TARA M. FINEGAN

tara.finegan@missouri.edu ⋄ https://tara-finegan.squarespace.com
Division of Biological Sciences, 117 Tucker Hall, 612 Hitt St, Columbia, MO, 65211-7400, USA
she/her ⋄ British and Irish National, US Green Card Holder

RESEARCH INTERESTS

The biophysical properties of animal tissues. Epithelial biology and mechanics. Observation, disruption and modeling of the 3D structure, shape and dynamics of tissues using advanced light microscopy, quantitative analysis, genetics, theory and simulations.

EDUCATION

Ph.D. in Developmental Mechanisms *2014-2018*
University of Cambridge, UK ; Jesus College
Department of Physiology, Development and Neuroscience
Wellcome Trust PhD Programme in Developmental Mechanisms
Thesis title: "The localisation and role of Sidekick in *Drosophila* epithelial morphogenesis."
Thesis advisor: Prof. Bénédicte Sanson

M.Phil. in Developmental Biology *2013-2014*
University of Cambridge, UK ; Clare Hall
Lab rotation training as part of the Wellcome Trust PhD Programme in Developmental Mechanisms

M.Phil. in Genetics (by Research) *2012-2013*
University of Cambridge, UK ; Clare Hall
Wellcome Trust and Cancer Research UK Gurdon Institute
Thesis title: "Expanding the *S. pombe* polarity network using a SILAC mass spectrometry approach"
Thesis advisor: Prof. Rafael Carazo Salas (now University of Bristol, UK)

M.A.(Cantab) in Natural Sciences *2009-2012*
University of Cambridge, UK ; Jesus College
Part II ("Major") in Genetics, Class I (Highest grade classification in the UK).

RESEARCH EXPERIENCE

Research Scientist from May 2023
University of Missouri, USA.

Joint lab with Prof. Dan Bergstralh in the Division of Biological Sciences.

Postdoctoral Research Associate October 2022 - April 2023
University of Rochester, USA. *with scientific partner Prof. Dan Bergstralh*

· Trans-disciplinary approaches to epithelial tissue remodelling.

Postdoctoral Research Associate December 2020 - September 2022
Syracuse University, USA. *Advisors: Profs. J.M. Schwarz, Jenny L. Ross & M. Lisa Manning*

· Theoretical investigation and *in silico* modelling of how the material and topological properties of cancerous tumors influence their metastatic potential. Part of NSF collaborative grant 2014192.
· Development and investigation of 2D and 3D vertex models of tissues.
· Development of molecular biology tools for the manipulation of the microtubule severing enzyme katanin.
· Establishment of epithelial cell culture in the Ross lab.

Postdoctoral Research Associate April 2018 - December 2020
University of Rochester, USA. *Advisors: Prof. Dan Bergstralh & Prof. Michael Welte*

· Study of conserved morphogenetic cell behaviours that shape tissues in the *Drosophila* model.
· Elucidation of how tissue-level forces influence cell geometry and cell division behavior in the developing *Drosophila* follicular epithelium via live image analysis and biophysical manipulations.
· Dissection of the molecular mechanism of "cell integration" into tissues through genetic analysis and quantitative image analysis.

PhD student September 2014 - March 2018
University of Cambridge, UK. *Advisor: Dr Bénédicte Sanson*

· Quantitative analysis of tissue deformation during embryonic development of *Drosophila*.
· Characterisation of the localisation of a novel vertex-specific protein in *Drosophila* tissues.
· Dissection of the relative contributions of cell-intrinsic and tissue-level cell-extrinsic factors in tissue remodeling.

MPhil Student September 2012 - September 2014
University of Cambridge, UK. *Multiple advisors*

· I obtained experience in multiple labs in the Genetics research community at Cambridge through short research projects (Advisors: Rafael Carazo Salas, Eric Miska, Michael Akam, Erik Clark, Bénédicte Sanson.)
· Practical experience gained in biochemistry, genetics, cell biology, microscopy, computational modeling.

Research Assistant Summer 2011 & 2012
MRC Laboratory of Molecular Biology, Cambridge, UK. *Prof. Roger Williams*

· Dissection of the biochemical structure of Phosphoinositide-3-kinases.

PUBLICATIONS

*denotes equal contribution

15. Cammarota, C., Dawney, N.S., Bellomio, P.M., Jüng, M., Fletcher, A.G., **Finegan, T.M.**, Bergstralh, D.T. (2024) The Mechanical Influence of Densification on Initial Epithelial Architecture. PLoS Computational Biology, *in press* 20(4): e1012001.

