Emily Kolenbrander Ho

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EDUCATION

2014-2020 **Ph.D**., Developmental Biology, Stanford University, Stanford, CA

2010-2014 **B.A**., Biology, Carleton College, Northfield, MN
Biochemistry Concentration, *Summa Cum Laude*

ACADEMIC POSITIONS

2025-present **Assistant Professor** of Integrated Sciences: Developmental Biology
Kravis Department of Integrated Sciences, Claremont McKenna College, Claremont, CA

2021-2025 **Postdoctoral Fellow,** Molecular Biology, Princeton University, Princeton, NJ

2020-2021 **Visiting Assistant Professor,** Biology, Carleton College, Northfield, MN

2019 **Adjunct Lecturer,** Biological Sciences, San José State University, San José, CA

RESEARCH TRAINING

2021-2025 **Postdoctoral Fellow**, Laboratory of Jared Toettcher, Ph.D.
Molecular Biology, Princeton University, Princeton, NJ
Project: Optogenetic dissection of ERK signal interpretation in early embryogenesis

2015-2020 **Ph.D. Candidate**, Laboratory of Tim Stearns, Ph.D.
Biology, Stanford University, Stanford, CA
Thesis: Spatial and temporal constraints imposed on the Hedgehog pathway by the primary cilium

2012-2014 **Undergraduate Research Assistant,** Laboratory of Jennifer Wolff, Ph.D.
Biology, Carleton College, Northfield, MN
Project: RNAi screen for regulators of sex-specific ventral nerve cord development in *C. elegans*

2011-2012 **Undergraduate Summer Research Assistant,** Laboratory of Peter Dedon, Ph.D.
Biological Engineering, Massachusetts Institute of Technology, Cambridge, MA
Project: Effect of phosphorothioate DNA modifications and the physiological inflammatory response on the evolution of bacterial antibiotic resistance

FELLOWSHIPS

2023-present National Institutes of Health F32 Postdoctoral Fellowship 1F32GM148016

2018-2020 National Institutes of Health F31 Predoctoral Fellowship 1F31GM129950

2014-2017 Lucille P. Markey Basic Biomedical Research Stanford Graduate Fellowship

PUBLICATIONS

Ho, E.K., Kim-Yip, R.P., Simpkins, A. G., Farahani, P.E., Oatman, H.R., Posfai E, Shvartsman, S.Y., and Toettcher, J.E. (2025). *In vivo* measurements of receptor tyrosine kinase activity reveal feedback regulation of a developmental gradient. Cell Reports. *44(7),* 115930.
*Selected for cover image

Ho, E.K., Oatman, H.R., McFann, S.E., Yang, L., Johnson, H.E., Shvartsman, S.Y., and Toettcher, J.E. (2023). Dynamics of an incoherent feedforward loop drive ERK-dependent pattern formation in the early *Drosophila* embryo. Development. *150*, dev.201818.

Ho, E.K. and Stearns, T. (2021). Hedgehog signaling and the primary cilium: implications for spatial and temporal constraints on signaling. Development. *148,* dev195552.

Ho, E.K., Tsai, A.E.*, and Stearns, T. (2020). Transient primary cilia mediate robust Hedgehog pathway-dependent cell cycle control. Current Biology. *30*, 2829–2835.e5.
*Undergraduate student researcher

Kalis, A.K., Kissiov, D.U., **Kolenbrander, E.S.,** Palchick, Z., Raghavan, S., Tetreault, B.J., Williams, E., Loer, C.M., and Wolff, J.R. (2014). Patterning of sexually dimorphic neurogenesis in the *Caenorhabditis elegans* ventral cord by Hox and TALE homeodomain transcription factors. Developmental Dynamics *243,* 159-167.

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COURSES TAUGHT

Assistant Professor, Claremont McKenna College

Fall 2025 **Codes of Life (SCI 10)**

Visiting Assistant Professor, Carleton College

2021 **Genetics and Genetics Laboratory (BIOL 240 and 241)**
A mid-level biology course covering the transmission and expression of genetic information. The associated laboratory focused on genetic engineering in *C. elegans*, directly contributing to ongoing research in the biology department. Taught in winter and spring terms.

2020 **Seminar: Selected Topics in Developmental Biology (BIOL 356)**
Designed and taught an upper-level seminar with 9 junior and senior biology majors, focused on critical analysis of primary literature in the field of developmental cell biology.

