

David Au

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EDUCATION

Ph.D. in Biomedical Science 9/2017 – 4/2023
University of California, Irvine (UCI), Irvine, CA

B.S. in Biomedical Engineering (with Minor in Physics) 8/2011 – 5/2016
University of Utah, Salt Lake City, UT

EMPLOYMENT

R&D Engineer at microfluidic start-up company, Carterra® 1/2015 – 9/2017
Salt Lake City, UT

- Led quality control testing of microfluidic cell-printing devices.
- Designed dextran-surface functionalization protocol for surface plasmon resonance biosensors.

RESEARCH EXPERIENCE

Postdoctoral Research Scholar 5/2023 – present

Stanford University, Department of Neurobiology, Palo Alto, CA
(*Research Advisor: Dr. Stephen A. Baccus*)

- Utilizing *in vivo* multielectrode (Neuropixel) electrophysiology and retinal eye tracking techniques in mice under natural scenes stimuli to determine how melanopsin converge with classic image-forming pathways.
- Developing complex predictive computational models of the retinal and cortical neural code for visual processing of complex features related to multiplexed photoreceptor pathways and sleep in mammals.

Mentorship Experience: Mentored several community college students from the local area on academic success in STEM focused majors.

Graduate Student Researcher 4/2018 – 4/2023

University of California, Irvine, Department of Physiology and Biophysics, Irvine, CA
(*Research Advisor: Dr. Todd C. Holmes*)

- PCR mutagenesis, transgenic fly generation, patch-clamp electrophysiology, behavioral assays, immunocytochemistry, confocal microscopy, and programming/circuit building for tool-development.
- Measured photoreceptive properties of Cryptochrome (CRY) structural mutants and mosquito CRY1 in *Drosophila* transgenics using electrophysiological, behavioral, immunostaining techniques.
- Discovered fly non-image forming visual processes occur as an integration of multiple photoreceptor systems using whole-cell current-clamping of *Drosophila* circadian/arousal neurons and behavioral assays.

Mentorship Experience: Mentored nine undergraduate students under the course Bio199: Undergraduate Research, four undergraduate students in academics, two graduate rotation students in research, one graduate student in academics, and one lab manager. Managed lab safety compliance for all lab members.

Undergraduate Student Researcher 9/2011 – 12/2014

University of Utah, Department of Bioengineering and Department of Pharmaceutics, Salt Lake City, UT
(*Research Advisor: Dr. Amanda E. Brooks; Co-advisor: Dr. David W. Grainger*)

- Developed skills in laboratory maintenance, sterile technique, cell-culturing, and microfluidic cell-printing.
- Assisted with proving new instrumentation capabilities for the submission of two research grant proposals.
- Led a research project on cell-printing macrophages and fibroblasts to mimic biomaterial-induced fibrosis.

Mentorship Experience: Trained one graduate student and one postdoctoral researcher on self-developed microfluidic cell-printing application and protocol.

TEACHING EXPERIENCE

Teaching Assistant (Physio 232 – Physiology of Ion Channels)

4/2021 – 7/2021

University of California, Irvine, Department of Physiology and Biophysics, Irvine, CA

(Professor: Dr. Francesco Tombola)

- Evaluated student performance using various metrics for grading (assignments, presentations, reports, etc.)

HONORS AND AWARDS

NIH NRSA F32 Postdoctoral Fellowship (funded by NEI), \$210,372 (2024-present)

- Awarded to promising postdoctoral candidates who have the potential to become productive, independent investigators in scientific health-related research fields relevant to the missions of the participating NIH Institutes and Centers.

Stanford Propel Fellowship, \$178,000 (2023-present)

- Prestigious 2-year award for postdoctoral scholars who demonstrate research excellence, a commitment to an academic career, a desire to engage with a robust community of diverse colleagues (broadly defined) and shows promise in leadership that will enhance their contributions to Stanford and the world.