14. Cammarota, C., Bergstralh, D.T., **Finegan, T.M.** (2024) Automated Layer Analysis (ALAn): An Image Analysis Tool for the Unbiased Characterization of Mammalian Epithelial Architecture in Culture. Bio-protocol Journal *in press* https://doi.org/10.21769/BioProtoc.4971.

13. **Finegan, T.M.**, Cammarota, C., Mendoza Andrade, O., Garoutte, A., Bergstralh, D.T. (2024) Fas2[EB112]: A Tale of Two Chromosomes. G3: Genes, Genomes, Genetics, *in press* jkae047.

12. Schmidt, A., **Finegan, T.M.**, Häring, M., Kong, D., Fletcher, A.G., Alam, Z., Grosshans, J., Wolf, F., Peifer, M. (2023) Polychaetoid/ZO-1 strengthens cell junctions under tension while localizing differently than core adherens junction proteins. Molecular Biology of the Cell, Special issue on Forces On and Within Cells, 34(8):ar81.

11. Lindsay, K.A., Abdelhamid, N., Kahawatte, S., Dima, R.I., Sackett, D.L., **Finegan, T.M.**, Ross, J.L. (2023) A Tale of 12 Tails: Katanin Severing Activity Affected by Carboxy-Terminal Tail Sequences. Biomolecules, 13(4):620.

10. Dawney, N.S., Cammarota, C., Jia, Q., Shipley, A., Glichowski, J.A., Vasandani, M., **Finegan, T.M.***, Bergstralh, D.T.* (2023) An unbiased characterization of epithelial monolayer development in culture. Molecular Biology of the Cell, 34(4):ar25.

9. Neville, K.E.*, **Finegan, T.M.***, Lowe, N., Bellomio, P.M., Na, D., Bergstralh, D.T. (2023) The spindle orienting machinery requires activation, not just localization. EMBO Reports, 24(3):e56074.

8. Perez-Vale, K.Z., Yow K.D., Johnson R., Byrnes, A., **Finegan T.M.**, Slep, K.C., and Peifer M. (2021) Multivalent interactions make adherens junction-cytoskeletal linkage robust during morphogenesis. Journal of Cell Biology, 220(12):e202104087.

7. **Finegan T.M.**, and Bergstralh, D.T. (2020) Gametogenesis: germ cells aren't just along for the ride. Current Biology, 30(18) PR1324-R1327. *Dispatch article.*

6. Cammarota, C.*, **Finegan T.M.***, Wilson, T.J., Yang, S., Bergstralh, D.T. (2020) An Axon-Pathfinding Mechanism Preserves Epithelial Tissue Integrity. Current Biology, 30(24) 5049-5057.

5. **Finegan T.M.** and Bergstralh, D.T. (2020) Neuronal IgCAMs in epithelial morphogenesis: insights from Drosophila. Philosophical Transactions of the Royal Society London B, 375(1809):20190553. *Invited Review in 'Contemporary morphogenesis' theme issue.*

4. **Finegan T.M.***, Hervieux, N.*, Nestor-Bergmann, A., Fletcher, A.G., Blanchard, G.B., Sanson, B. (2019) The tricellular vertex-specific adhesion molecule Sidekick facilitates polarised cell intercalation during Drosophila axis extension. PLoS Biology 17(12): e3000522.

3. **Finegan T.M.** and Bergstralh, D.T. (2019) Division orientation: disentangling shape and mechanical forces. Cell Cycle. 18(11):1187-1198. *Invited Review.*

2. **Finegan T.M.**, Na, D., Cammarota, C., Skeeters, A.V., Nádasi, T.J., Dawney, N.S., Fletcher, A.G., Oakes, P.W., Bergstralh, D.T. (2018) Tissue tension and not interphase cell shape determines cell division orientation in the Drosophila follicular epithelium. The EMBO Journal 38(3): e100072. Cover article. *Article highlighted by News and Views Articles: 1) Scepanovic G. and Fernandez-Gonzalez R. (2018) Developmental Cell 47(6), 686-687. & 2) Manning L.A. and Peifer M. The EMBO Journal.*

1. Burke, J.E., Vadas, O., Berndt, A., **Finegan T.**, Perisic, O., Williams, R.L. (2011) Dynamics of the phosphoinositide 3-kinase p110δ interaction with p85α and membranes reveals aspects of regulation distinct from p110α. Structure 19(8):1127-37.