Genes, Development, and Evolution, A Problem-Solving Approach (BIOL 125)
An introductory biology course designed for both majors and non-majors, exploring the flow of genetic information in biological systems. This course includes a significant problem-solving component designed to level the playing field for students regardless of their previous scientific experience. Co-taught with D. Walser-Kuntz.

Adjunct Lecturer, San José State University

2019 **Principles of Developmental Biology (BIOL 105)**
Instructor of record for course of 58 students including undergraduate majors and graduate students, exploring the principles of developmental biology in animals, with a focus on mammalian development and model systems

Graduate Instructor, Stanford University

2018 **The Cell's Antenna: Cilia in Evolution, Development and Human Health (BIOS 273)**
Designed and taught a new graduate course for 30 students exploring the structure, function, and disease relevance of the primary cilium. Co-taught with J. Wang, M. Stratton, and M. Mirvis.

AWARDS

2019 FASEB Biology of Cilia and Flagella Best Graduate Student Talk, Second Place
2015 National Science Foundation Graduate Research Fellowship Program Honorable Mention
2014 Council for Undergraduate Research Posters on the Hill Winner
2011-2013 Carleton College Dean's List

CONFERENCE TALKS AND INVITED SEMINARS

2025 West Coast Society for Developmental Biology Meeting

2024 Santa Cruz Developmental Biology Meeting
pYtags enable robust measurements of endogenous receptor tyrosine kinase activity in developing tissues

2023 Dynamics of Cells and Embryos Conference, Flatiron Institute
Cell fate control by dynamic signaling

2023 Fairleigh Dickinson University, Biology Seminar
Shining light on ERK signaling in the early Drosophila embryo
**Primarily undergraduate audience*

2023 Mid-Atlantic Society for Developmental Biology Regional Meeting
Dynamics of an incoherent feedforward loop drive ERK-dependent pattern formation in the early Drosophila embryo

2019 FASEB Biology of Cilia and Flagella
Transient primary cilia mediate robust Hedgehog pathway-dependent cell cycle control

POSTER PRESENTATIONS

2023 Society for Developmental Biology Annual Meeting
Selected for oral "Poster Teaser" presentation
2019 FASEB Biology of Cilia and Flagella
2016 American Society for Cell Biology Annual Meeting
2016 Society for Developmental Biology Annual Meeting
2014 Council for Undergraduate Research, Posters on the Hill
2013 International *C. elegans* Meeting

UNDERGRADUATE MENTORSHIP

2022-2025 **Alison Araten, Princeton University**
Senior Thesis: The Regulatory Logic of a Dose-Dependent Fate Decision: How a Low-Amplitude Erk Input Patterns Abd-B Expression to Produce *Drosophila* Tail Structures
Sigma Xi Award for Outstanding Thesis Research
Current: Clinical Research Coordinator, Massachusetts General Hospital

2018-2020 **Anaïs Tsai, Stanford University**
Funding: Stanford Bio-X
Current: MIT Ph.D. candidate, HHMI Gilliam Fellow

2016-2017 **Ulises Diaz, Stanford University**
Funding: Howard Hughes Medical Institute Exceptional Research Opportunities Program
Current: UCSF Ph.D. candidate, HHMI Gilliam Fellow

ADDITIONAL TEACHING EXPERIENCE

2017-2019 **Instructor, Stanford SPLASH High School Enrichment Program,** Stanford University

There's a Flamingo in my Genes: Genetic Mutants 101
Created and taught an hour-long enrichment course introducing high school students to genetic mutants and nomenclature

How the Python Got Its Name: Greek Mythology in Animal Taxonomy
Co-designed and taught an interdisciplinary course exploring how Greek mythology informs scientific names. Co-taught with A. Melzer.

2017 **Lecturer, Stanford Institutes of Medicine Summer Research Program,** Stanford University
Developed and taught a lecture for high school research students on developmental signaling

2013-2014 **Teaching Assistant,** Carleton College Biology Department
Five quarters of experience assisting in the teaching and grading of the classroom and lab components

ADDITIONAL SERVICE

2025 **Session Chair**, West Coast Society for Developmental Biology
Chaired Education Session

2021 **Writing Portfolio Reader** Carleton College
Evaluated writing portfolios of Carleton College sophomores to assess academic writing skills