Scripps Research
Science Changing Life

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National Science Foundation

EDUCATION

University of California, Berkeley — December 2019
Ph.D. Molecular and Cell Biology — Berkeley, CA
Thesis: *Visualizing the regulation of the microtubule using cryo-EM*
Awarded the 2020 Cris Alvaro PhD Commencement Prize

Grinnell College — May 2014
B.A. Biological Chemistry — Grinnell, IA
Concentration: Public Policy Studies

RESEARCH EXPERIENCE

Postdoctoral Fellow, The Scripps Research Institute — 2020 - Present
Department of Integrative Structural & Computational Biology — La Jolla, CA
Advisors: Gabe Lander, Ph.D., and Andrew Ward, Ph.D.

- Uncovered novel conformations of mitochondrial AAA+ quality control protease YME1 using cryo-EM.
- Visualized the first full-length, membrane embedded HCV glycoprotein E1E2 using cryo-EM.
- Developed surface plasmon resonance (SPR)-based method to screen small molecule binders.

This work resulted in a publication in ***Science*** and was funded by the **National Science Foundation**.

Graduate Student, University of California, Berkeley — 2015 - 2019
Department of Molecular and Cell Biology — Berkeley, CA
Advisor: Eva Nogales, Ph.D.

- Initiated a collaboration with the Dr. Ahmet Yildez at UC Berkeley to solve the first structure of the microtubule-associated protein (MAP7) using cryo-EM and single molecular biophysics.
- Showed that the post-translational modification acetylation directly stabilizes microtubules using cryo-EM and molecular dynamics in collaboration with Drs. Jaime Fraser and Max Bonomi at UCSF and the University of Cambridge, respectively.

This work resulted two publications in ***PNAS*** and ***Science*** and was funded by the **National Science Foundation** and the **Ford Foundation**.

Postbaccalaureate Fellow, The National Institutes of Health — 2014 - 2015
Department of Membrane Biology — Bethesda, MD
Advisor: Julie Donaldson, Ph.D.

- Conducted an siRNA screen of ~100 human de-ubiquitinating proteases (DUBs) to identify mediators of clathrin-independent endocytosis (CIE) cargo sorting in HeLa cells.

This work was funded by an Intramural Research Training Award and award the poster prize at the 2015 NHLBI/NIH Research Festival.

Postbaccalaureate Fellow, The National Institutes of Health Academy on Health Disparities — 2014 - 2015
Office of Intramural Training and Research — Bethesda, MD
Advisor: Sharon Mitchell

- Trained in how to address health disparities in medicine and science, diversity and inclusion, and bystander intervention and allyship.
- Collaborated with Keys to Canaan, 501(c)(3) nonprofit organization, to develop and set up support networks low-income, senior residents of Wards 7 and 8 in southeast Washington, D.C.

Undergraduate Researcher, Mentored Advanced Project at Grinnell College — Fall 2014
Department of Policy Studies & Global Development Studies — Grinnell, IA
Advisor: Eliza Willis, Ph.D.

- Conducted a critical analysis of the impact of non-profit organizations and advocacy groups, in collaboration with the Ministry of Health, Estelí Office, in Estelí, Nicaragua.

Undergraduate Researcher, California Institute of Technology Summer 2013
Department of Bioengineering Los Angeles, CA
Advisor: Morteza Gharib, Ph.D.
- Designed a temperature-controlled apparatus to monitor the growth of live cells.

This work was funded by the **Howard Hughes Medical Institute** and resulted in one publication in **CURJ**.

Undergraduate Researcher, Children's National Medical Center Fall 2013
Center for Cancer and Immunology Washington, D.C.
Advisor: Steven Zeichner, M.D., Ph.D.
- Screened immunogenic antigens capable of inducing a broadly neutralizing anti-HIV immune response in mice.

This work was funded by the **Grinnell College** through the Grinnell-in-Washington, D.C. study off-campus program and in collaboration with **Washington University, St. Louis**.

Undergraduate Researcher, University of California, San Francisco Summer 2012
Department of Microbiology and Immunology San Francisco, CA
Advisor: Raul Andino, Ph.D.
- Examined the influence of interferon on the exonic structure of the human RNA editing enzyme ADAR1 in mouse embryonic fibroblasts (NIIH3T3 cells) using molecular biology techniques.

This work was funded by the **Amgen Foundation** through the **Amgen Scholars Program**.

