects on cellular mechanics**
Oral Presentation: Allen Distinguished Investigators Cell Nucleus Meeting Boston, MA 2023

**Nuclear Shape and Positioning in the Giant Ciliate *Stentor coeruleus***
Oral Presentations:
- ASCB|EMBO Annual Meeting Washington DC 2019
- Cell Dynamics: Organelle-Cytoskeleton Interface Meeting Lisbon, Portugal 2019
- ASCB|EMBO Annual Meeting San Diego, CA 2018
- UCSF Tetrad Graduate Program Retreat Tahoe City, CA 2018
- Ciliate Molecular Biology Conference Washington DC 2018
- Nuclear Organization and Function Meeting Cold Spring Harbor, NY 2018

Poster Presentations:
- Santa Cruz Developmental Biology Meeting Santa Cruz, CA 2018
- Bay Area Cytoskeletal Meeting San Francisco, CA 2018

## Honors and Awards

- Hartwell Biomedical Research Fellowship 2023
- UCSF Tetrad Graduate Program Teaching Assistant Award 2017
- NSF Graduate Research Fellowships Program Honorable Mention 2017
- Dean's Prize, UCLA Molecular, Cell, and Developmental Biology Department 2015
- UCLA Molecular, Cell, and Developmental Biology Undergraduate Poster Award 2015
- Kivelson Summer Research Fellowship 2014
- Undergraduate Research Scholars Program at UCLA 2013-2014
- Amgen Scholars Program at UCLA 2013

## Teaching Experience

**Physiology Course Teaching Assistant** Summer 2018
Marine Biological Laboratory, Woods Hole, MA
- Proposed a project for a team of three students to study ciliary beat coordination during *Stentor coeruleus* regeneration. This project resulted in a publication (Wan et. al, 2020).
- Worked with students to form research questions, troubleshoot experiments, and create research presentations during an intensive 2-week portion of the course

**Macromolecules Course Teaching Assistant** Fall 2016
Tetrad Graduate Program, UCSF
- Proposed a lab-based project to study how the rate of *Stentor* and *Chlamydomonas* regeneration is affected by temperature
- Mentored a team of five first-year graduate students to work on this project and present their results in an oral presentation
- Wrote and graded problem sets, and organized review sessions about course material

## Mentored Students

**UC Davis undergraduate student** 2023 - present
Project: Expression and purification of human SUN proteins

**Rotation students, Biophysics Ph.D. program at UC Davis** Fall 2022
Project: Passive rheology in the nucleus and cytoplasm of U2OS cells

**SFSU Undergraduate Student and UCSF Junior Specialist** 2017- 2019
Project: Live imaging of *Stentor coeruleus* mitochondria during regeneration
Current Status: Ph.D. student at UC Davis

## Outreach Experience

**Microscopy Workshop Planning Committee Member** 2022 - 2023
UC Davis BMCDB Graduate Group + Advanced Imaging Center at Janelia
Workshop title: *2023 Imaging Workshop for Emerging California Scientists*

- Coordinated fundraising efforts among graduate students, faculty, and UC Davis Foundation and Corporate Engagement Office
- Secured a $1000 corporate donation to help fund workshop expenses
- Assisted with event logistics during the workshop

**Exploratorium Intern** 2018 - 2019
The Exploratorium, San Francisco CA
Project title: *Take your own Cell-fie*

- Developed and performed a live demonstration as part of the *Cells to Self* Exhibition
- Wrote an ImageJ macro to merge images of visitor's cheek cells with an image of their face to illustrate that we are each made of trillions of individual cells
- Demonstration was featured at the opening night of the Cells to Self Exhibition, an After Dark Event, and was regularly performed on the museum floor after my internship ended

**Volunteer at Science Festival Exhibits**
Marshall Lab at UCSF + NSF Center for Cellular Construction
Projects: Variety of outreach demonstrations featuring topics like regeneration, molecular self-assembly, cellular behavior, and DIY microscopy

- Bay Area Maker Faire San Mateo, CA 2016 - 2018
- Bay Area Science Festival San Francisco, CA 2018
- Nashville Mini Maker Faire Nashville, TN 2018
- Rogue Valley Mini Maker Faire Ashland, OR 2017
- East Bay Mini Maker Faire Oakland, CA 2017

**Art Science Undergraduate Society President and Founding Member** 2012-2014
University of California, Los Angeles

- Organized an art exhibition with work from our members at the California Nanosystems Institute and UCLA Art|Sci Center