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Dr Lara C. Busby

I am currently an EMBO Postdoctoral Fellow in Developmental Biology at the University of California, Berkeley. The broad goal of my research is to understand how cell state transitions are coordinated in space and time through the integration of cell-intrinsic and extrinsic cues. To achieve this, I use modern molecular approaches in combination with classical experimental embryology manipulations to challenge cells with new environmental contexts.

EDUCATION & RESEARCH POSITIONS

Aug. 2023 – Present | Postdoctoral Researcher | Martik Lab | University of California, Berkeley (CA, USA)

- My current research focuses on understanding how gene regulatory networks driving ectomesenchymal differentiation have evolved across the vertebrate phylum, with a particular focus on the *Twist1* gene.
- Experimental techniques: molecular cloning, enhancer reporter assays, single cell RNA-sequencing and multiomic profiling, interspecies scRNA-seq integration, lamprey transgenesis, cryo and paraffin sectioning, CRISPR gene editing in chicken, lamprey and frog, *in situ* hybridization, chicken *in ovo* electroporation.

March – July 2023 | Postdoctoral Researcher | Steventon Lab | University of Cambridge (UK)

- This short postdoc position was spent preparing my PhD work for publication.

Oct. 2018 – Feb. 2023 | PhD Biological Sciences (BBSRC DTP) | Steventon Lab | University of Cambridge (UK)

- My PhD project 'Axial progenitor cells, Hox genes and time' was supervised by Dr Benjamin Steventon (Department of Genetics), submitted in March 2023, and successfully defended in April 2023.
- My project focused on understanding how axial progenitor cell behaviour is coordinated over time with the elongation of the vertebrate body axis.
- I completed a rotation project entitled 'Investigating axial progenitor cell diversity in amphioxus with multiplexed gene expression analyses' supervised by Dr Elia Benito-Guiterrez (2018, Department of Zoology) in which I applied Hybridization Chain Reaction (HCR) staining to amphioxus embryos for the first time.
- Experimental techniques: *ex ovo* chicken embryo culture, grafting, explant culture, electroporation, single cell RNA-sequencing (sample preparation and computational analysis), hybridization chain reaction (HCR), confocal imaging, RT-qPCR.

Sept. 2017 – Sept. 2018 | Research Assistant | Towers Lab | University of Sheffield (UK)

- I conducted an independent research project on the development of wing flight feathers in avian embryos, leading to a first-author paper published in 2020. I was additionally responsible for day-to-day maintenance of the laboratory, including ordering and organization of communal resources.
- Experimental techniques: RT-qPCR, bulk RNA-sequencing, in situ hybridization, paraffin sectioning, limb polarizing region grafts.

Oct. 2014 – July 2017 | B.A. Natural Sciences, Class I | University of Cambridge (UK)

- Final year modules: Chromosomes and the Cell Cycle (72%), Plant and Microbial Genetics (68%), Developmental Genetics (80%), Evolutionary Genetics (71%), and Human Genomics and Systems Biology (70%).
- My undergraduate research project 'Microtubules, Shot and Patronin in Oocyte Determination' (supervised by Prof. Daniel St Johnston) was awarded a mark of 80%.

PUBLICATIONS

1. Busby, Patrick, Lyons, Bergman and Martik (2025). Ectomesenchymal identity emerges via relief of *Twist1* transcript destabilization. *BioRxiv Preprint, currently under review at Nature Communications.*

2. Takahashi, Neaverson, Busby, Twarowski, Camacho-Macorra, Serrano Najera and Steventon (2025). Reciprocal interactions between EMT and BMP signalling drive collective cell invasion. *BioRxiv preprint*.

3. Busby, Serrano Najera and Steventon (2024). Intrinsic and extrinsic cues time somite progenitor contribution to the vertebrate primary body axis. *eLife* 13:e90499.

4. Busby, Saunders, Serrano Najera and Steventon (2022). Quantitative Experimental Embryology: A Modern Classical Approach (Review). *Journal of Developmental Biology* 10(44).

5. Nashchekin, Busby, Jakobs, Squires and St Johnston (2021). Symmetry breaking in the female germline cyst. *Science* 374(6569), 874-879.

6. Steventon, Busby, and Martinez Arias (2021). Establishment of the vertebrate body plan: Rethinking gastrulation through stem cell models of early embryogenesis (Review). *Developmental Cell* 56(17), 2405-2418.

7. Busby and Steventon (2020). Tissue tectonics and the multi-scale regulation of developmental timing (Review). *Royal Society's Focus Interface: 'Dynamics in Biology'*.

8. Andrews, Gattoni, Busby, Schwimmer and Benito-Gutierrez (2020). Hybridisation chain reaction for quantitative and multiplex imaging of gene expression in amphioxus embryos and adult tissues. Chapter in '*In Situ Hybridization Protocols, Fifth Edition*' (Springer Protocols).