Annual Biomedical Research Conference for Minoritized Scientists (ABRCMS) Judge Travel Award (2024)

Stanford PRISM Baker Fellowship, \$34,119 (2023)

- Awarded to talented postdoctoral scholars from under-represented populations across a variety of academic fields, who are developing research independence through top-notch mentoring, innovative scientific training, and strategic collaborations.

UCI Most Promising Future Faculty Award (Honorable Mention) (2023)

NIH NRSA F31-Diversity Predoctoral Fellowship (funded by NIGMS), \$83,252 (2021-2023)

- Awarded to candidates from underrepresented racial and ethnic groups and from disadvantaged backgrounds to enhance the diversity of biomedical, behavioral, and clinical research.

Katherine and Robert Phalen Endowment Fellowship, \$400 (2023)

- Awarded to students whose current laboratory research shows future promise for preventing, treating, or understanding human disease.

Center for Circadian Biology Network Award (2023)

- Funds trainees whose activities and experiences contribute to expanding the diversity of scientists involved in biological rhythms research.

Society for Neuroscience Trainee Professional Development Award (TPDA) (2022)

- Recognizes undergraduate and graduate students and postdoctoral scholars who demonstrate scientific merit and excellence in research.

Honorary Graduate Student UROP Fellow (awarded but not funded) (2022)

UCI Inclusive Excellence Fellowship, \$5,000 (2022)

- Awarded to students whose research, teaching, and/or service supports diversity, equity, and inclusion and contributes to opening opportunities for under-represented groups in higher education.

UCI Graduate Dean's Dissertation Fellowship, \$5,000 (2022)

Society for Research in Biological Rhythms Emmett Chappell Award (2022)

- *Awarded to researchers with disabilities or who identify as coming from backgrounds underrepresented in the biomedical sciences as defined by NIH regardless of nationality.*

UCI Distinguished Public Impact Fellowship, \$12,000 (2021)

- *Awarded to students whose current research has the potential for substantial impact in the public sphere. Ideal candidates are involved in research designed to significantly improve or enrich the lives of Californians and/or national and global communities.*

UCI School of Medicine Grad Day Outstanding Elevator Talk (2021)

Outstanding DECADE Representative Award, \$1,000 (2021)

- *Recognizes the student representatives who have done an exceptional job at fostering a sense of belonging for the students in their department/school.*

Activate-to-Captivate Public Speaking Certificate of Achievement (2021)

Mentoring Excellence Certificate of Achievement (2021)

Inclusive Excellence Certificate of Achievement (2021)

Behrens Research Excellence Award, \$5,000 (2021)

- *Awarded to those who represent the next generation of leaders who will shape the future of scientific discovery.*

UCI School of Medicine Grad Day Outstanding Poster Talk (2020)

Society for Research in Biological Rhythms Merit & Excellence Travel Award (2020)

Center for Circadian Biology Outstanding Poster Award (2019)

Undergraduate Research Scholar Designation (2016)

University of Utah Bioengineering Research Symposium 2nd place Outstanding Oral Presentation (2016)

Larry H. and Gail Miller Enrichment Scholarship (full tuition, room/board, stipend), ~\$55,000 (2011-2016)

- *Awarded to deserving students who will contribute to an educationally diverse environment at the University of Utah.*

Mathematics Engineering Science Achievement (MESA) Scholarship, \$1,000 (2011)

LIST OF PUBLICATIONS

1. **Au, D. D.;** Liu, J. C.; Nguyen, T. H.; Holmes, T. C. Methods of measuring insect attraction and avoidance locomotor responses to light, (*manuscript in preparation*).
2. **Au, D. D.;** Liu, J. C.; Nguyen, T. H.; Dimalanta, M.; Park, S. J.; Foden, A. J.; Holmes, T. C. Convergent photoreceptor input to arousal neurons mediate a complex sequence of excitatory and inhibitory responses to light in flies for non-image forming visual processes, (*manuscript in preparation*).