AWARDS

2017	Best Poster Prize at Physics of Living Matter 12 Symposium, Cambridge UK.
2017	BSDB / Company of Biologists Travel Award to attend SDB Conference, Minneapolis, MN, USA.
2015	Jesus College Doctoral Research Fund Prize to attend EMBO Course.
2014	Genetics Society Training Grant to attend EMBO Course.
2014	BSDB/Company of Biologists Travel Award to attend EMBO Course.
2014	BSDB/Company of Biologists Travel Award to attend BSDB/BSCB Research Conference.
2013	**Wellcome Trust / University of Cambridge PhD Studentship and Research Grant (approx. £120,000 value)**.
2013	Genetics Society Student Travel Grant to attend BSDB/BSCB Research Conference.
2012	Clare Hall Academic Bursary (£5,000 value) to fund Master's Research.
2012	Jesus College Scholarship for First Class examination results.
2011	Sir Robbie Jennings Travel Scholarship (Jesus College) to attend AAAS Conference.
2010/11	MRC Undergraduate Studentships for summer research at MRC LMB.

TALKS

Sept 2023	Department of Pathology and Laboratory Medicine, Univeristy of North Carolina at Chapel Hill, NC. "Beyond Two Dimensions: Exploring Epithelial Monolayers in Depth" *Invited Seminar.*
Jan 2023	Division of Biological Sciences, University of Missouri. Columbia, MO. "Getting into shape." *Department Seminar.*
Nov 2022	Developmental Mechanics Seminar Series. International, virtual. "The spindle orienting machinery requires activation, not just localization." *Contributed Talk.*
Oct 2022	UpState New York Soft Matter Workshop. Rochester, NY, USA."Getting into shape." *Contributed Short Talk*
July 2022	Department of Biology. Rochester, NY, USA."Getting into shape." *Invited seminar.*
March 2022	APS March Meeting, Chicago, USA. Virtually Attended. "Brittle-to-ductile cell escape from a two-dimensional spheroid." *Contributed Talk.*
Nov 2020	University of Rochester Medical Center, Department of Biomedical Genetics, Rochester, NY, USA. "Epithelial Cell Reintegration: a morphogenetic event with biomedical implications" *Invited Seminar.*
April 2018	Northeast Society for Developmental Biology Regional Meeting, Marine Biological Laboratory, Woods Hole, USA. "Interphase Cell Shape Does Not Predict Division Orientation in a *Drosophila* Epithelium". *Contributed Short Talk.*
March 2018	Department of Physiology, Development and Neuroscience, University of Cambridge, UK. "The localisation and role of Sidekick in Drosophila epithelial morphogenesis." *Graduate Defense Research Seminar.*
Feb 2018	Department of Biology, University of Rochester, USA. "A Sidekick at corners helps cells rearrange during epithelial morphogenesis." *Invited Seminar.*
July 2017	Society for Developmental Biology 76th Annual Meeting, Minneapolis, MN, USA. "Epithelial apical vertices are important for morphogenesis." *Contributed Talk.*
July 2017	Department of Physiology, Development and Neuroscience Annual Symposium, University of Cambridge, UK. "Epithelial apical vertices are important for morphogenesis."
June 2013	EMBO International Conference on Fission Yeast. London, UK. "Expanding the S. pombe cell polarity network using a SILAC mass spectrometry approach." *Contributed Short Talk.*

POSTER PRESENTATIONS

March 2024	The Allied Genetics Meeting, Washington D.C., USA. **Finegan, T.M.**, Cammarota, C., Bergstralh, D.T. "An Immunoglobulin cell adhesion junction module maintains epithelial integrity"
Dec 2023	American Society for Cell Biology Cell Bio Annual Meeting, Boston, USA. **Finegan, T.M.**, Cammarota, C., Bergstralh, D.T. "An Immunoglobulin cell adhesion junction module maintains epithelial integrity"
Dec 2023	American Society for Cell Biology Cell Bio Annual Meeting, Boston, USA. **Finegan, T.M.**, Deem, K., Tan, R., Wang, X., Weeks, N., Lowe, N., Bergstralh, D.T. "Slogging through Mud: meiotic isoforms and their function"
June 2023	Cell Contact and Adhesion, Gordon Research Conference, Colby-Sawyer College, NH, USA. **Finegan, T.M.**, Cammarota, C., Bergstralh, D.T . "An Immunoglobulin cell adhesion junction module maintains epithelial integrity"