RESEARCH GRANTS

Contributions to Ongoing Funded Research

2016 – 2024 Impacting mitochondrial function through altered protease activity
Principal Investigators: Gabe Lander, Ph.D., and Luke Wiseman, Ph.D.
Funder: National Institute of Neurological Disorders and Stroke (NINDS)
Grant number: R01NS095892
NIH R01 award: $4,074,769
Role: Co-author. My postdoctoral work on AAA+ IM Yme1 is part of the basis for this grant. I developed one of the aims related to AAA+ protease and edited multiple drafts.

FELLOWSHIPS

IMPACT Fellows Program, National Postdoctoral Association 2023
Role: Postdoctoral Fellow | Resources: DEI expert and peer mentoring opportunities

Intersections Science Fellows Program, Yale University 2023
Role: Postdoctoral Fellow | Resources: Faculty and peer mentoring opportunities

National Science Foundation Postdoctoral Research Fellowship in Biology (NSF-PRFB) 2021 – 2023
Role: Postdoctoral Fellow | Resources: $138,000

National Institutes of Health Loan Repayment Program 2022
Role: Postdoctoral Fellow | Resources: $25,000

Damon Runyon Postdoctoral Fellowship, Declined 2021
Role: Postdoctoral Fellow | Resources: $240,000

Ford Foundation Postdoctoral Fellowship, Declined 2021
Role: Postdoctoral Fellow | Resources: $50,000

Leading Edge Fellowship Program, Janelia Farms 2020
Role: Postdoctoral Fellow | Resources: Faculty and peer mentoring opportunities

Ford Foundation Predoctoral Fellowship 2019 – 2020
Role: Graduate Student | Resources: $27,000

National Science Foundation Graduate Research Fellowship Program (NSF-GRFP) 2016 – 2019
Role: Graduate Student | Resources: $159,000

PUBLICATIONS

1. Martin G, Quintero MLF, Lee WH, Pholcharee T, **Eshun-Wilson L**, Liedl KR, Pancera M, Seder RA, Wilson IA, Ward AB. Structural basis of epitope selectivity and potent protection from malaria by PfCSP antibody L9. *Nature Communications* (**2023**) 14 (2815) 1-11.

2. **Eshun-Wilson L***, Torrents de la Peña A*, Sliepen K*, Newby M, Allen J, Koekkoek S, Zon I, Chumbe A, Crispin M, Schinkel J, Sanders R, Lander G, Ward A. Structure of full-length hepatitis C virus E1E2 glycoprotein complex. ***Science*** (**2022**) 6617 (378) 263-269. ***Equal contribution**.

3. **Eshun-Wilson, L**.*, Ferro, L.*, Fang Q.*, Fernandes, J*, Jack A, Gölcük M, Fernandes J, Huijben T, Costa K, Gür M, DiMaio, F., Nogales, E., Yildez, A. Structural and functional insight into regulation of kinesin-1 by microtubule-associated protein MAP7. UCB, Berkeley, CA. ***Science*** (**2022**) 375 (6578) 326-331. ***Equal contribution**.

4. **Eshun-Wilson L**, Zhang R, Portran D, Toso D, Nachury M, Bonomi M, Fraser JS, Nogales E. Structural insights into the effects of α-tubulin acetylation on microtubule structure and properties. *Proceedings of the National Academy of Sciences* (**2019**) 116 (21) 10366-10371. *Cited by 231.*

5. **Eshun-Wilson, L**., Azizgolshani, H., Gharib, M. Tissue Expansion for Organ Construction and Tissue Regeneration: A Focus on Design and Instrumentation. *Caltech Undergraduate Research Journal*. (**2014**) 14 (1) 10-17.

HONORS & AWARDS

Name	Funder	Amount	Year
Cryo-EM Grant Award	Thermo Fisher Scientific, Inc.	$5,000	2023
Travel Award	The Scripps Research Institute	$1,500	2022
Dean's Graduate Diversity Innovation Award	University of California, Berkeley	$1,500	2021
Cris Alvarez Memorial Commencement Prize	**University of California, Berkeley**	**$1,000**	**2020**
Carl Storm Minority Travel Award & Outstanding Poster Prize	Gordon Research Conference	$1,500	2019
Travel Award	University of California, Berkeley	$1,000	2019
Chancellor's Award for Public Service Nominee	University of California, Berkeley		2019
Dean of Students Outstanding Leadership Award Nominee	University of California, Berkeley		2019
Outstanding Poster Prize	Microtubule EMBO/EMBL Meeting	$100	2018
RISE! Leader Award	Centers for Educational Justice & Community Engagement, University of California, Berkeley	$500	2018
Dept. of Molecular and Cell Biology Equity & Inclusion Award	MCB/UCB	$1,500	2018
Poster Prize	Annual Research Festival NHLBI/NIH	$100	2015
Travel Award	King Abdullah University of Science and Technology	$2,500	2014
John Y. Young Service Memorial Scholarship	Grinnell College	$4,000	2014
Full Undergraduate Scholarship	The POSSE Foundation	$250,000	2010