3. **Au, D. D.;** Liu, J. C.; Park, S. J.; Nguyen, T. H.; Dimalanta, M.; Foden, A. J.; Holmes, T. C. Drosophila Photoreceptor Systems Converge in Arousal Neurons and Confer Light Responsive Robustness. *Front. Neurosci.* **2023**, 17, 1160353. <https://doi.org/10.3389/fnins.2023.1160353>.
4. **Au, D. D.;** Liu, J. C.; Nguyen, T. H.; Foden, A. J.; Park, S. J.; Dimalanta, M.; Yu, Z.; Holmes, T. C. Nocturnal Mosquito Cryptochrome 1 Mediates Greater Electrophysiological and Behavioral Responses to Blue Light Relative to Diurnal Mosquito Cryptochrome 1. *Front. Neurosci.* **2022**, 16, 1042508. <https://doi.org/10.3389/fnins.2022.1042508>.
5. **Au, D. D.;** Foden, A. J.; Park, S. J.; Nguyen, T. H.; Liu, J. C.; Tran, M. D.; Jaime, O. G.; Yu, Z.; Holmes, T. C. Mosquito Cryptochromes Expressed in Drosophila Confer Species-Specific Behavioral Light Responses. *Curr. Biol.* **2022**, S0960982222011228. <https://doi.org/10.1016/j.cub.2022.07.021>.
6. Baik, L. S.; Nave, C.; **Au, D. D.;** Guda, T.; Chevez, J. A.; Ray, A.; Holmes, T. C. Circadian Regulation of Light-Evoked Attraction and Avoidance Behaviors in Daytime- versus Nighttime-Biting Mosquitoes. *Curr. Biol.* **2020**, 30 (16), 3252-3259.e3. <https://doi.org/10.1016/j.cub.2020.06.010>.
7. Baik, L. S.; **Au, D. D.;** Nave, C.; Foden, A. J.; Enriquez-Villalva, W. K.; Holmes, T. C. Distinct Mechanisms of Drosophila CRYPTOCHROME-Mediated Light-Evoked Membrane Depolarization and in Vivo Clock Resetting. *Proc. Natl. Acad. Sci.* **2019**, 116 (46), 23339–23344. <https://doi.org/10.1073/pnas.1905023116>.
8. Baik, L. S.; Recinos, Y.; Chevez, J. A.; **Au, D. D.;** Holmes, T. C. Multiple Phototransduction Inputs Integrate to Mediate UV Light-Evoked Avoidance/Attraction Behavior in Drosophila. *J. Biol. Rhythms* **2019**, 34 (4), 391–400. <https://doi.org/10.1177/0748730419847339>.
9. **Au, D.+;** Davidoff, S. N.+; Gale, B. K.; Brooks, B. D.; Brooks, A. E. (+ denotes equal contribution). Maximizing Fibroblast Adhesion on Protein-Coated Surfaces Using Microfluidic Cell Printing. *RSC Adv.* **2015**, 5 (126), 104101–104109. <https://doi.org/10.1039/C5RA18673K>.
10. Davidoff, S. N.; **Au, D.;** Smith, S.; Brooks, A.E.; Brooks, B.D. Comparison of submerged and unsubmerged printing of ovarian cancer cells. *Biomed. Sci. Instrum.* **2015**, 51, 24-30. PMID: 25996695.

CONFERENCE ABSTRACTS AND PRESENTATIONS

1. **Au, D.,** Liu, J., Nguyen, T., Park, S.J., Foden, A., Dimalanta, M., Yu, Z., and Holmes, T. Drosophila phototransduction occurs in arousal/circadian neurons via color-specific external and internal photoreceptors. (2022)
 - Poster Presentation, Center for Circadian Biology, UCSD, San Diego, CA (2023).
 - Data Blitz and Poster Presentations, Advancing Sleep & Circadian Science (ASCS), Clearwater, FL (2023).
 - Poster Presentation, Society for Neuroscience, San Diego, CA (2022).
2. **Au, D.,** Foden, A., Park, S.J., Tran, M., Jaime, O., and Holmes, T. Mosquito cryptochrome is a well-conserved key photoreceptor for light-mediated behaviors in flies. (2021)
 - Oral Presentation, UCI Progress in Neuroscience Seminar, Irvine, CA (2022).
 - Oral Presentation, Society for Research in Biological Rhythms, Amelia Island, FL (2022).
 - Poster Presentation, Society for Neuroscience, Zoom Virtual (2021).
 - Oral and Poster Presentations, Center for Circadian Biology Workshop, Zoom Virtual (2021).
 - Oral Presentation, CSHL – Drosophila Neurobiology Symposium, Zoom Virtual (2021).