9. Busby, McQueen, Aceituno, Rich, Ros and Towers (2020). Sonic Hedgehog specifies flight feather positional information in avian wings. *Development* 147, dev188821.

ADDITIONAL RELEVANT TRAINING

June 2025 | **Laboratory Leadership for Postdocs** | EMBO Solutions

April 2024 | **Advanced Training Course: Cell & Developmental Biology of Xenopus** | Cold Springs Harbor Laboratory (NY, USA)

January 2024 | **Training Course: Introduction to Geometric Morphometrics** | Transmitting Science

May – July 2022 | **Advanced Training Course: Embryology** | Marine Biological Laboratory (Woods Hole, MA, USA)

August 2019 | **Venice Evo-Devo Summer School: Mechanism in Development and Evolution** | Venice, Italy

FUNDING, SCHOLARSHIPS AND AWARDS

September 2025	Talk Award (UC Berkeley MCB Department Retreat)
April 2024	Image Competition Award (Cold Springs Harbor *Xenopus* Course)
December 2023	EMBO Postdoctoral Fellowship (2 years)
July 2022	Dennis Summerbell Award (British Society of Developmental Biology)
May 2022	Society of General Physiologists' (SGP) Scholar at Marine Biological Laboratory (MBL) Award
May 2022	Max Burger Endowed Scholar for Embryology (MBL Scholarship)
May 2022	British Society of Developmental Biology Travel Grant Awardee
May 2022	Sammy Lee Memorial Medal (Young Embryologist Network Meeting)
December 2019	Poster Prize at Department of Genetics 'Research in Genetics Day'
July 2019	1st Poster Prize at International Limb Development and Regeneration Conference
October 2018	BBSRC DTP Scholarship (University of Cambridge)
July 2017	Carter Prize for Part II Examination Results (Corpus Christi College, University of Cambridge)
July 2016	Intermediate Exhibition for Part IB Examination Results (Corpus Christi College, University of Cambridge)

PRESENTATIONS

September 2025	MCB Department Retreat (UC Berkeley) | Short Talk
June 2025	International Congress for Developmental Biology | Short Talk
May 2025	Postdoctoral Research Showcase (UC Berkeley) | Short Talk
April 2025	Neural Crest & Cranial Placodes Gordon Research Seminar | Short Talk
March 2025	Centre for Theoretical and Evolutionary Genomics (Berkeley) | Seminar
October 2024	Stowers Research Conference: Developmental Cell Biology | Short Talk
July 2024	European Evolutionary Developmental Biology Meeting | Poster Presentation
April 2023	British Society of Developmental Biology Spring Meeting | Poster Presentation
September 2022	Lewis Wolpert Memorial Symposium | Dennis Summerbell Award Lecture
June 2022	European Evolutionary Developmental Biology Meeting | Poster Presentation
May 2022	Young Embryologist Network (YEN) Annual Meeting | Selected Talk | Awarded Prize
April 2022	British Society of Developmental Biology Annual Meeting | Poster Presentation
October 2021	Department of Genetics (University of Cambridge) | Departmental Seminar
September 2021	UK Chick Developmental Biology Meeting | Short Talk
July 2019	International Limb Development and Regeneration Conference | Poster Presentation

TEACHING AND MENTORING

Nov. 2023 – Present | Mentor to Undergraduate Students | Martik Lab, UC Berkeley

- I have mentored four undergraduate students in the lab, including one Honors Thesis student, as well as one PhD rotation student.

Oct. 2020 – May 2023 | Undergraduate Supervisor (small group teaching) | University of Cambridge

- Across the three years, I independently taught more than 300 hours of small group teaching (2-3 students) for the courses *Cell and Developmental Biology* (2nd year) and *Biology of the Cell* (1st year).

June 2019 – May 2023 | Practical Demonstrator for Undergraduate Laboratory Classes | University of Cambridge

- I taught ~300 first-year students' practical techniques and theory in four different practical classes focused on embryology, microscopy, genetics, and cell division.

SERVICE & ACTIVITIES

June 2025 | Co-chair | Hilde Mangold Postdoctoral Symposium (SDB Meeting, Puerto Rico)

- I selected talks from abstracts and chaired the symposium session.

May 2021 – Feb. 2023 | Postgraduate Representative | British Society of Developmental Biology (BSDB) Committee

- I was heavily involved in the organization of the BSDB's annual conference (approximately 400-500 delegates attend each year), and more generally represented the needs and interests of all postgraduate student members to the rest of the Committee.

October – December 2020 | BBSRC PhD Internship | Vivid Biology Scientific Illustrating Company

- I worked on client projects including animations, scientific figures, and artwork. In addition, I conceived and produced a whiteboard animation 'Cutting and sticking: a brief history of experimental embryology'.

January – December 2020 | Female Welfare Officer | Corpus Christi MCR Committee

- I organized weekly welfare events for the MCR (Middle Common Room, graduate student governance body) community including a 'Women in Academia' initiative. I also arranged substantial support for students in quarantine during COVID-19.