LEADERSHIP & DIVERSITY, EQUITY, AND INCLUSION EXPERIENCE

Founder and Co-Director, inclusiveScripps 2022 - Present

iScripps aims to institutionalize the following sustainable and supportive measures for URM postdocs:

- An institution-wide *iScripps* awareness-building conference modeled after inclusiveMCB to raise awareness about issues that disproportionately affect URM trainees, such as stereotype threat, imposter syndrome, the mentoring gap, or income disparity-related issues.
- *"Office Hours"*, or a mentoring program I have designed to give postdocs the opportunity to foster productive mentee-mentor relationships or future collaborations with faculty who identify as URM or display cultural humility and expertise in mentoring students outside of their own race.

This work has been nominated for the **2023 Joseph F. Wall '41 Service Award** from **Grinnell College** in the amount of $40,000 and is a recipient of the **2023 National Postdoctoral Association IMPACT Fellowship Award**.

Founder and Co-Director, inclusiveMCB (now inclusiveBiosciences) 2016 - 2022

iMCB, now iBio, was a student-led initiative to transform the institutional and social climate within the department to support URM graduate students, postdocs, and faculty, with a special emphasis on communities highly susceptible to violence, with a special emphasis on Black, indigenous, transgender and gender non-conforming students. To do this systematically, I designed the following four program pillars:

- An annual conference that raises awareness about issues that disproportionately affect URM students.
- An academic tutoring program in which URM postdocs serve as teaching assistants in graduate courses to ensure that URM graduate students excel academically.
- A personalized faculty-mentoring program that connects first year iMCB students to faculty members dedicated to ensuring that iMCB students feel equip to tackle the challenges of graduate school.
- A research team that investigates evidence-based mentoring strategies to improve and further institutionalize the iMCB model.

This work received the **2018 MCB Equity & Inclusion Award** and **2021 Dean's Graduate Diversity Innovation Fund** from **UC Berkeley** for the combined amount of $3,000. Since 2016, iMCB and now iBio have received over $30,000 in departmental resources to sustain.

Graduate Student Fellow, Restorative Justice (RJ) Graduate Student Inclusivity Certificate Program 2017

A 20-hour training over the course of three Saturdays hosted by the Office of Graduate Diversity, Restorative Justice (RJ) Center, and the Multicultural Education Program (MEP).

- RJ-based training offered concrete examples of restorative responses instructors can make to mediate to conflict and harm.
- MEP-based training provided in-depth trainings on workplace diversity, unconscious bias, and cross-cultural communication.
- Participants received a MEP/RJ Training Certificate of Completion and institutional support to develop personalized DEI programming for their respective departments.

PRESENTATIONS

Oral Presentations:

1. Eshun-Wilson, L. Ward, A., Lander, G. "Visualizing some of nature's most mysterious molecular machines using cryo-EM". Intersections Science Fellows Symposium. Yale University. September 2023.

2. Eshun-Wilson, L., Soto-Reid, M., and Arnold, M. "State of DEIA: Where We Are and Where Plan to Go". Fostering partnerships among minority-serving institutions and national laboratories Session. Molecular Foundry Annual User Meeting. Lawrence Berkeley National Lab. Berkeley, CA. August 2023.

3. Eshun-Wilson L*, Torrents de la Peña A*, Sliepen K*, Newby M, Allen J, Koekkoek S, Zon I, Chumbe A, Crispin M, Schinkel J, Sanders R, Lander G, Ward A. "Structure of full-length hepatitis C virus E1E2 glycoprotein complex". Spring Lecture (Přednáška) Series, Prague Institute of Organic Chemistry and Biochemistry (IOCB), Prague, Czech Republic. January 2023.

4. Eshun-Wilson, L. Ward, A., Lander, G. “Using 3D Variability Analysis to resolve some of nature’s most mysterious molecular machines”. Next Generation in Biomedicine, Broad Institute, Boston, MA. October 2022.