3. Baik, L., **Au, D.**, Nave, C., Foden, A., Enrriquez-Villalva, W. and Holmes, T. Elucidating the Mechanistic Distinction of Drosophila CRYPTOCHROME's Role in Clock Resetting and Light-Evoked Potential. (2019)
 - Poster Presentation, Society for Research in Biological Rhythms, Zoom Virtual (2019).
 - Poster Presentation, Center for Circadian Biology, UCSD, San Diego, CA (2020).
 - Poster Presentation, CSHL – Drosophila Neurobiology Symposium, Cold Spring Harbor, NY (2020).
4. Baik, L., Recinos, Y., Chevez, J., **Au, D.**, and Holmes, T. Phototransduction processes to UV light stimuli relay avoidance/attraction behavior in Drosophila melanogaster. (2018)
 - Poster Presentation, Center for Circadian Biology, UCSD, San Diego, CA (2019).

OTHER EXPERIENCES AND PROFESSIONAL MEMBERSHIPS

Postdoc Member, Stanford Neurosciences PhD DEIB Committee (2024)

- *Appointed postdoctoral fellows serve on a committee to actively improve Diversity, Equity, Inclusion, and Belonging (DEIB) within Stanford's Interdepartmental PhD Program, and within the broader context of Stanford University.*

Member, Stanford Wu Tsai Pathways to Neurosciences Program (2024-2026)

- *Pathways to Neurosciences is an NIH-funded mentorship and leadership training program that fosters belonging among underrepresented trainees through peer and faculty mentorship, professional and scientific development opportunities, and community-building events.*

Neuroscience Scholars Program (NSP) Associate, Society for Neuroscience (2024-2026)

- *The Neuroscience Scholars Program (NSP) is a two-year online training program open to underrepresented graduate students and postdoctoral researchers. NSP provides resources focused on career advancement, the research process, and cutting-edge scientific content.*

Mentor, Stanford Science Small Groups (SSG) (2023-2024)

- *10-week interactive research mentoring opportunity for community college students; met with 3-4 students weekly for an hour of hands-on mentoring pertaining to research and academic success.*

Mentor, Stanford Community College Outreach Program (CCOP) (2023)

- *Summer bootcamp mentoring opportunity for community college students; met with 3-4 students weekly for an hour of lecture and an hour of hands-on mentoring for 5 weeks.*

Councilmember, UCI School of Medicine Student Advisory Council (2020-2023)

- *Appointed leadership position focused on event planning to address unmet student needs concerning diversity, equity, inclusion (DEI), health, and wellness for all School of Medicine students.*

Representative, Diverse Educational Community and Doctoral Experience (DECADE) (2018-2023)

- *Represented all doctoral students across eight departments that comprised the School of Medicine; planned quarterly community-building events to foster DEI in graduate education.*

Invited Speaker, Graduate Dean's Leadership Council Event (2022)

Peer-review mentor, NIH Fellowship Success Writing Course at UCI (2022)

Mentor, UCI UROP Research Discovery Program (RDP) (2022)

- *Selected as a mentor to four underrepresented undergraduate students who were interested in academic research; scheduled bi-monthly meetings to discuss the steps to start academic research.*

Member, Stanford Postdoctoral Recruitment Initiative in Sciences and Medicine (PRISM) (2022)

Recruiter, NIH Graduate & Professional School at UCI (2020, 2021, 2022)

Recruiter, SACNAS at UCI (2020, 2021)

Member, Society for Neuroscience (SfN) (2021, 2022)