March 2023	64th Annual *Drosophila* Research Conference, Chicago, USA. **Finegan, T.M.**, Cammarota, C., Bergstralh, D.T . "An Immunoglobulin cell adhesion junction module maintains epithelial integrity"
Dec 2022	American Society for Cell Biology Cell Bio Annual Meeting, Washington D.C., USA. **Finegan, T.M.**, Lindsay, K.A., Primeau, K., Abdelhamid, N., Sackett, D.L., Ross, J.L. "Regulating Microtubule Severing by Katanin Physically and Chemically"
Dec 2022	American Society for Cell Biology Cell Bio Annual Meeting, Washington D.C. **Finegan, T.M.**, Neville, K.E., Lowe, N., Bellomio, P.M., Na, D., Bergstralh, D.T. "The spindle orienting machinery requires activation, not just localization"
July 2020	Society for Developmental Biology 79th Annual Meeting, Online. **Finegan T.M.**, Miller, J., Wilson, T.J., Cammarota, C., Bergstralh, D.T. "Cell reintegration: Cell reintegration failure: A novel model for tumorigenesis."
July 2018	Society for Developmental Biology 77th Annual Meeting, Portland, OR, USA. **Finegan T.M.**, Na, D., Skeeters A.V., Dawney N.S., Fletcher A.G., Oakes P.W., Bergstralh, D.T. "Interphase Cell Shape Does Not Predict Division Orientation in a Drosophila Epithelium."
April 2018	59th Annual *Drosophila* Research Conference, Philadelphia, PA, USA. **Finegan T.M.**, Na, D., Skeeters A.V., Dawney N.S., Fletcher A.G., Oakes P.W., Bergstralh, D.T. "Spindle Orientation Drives Tissue Regularity in an Elongating Epithelium."
Sept 2017	European Drosophila Research Conference, London UK. **Finegan T.M.**, Hervieux, N., Fletcher, A.G., Blanchard, G.B. and Sanson, B. "Epithelial apical vertices are important for morphogenesis."
Sept 2017	Physics of Living Matter Symposium 12th Edition, University of Cambridge, UK. September 2017. **Finegan T.M.**, Hervieux, N., Fletcher, A.G., Blanchard, G.B. and Sanson, B. "Epithelial apical vertices are important for morphogenesis." ***won prize for best poster**
July 2017	Society for Developmental Biology 76th Annual Meeting, Minneapolis, MN, USA. Dawney, N., **Finegan T.M.**, and Bergstralh, D.T. "Breaking Hertwig's Rule in the Follicular Epithelium."
April 2016	Department of Physiology, Development and Neuroscience Annual Symposium, University of Cambridge. **Finegan T.M.**, and Sanson, B. "Investigation into the role of cell vertices in epithelial morphogenesis."
April 2015	EMBO Practical Course in Optical Microscopy, Plymouth, UK. **Finegan T.M.** and Sanson, B. "Investigating the role of cell vertices in epithelial morphogenesis."
June 2012	Research in Genetics Day, Department of Genetics and Gurdon Institute Retreat, University of Cambridge. **Finegan T.M.** and Carazo Salas, R.E. "A SILAC mass spectrometry approach to investigate polarity factor interactions."

MENTEES

- Hatty Cooper, undergraduate researcher University of Cambridge. Went on to medical school at the University of London.
- Susie McLaren, graduate rotation student, PhD in Developmental Mechanisms University of Cambridge. Now a postdoc at the University of Cambridge.
- Barlin Wado, high school student, Rochester NY. Refugee from Ethiopia. Went on to undergraduate studies at St Lawrence University, NY.
- Shruti Chauhan, high school student, Montgomery Blair High School Magnet, MD. Went on to undergraduate studies at the University of Maryland.

- Jon Rosales, undergraduate researcher, University of Rochester. First generation college student, LatinX. Now a Microbiology Lab Technician at iuvo BioScience, NY.
- John Miller, graduate rotation student. Went on to join the PhD program in Microbiology & Immunology at the University of Rochester Medical School.
- Christina Wang, undergraduate researcher, junior at the University of Rochester.
- Sreejato Chatterjee, undergraduate researcher, junior at the University of Rochester.
- Teresa Cajina, undergraduate researcher, University of Rochester. First generation college student, LatinX.
- Christian Cammarota, PhD student University of Rochester. Now a STEM Education Research Postdoc at RIT.
- Ashley Ciezadlo, summer undergraduate researcher, junior at the University of Missouri.
- Ashley Clark, Capstone project undergraduate researcher, senior at the University of Missouri.
- Audrey Garoutte, Capstone project undergraduate researcher, senior at the University of Missouri.