5. Eshun-Wilson, L. Ward, A., Lander, G. “Using 3D Variability Analysis to resolve some of nature’s most mysterious molecular machines”. Rising Stars Symposium, University of Utah, Salt Lake City, UT. September 2022.

6. Eshun-Wilson, L.*, Ferro, L.*, Fang Q.*, Fernandes, J*, Jack A, Gölcük M, Fernandes J, Huijben T, Costa K, Gür M, DiMaio, F., Nogales, E., Yildez, A. “Structural and functional insight into regulation of kinesin-1 by microtubule-associated protein MAP7”. Invited Speaker and Session Chair, American Crystallographic Association, Portland, OR. July 2022.

7. Eshun-Wilson, L. Ward, A., Lander, G. “Using 3D Variability Analysis to resolve some of nature’s most mysterious molecular machines”. Rockefeller University. New York, New York. July 2022.

8. Eshun-Wilson, L. Lander, G. “Uncovering the molecular mechanisms of stress”. Molecular Biosciences Seminar Series, Northwestern University, Evanston, IL. April 2021.

9. Eshun-Wilson, L. Lander, G. “Using 3D Variability Analysis to resolve some of nature’s most mysterious molecular machines”. University of Massachusetts Chan Medical School. Worcester, MA. March 2022.

10. Eshun-Wilson, L. Lander, G. “Uncovering the molecular mechanisms of ageing”. National Institute of Aging, National Institutes of Health (NIA/NIH), Bethesda, MD. February 2022.

11. Eshun-Wilson, L. Lander, G. “Effects of microtubule-associated protein 7 (MAP7) on MAPs, motors and intracellular trafficking”. Leading Edge Symposium, Howard Hughes Medical Institute (HHMI), Ashburn, VA. June 2021.

12. Eshun-Wilson, L. Lander, G. “Uncovering the molecular mechanisms of stress”. Rising Stars Seminar Series, University of Utah, Salt Lake City, UT. March 2021.

13. Eshun-Wilson, L., Soto-Reid, M., and Tucker, K. “InclusiveMCB: A Success Story”. Cultivating Ensembles and STEM Advocacy, New York Institute of Technology, NY. June 2019.

14. Eshun-Wilson L, Zhang R, Portran D, Toso D, Nachury M, Bonomi M, Fraser JS, Nogales E. “Structural insights into the effects of α-tubulin acetylation on microtubule structure and properties”. Cellular Dynamics and Models, Cold Spring Harbor Laboratory, NY. April 2019.

15. Eshun-Wilson L, Zhang R, Portran D, Toso D, Nachury M, Bonomi M, Fraser JS, Nogales E. “Structural insights into the effects of α-tubulin acetylation on microtubule structure and properties”. Ford Fellows Conference, National Academy of Sciences, Washington, DC. October 2018.

Poster Presentations:

1. Eshun-Wilson L*, Torrents de la Peña A*, Sliepen K*, Newby M, Allen J, Koekkoek S, Zon I, Chumbe A, Crispin M, Schinkel J, Sanders R, Lander G, Ward A. “Structure of full-length hepatitis C virus E1E2 glycoprotein complex”. Three-Dimensional Electron Microscopy Gordon Research Conference, Barcelona, Spain. June 2022.
2. Eshun-Wilson L*, Torrents de la Peña A*, Sliepen K*, Newby M, Allen J, Koekkoek S, Zon I, Chumbe A, Crispin M, Schinkel J, Sanders R, Lander G, Ward A. “Structure of full-length hepatitis C virus E1E2 glycoprotein complex”. The Biophysical Society, San Francisco, CA. February 2022.
3. Eshun-Wilson L, Zhang R, Portran D, Toso D, Nachury M, Bonomi M, Fraser JS, Nogales E. “Structural insights into the effects of α-tubulin acetylation on microtubule structure and properties”. Three-Dimensional Electron Microscopy Gordon Research Conference, Hong Kong, China. June 2019.