Member, Society for Research in Biological Rhythms (SRBR) (2020, 2022)

Mentor, UCI Cellular and Molecular Bioscience (CMB) Program (2020-2021)

- *Mentored one early-stage graduate student on topics related to extracurricular involvement, rotation research advice, and preliminary exam help.*

Recruiter, California Forum for Diversity in Graduate Education (2018)

Participant, Bench-to-Bedside Competition at University of Utah (2015-2016)

Participant, University of Utah Undergraduate Research Opportunities Program (UROP) (2011-2013)

PRIOR TRAINEES

Research Mentorship:

Trainee	Affiliation	Training Period	Current Position
Alexander John Foden*	UROP and Bio199: Undergrad Research	2019-2022	MSTP Student at Case Western Reserve University
Wendy Karen Enriquez-Villalva*	Bio199	2019-2020	Epidemiologist at Santa Barbara County Public Health Department
Tony Thai Bui*	Bio199	2019-2020	Master's Student of Nursing at UC Irvine
Soo Jee Park*	Bio199	2019-2022	Project Manager at re:Bloom non-profit web agency
Mary Dong Tran*	Bio199	2020-2022	Research Assistant at Zymo Research
Olga Graciela Jaime*	CMB Graduate Rotation	2020-2021	Physiology and Biophysics Doctoral Student at UC Irvine
Lauren Otsuka	CMB Graduate Rotation	2020-2021	Microbiology/Molecular Genetics Doctoral Student at UC Irvine
Jenny Chien Liu*	Bio199 and UROP	2021-2023	Lab Research Assistant at UC Irvine
Mia Dimalanta*	Bio199	2022-2023	Undergraduate Student at UC Irvine
Angelica Armesto	Bio199	2022-2023	Undergraduate Student at UC Irvine
Thanh Hoang Nguyen*	Lab Research Assistant	2021-2023	Junior Research Specialist at UC Irvine
Parrish Powell	Lab Manager	2022-2023	Lab Assistant Specialist at UC Irvine

Mercedes Morin	Stanford Summer Research Program	Summer 2024 (8 weeks)	Undergraduate Student at University of Michigan
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*Contributed and co-authored on peer-reviewed manuscript publication(s)

Academic Advisory Mentorship:

Trainee	Affiliation	Training Period	Current Position
Sean Tang	CMB Graduate Mentor Program	2020-2021	Physiology and Biophysics Doctoral Student at UC Irvine
Olga Graciela Jaime	DECADE	2021-2023	Physiology and Biophysics Doctoral Student at UC Irvine
Romelia Urbina	UROP RDP	2022-2023	Undergraduate Student at UC Irvine
Massee Said Akbar	UROP RDP	2022-2023	Undergraduate Student at UC Irvine
Georgina Giselle Alvarez Diaz	UROP RDP	2022-2023	Undergraduate Student at UC Irvine
Asja Aliyah Lani Deai	UROP RDP	2022-2023	Undergraduate Student at UC Irvine
Manuel Sanchez	Stanford CCOP	Summer 2023 (12 weeks)	Undergraduate Student at Foothill Community College
Aleeza Khan	Stanford SSG	Fall 2023 (10 weeks)	UC Davis
Penelope Reynos	Stanford SSG	Fall 2023 (10 weeks)	UC Berkeley
Auner Barrios	Stanford SSG	Fall 2023 (10 weeks)	College of San Mateo
Darlene Nguyen	Stanford SSG	Spring 2024 (10 weeks)	Mission College
Kayla Ling	Stanford SSG	Spring 2024 (10 weeks)	Santa Rosa Junior College
Nicole Nelson	Stanford SSG	Spring 2024 (10 weeks)	Foothill College
Lian Mar	Stanford SSG	Spring 2024 (20 weeks)	City College of San Francisco
Mazna Khan	Stanford SSG	Spring 2024 (20 weeks)	UC Davis
Laura Vo	Stanford SSG	Spring 2024 (20 weeks)	De Anza College