TEACHING AND OUTREACH EXPERIENCE

2023-24	**Faculty facilitator** Division of Biological Sciences Seminar Series Journal Club Course (BioSc 8087), University of Missouri.
From Feb 2024	**Board of Advisors** International Research Olympiad.
From Sept 2023	**Skype a Scientist** Paired with 10th-12th grade class from Illinois Mathematics and Science Academy, Aurora Illinois.
Summer 2022	**Teacher, STEM workshop day at Syracuse University Physics Department.** Helped to design, coordinate and lead a day-long outreach event for local middle-school students from the City of Syracuse's Police Athletic League (PAL).
2022	**Guest Lecturer, California State University Long Beach, USA.** Invited guest lecturer, Advanced Physics.
2022	**Guest Lecturer, Syracuse Univeristy, USA.** Invited guest lecturer, PHY315 'Biological and Medical Physics'.
2018 - 2022	**Guest Lecturer, University of Rochester, USA.** Invited guest lecturer in the 'BIO220: Advanced Cell Biology'.
Summer 2020	**Teacher, Morphogenesis short course, Upward Bound Program, University of Rochester, USA.** Together with a postdoc colleague from the Bergstralh lab, I generated a short video-based course on morphogenesis for the 'Upward Bound' outreach program for under-privileged high-school students(moved online due to pandemic).
2013-2015	**Undergraduate Teaching Supervisor and Lab Demonstrator. University of Cambridge, UK.** I worked as an academic supervisor for second year undergraduate students, running tutorials for groups of 1-4 students. This involved clarifying teaching material, setting problems, developing my own teaching materials and promoting group discussions. I also served as a teaching instructor during practical courses in genetics and microscopy for 'Part IB Cell and Developmental Biology'.

SERVICE

since 2019	**Peer Reviewer.** I have reviewed papers for 'Biophysical Journal', 'Current Biology', 'Cell Cycle', and 'American Journal of Physiology-Regulatory, Integrative and Comparative Physiology'.
2023	**Co-chair** for Minisymposium 'Communal Cell' at ASCB/EMBO Cell Bio 2023 Meeting, Boston, USA. Chaired Morphogenesis session with Prof. Celeste Nelson.
2023	**Poster Judge.** Undergraduate Research Symposium, University of Missouri, USA.
2023	**Panelist** for Cell Contact and Adhesion Gordon Research Seminar 'What's my PhD Worth? Career Opportunities After Your PhD/Postdoc'. Invited by GRS organizers.
2023	**Poster Judge.** Cell biology: Cytoskeleton, organelles and trafficking session at Dros23 conference, Chicago, USA.
Nov 2022	**Panelist, First-Generation Networking and Research Night.** Kearns Center for Leadership and Diversity. University of Rochester, USA.
2020	**Biology Department Pandemic Reopening Committee** I served as a postdoctoral representative on the departmental committee overseeing the safe reopening of the department following the pandemic lockdown. University of Rochester, USA.
2018	**PDN Departmental Symposium Committee Member.** I served on the organizational committee to run the annual Departmental research symposium. University of Cambridge, UK.
2009-2015	**Executive Committee Member, Events Coordinator and Peer Reviewer for The Triple Helix Student Society.** My broad interest in science and its application to society and policy, is demonstrated by my involvement in the Cambridge University chapter of 'The Triple Helix' international science society which publishes a termly online journal. I served on the executive committee as Events coordinator, communications officer and 2 terms as vice president. I organised several successful panel debate events. University of Cambridge, UK.

CAREER DISRUPTIONS

- Parental leave: February–October 2019 & May–September 2021.
- Caring responsibilities for partner seriously injured in a road traffic collision: August-December 2019.
- Full-time childcare responsibilities due to the global pandemic: March–August 2020.
- Thyroid cancer diagnosis and treatment: August-November 2021.

TECHNICAL STRENGTHS

Computing Languages	Python, R, MatLab, LaTeX.
Experimental	Confocal, multi-photon & super resolution microscopy, Live tissue imaging, Laser ablation, FRAP, Model organism genetics, Cell culture, Molecular Biology, Quantitative Analysis.