4. Eshun-Wilson L, Zhang R, Portran D, Toso D, Nachury M, Bonomi M, Fraser JS, Nogales E. Structural insights into the effects of α-tubulin acetylation on microtubule structure and properties. "Microtubules: From Atoms to Complex Systems". EMBL EMBO Conference, Heidelberg, Germany. June 2018.
5. Eshun-Wilson L, Williamson C, Donaldson J. "siRNA screen of ~100 human de-ubiquitinating proteases (DUBs) to identify mediators of clathrin-independent endocytosis (CIE) cargo sorting in HeLa cells". NHLBI/NIH Research Festival, Bethesda, MD. June 2015.
6. Eshun-Wilson L, Burrack L. "The effect of neocentromere formation on DNA localization in C. albicans". Biological Chemistry Seminar Series, Dept. of Biological Chemistry, Grinnell College, Grinnell, IA. April 2014.
7. Eshun-Wilson L, Azizgolshani, H, Gharib, M. "Tissue Expansion for Organ Construction and Tissue Regeneration: A Focus on Design and Instrumentation". Winter Enrichment Program, King Abdullah University of Science and Technology, Jeddah, Saudi Arabia. January 2014.
8. Eshun-Wilson L, Azizgolshani, H, Gharib, M. "Tissue Expansion for Organ Construction and Tissue Regeneration: A Focus on Design and Instrumentation". CalTech Summer Undergraduate Research Fellowship Seminar Series. Engineering and Robotics Division. August 2013.
9. Eshun-Wilson L, Smith A, Andino R. "Influence of interferon on the exonic structure of the human RNA editing enzyme ADAR1 in mouse embryonic fibroblasts". Amgen Scholars Summer Symposium, UCLA, Westwood, CA. July 2022.

TEACHING EXPERIENCE

Guest lecturer, University of California, San Francisco Spring 2023
Course: Biophysics 204B: Methods in Macromolecular Structure
Responsibilities: Invited to teach one lecture on my work to graduate students. Developed and delivered a 50-min lecture with interactive components, including live-poll questions and think-pair-share.

Guest lecturer, SBGrid Consortium, Harvard University Fall 2021
Course: Mini-Series: CryoEM: from Sample to Structure
Responsibilities: Invited to teach one lecture on cryo-EM sample preparation on a recorded webinar series, that is now widely available on YouTube. Developed and delivered a 10-min presentation on how to overcome issues that arise in cryo-EM, including sample heterogeneity, air-water interface issues, ice thickness variability, and protein aggregation.

Graduate Student Reader, **University of California, Berkeley** Spring 2019
Course: MCB100B Biophysical Chemistry
Responsibilities: Graded homework assignments and exams.

Graduate Student Reader, **University of California, Berkeley** Fall 2018
Course: MCB102 Biochemistry and Molecular Biology
Responsibilities: Graded homework assignments and exams.

Graduate Student Instructor, University of California, Berkeley Fall 2017
Course: MCB100A Biophysical Chemistry
Responsibilities: Develop and grade weekly problem sets and exam questions for an undergraduate course; 50 students. Hosted a discussion section for 10-15 students once a week to discuss individual assignments and provide exam preparation exercises.

Graduate Student Instructor, University of California, Berkeley Spring 2017
Course: BIO1A General Biology Lecture
Responsibilities: Develop and grade weekly problem sets and exam questions for an undergraduate course; 100 students. Hosted a discussion section for 30 students once a week to discuss individual assignments and provide exam preparation exercises.

Graduate Student Reader, **University of California, Berkeley** Fall 2016
Course: MCB102 Biochemistry and Molecular Biology
Responsibilities: Graded homework assignments and exams.

MENTORING & SERVICE

Amgen Foundation Graduate Assistant Summer 2016

- Mentored six summer undergraduate researchers from across the US and Puerto Rico at UC Berkeley by offering weekly check-in meetings to discuss their scientific progress, required presentations, including journal clubs, progress reports for lab, poster presentations, and culminating research presentations for the annual Amgen conference at UCLA.
- Four students successfully matriculated into graduate school the following Fall semester.

Bay Area Scientists in Schools 2015 - 2016

- Volunteered to foster scientific curiosity in K-12 classrooms in the larger bay area school system. Introduced low-income students to fundamental scientific concepts, such as how the photoreceptor cells in our eyes perceive different types of light in the color spectrum.
- Designed 20 min presentations comprising of hands-on classroom experiences, engaging discussions, and finger-painting activities.

Dinner with a Scientist 2015 - 2016

- Attended an annual dinner with low-income K-12 students and their families to talk about my graduate work.
- Led a hands-on, student-centered activity on protein shape and size, and answers questions.

REFERENCES

Gabe Lander, Ph.D.
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Department of Integrative Structural and Computational Biology
The Scripps Research Institute
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