CHRISTOPHER A. AZALDEGUI

(he/him/his)

Postdoctoral Scholar, Stanford University

azaldeg@stanford.edu

PROFESSIONAL APPOINTMENTS

Stanford University *Stanford, CA* 2025 -
Postdoctoral Scholar
Research Advisor: Peter Dahlberg, Ph.D. (Photon Science and Structural Biology)

EDUCATION

University of Michigan, *Ann Arbor, MI* 2019 - 2024
Ph.D. Chemical Biology
Thesis title: *Mechanisms of subcellular organization in bacteria*
Research Advisor: Julie Biteen, Ph.D. (Chemistry)

St. Edward's University, *Austin, TX* 2019
B.S. Chemistry and minor in Mathematics (Magna cum laude).
Thesis title: *Development of image analysis tools for forensic applications*
Research Advisor: Raychelle Burks, Ph.D. (Chemistry)

SELECT HONORS AND AWARDS

ProQuest Distinguished Dissertation Award Honorable Mention, University of Michigan	2025
Rackham Predoctoral Fellowship, University of Michigan	2023
Dr. Alfred Sussman Fellowship, University of Michigan	2022
HHMI Gilliam Graduate Fellowship Finalist	2022
Single Molecule Approaches to Biology Gordon Research Conference Best Poster Prize	2022
Ford Foundation Predoctoral Fellowship Honorable Mention	2021
Chemistry/Biology Interface Training Fellowship, University of Michigan	2020
Rackham Merit Fellowship, University of Michigan	2019
Overall Outstanding Chemistry Student, St. Edward's University	2019

PREPRINTS

4. Croskey, A., **C.A. Azaldegui**, C.S. Regan, A.K. Mapp, R.M. Burks, "Uncovering dynamic protein binding events using a colorimetric dye." **(2026)**. DOI:/10.2139/ssrn.6545445
3. **C.A. Azaldegui**, H.M. Swasthi, L. Hu, L.T. Pulianmackal, H. Rivett-Trznadel, J. Liu, A.G. Vecchiarelli, J.S. Biteen, "The kinetics and mobility of a ParA ATPase drive carboxysome distribution in *Halothiobacillus neapolitanus*," bioRxiv **(2026)** DOI: 10.64898/2026.03.03.709431
2. Hoang, Y, P.V. Jadhav, D.S. Trettel, R.E. Dow, S. Kwon, K. Matej, J.A. Byrne, **C.A. Azaldegui**, T.W. Giessen, H. Pi, S. Mosalaganti, A.G. Vecchiarelli, "Engineering Spatial Control of Bacterial Organelles," bioRxiv (**2025**) DOI: 10.1101/2025.09.22.677801

1. Byrne, J.A., H.M. Swasthi, L. Hu, **C.A. Azaldegui**, J. Liu, A.G. Vecchiarelli, "Tuning the interaction of a ParA-type ATPase with its partner separates bacterial organelle positioning from partitioning," bioRxiv (**2025**) DOI: 10.1101/2025.05.22.655647

JOURNAL PUBLICATIONS

9. Guan, J., R.L. Hurto, K. Rai, J. Bhattrai, **C.A. Azaldegui**, L.A. Ortiz-Rodríguez, Q. Liu, J.S. Biteen, L. Freddolino, U. Jakob, "Polyphosphate modulates the stress-responsive formation of functional RNA-protein condensates in bacteria and mammalian cells," *PLoS Biology* 24(4) e3003775. **(2026)** DOI: 10.1371/journal.pbio.3003775

8. Ortiz-Rodríguez L.A., H. Yassine, A. Hatami, V. Nandana, **C.A. Azaldegui**, J. Cheng, Y. Zhu, J.M. Schrader, J.S. Biteen, "Stress changes the material state of a bacterial biomolecular condensate and shifts function from mRNA decay to storage," *Nature Communications* **16**, 10019 **(2025)** DOI: 10.1038/s41467-025-65358-y

7. Dudley, C.E., **C.A. Azaldegui**, D.J. Foust, O. LaCommare, J.S. Biteen, A.G. Vecchiarelli, "Nucleoid Compaction Influences Carboxysome Localization and Dynamics in *Synechococcus elongatus* PCC 7942," *mBio* e01919-25 **(2025)** DOI: 10.1128/mbio.01919-25

6. **Azaldegui C.A.**, A.G. Vecchiarelli, and J.S. Biteen, "Brownian ratchet mechanisms for carboxysome positioning in bacteria," *Current Opinion in Microbiology* 87, 102638 **(2025)**, DOI: 10.1016/j.mib.2025.102638

5. Perez D., D.P. Dowlatshahi, **C.A. Azaldegui**, T.B. Ansell, P.D. Dahlberg, W.E. Moerner, "Exploring transient states of PAmKate to enable improved cryogenic single-molecule imaging," *J. Am. Chem. Soc.* 146 (42), 28707-28716 **(2024)** DOI: 10.1021/jacs.4c05632

4. *Hoang Y, ***Azaldegui C.A.**, R. Dow, M. Ghalmi, J.S. Biteen and A.G. Vecchiarelli, "An experimental framework to assess biomolecular condensates in bacteria," *Nature Communications* **15**, 3222 **(2024)** * denotes co-first authorship. DOI: 10.1038/s41467-024-47330-4

3. Rangarajan A.A., H.E. Chia, **C.A. Azaldegui**, M. Olzewski, N. Koropatkin, and J.S. Biteen, "*Ruminococcus bromii* enables the growth of proximal *Bacteroides thetaiotaomicron* by releasing glucose during starch degradation," *Microbiology* 168:001190 **(2022)**. DOI: 10.1099/mic.0.001180

2. **Azaldegui C.A.**, A.G. Vecchiarelli, and J.S. Biteen, "The emergence of phase separation as an organizing principle in bacteria," *Biophysical Journal* 120, 1123-1138 **(2021)**, DOI: 10.1016/j.bpj.2020.09.023. *Special Issue on Phase Separation in Nucleic Acid Biochemistry and Signal Transduction

1. **Azaldegui C.A.**, L. Aguilar, S. Enriquez, C. Madonna, C. Parish-Fisher, and R.M. Burks, "Benzoic Acid Derivatives as Vapor-Phase Stains in Cyanoacrylate Fuming of Latent Fingerprints," *Journal of Forensic Sciences* 66, 1085-1093 **(2021)**, DOI: 10.1111/1556-4029.14678

SELECT ORAL PRESENTATIONS

Azaldegui CA, Perez DD, Dwyer W, Rose KM, Rui Y, Dinneny J, Dahlberg PD, **(Feb. 2026)**. "Correlating physiology and structure with fluorescent biosensors and cryo-ET." 70th Biophysical Society Annual Meeting. San Francisco, CA.

Azaldegui CA, Swasthi H, Pulianmackal LT, Rivett H, Vecchiarelli AG, Biteen JS **(July 2024)**. "Single-Molecule Dynamics Show the ATP-Driven Distribution of a Carbon-Fixing Organelle in Bacteria." Single Molecule Approaches to Biology Gordon Research Seminar. Newry, ME.

Azaldegui CA, Pulianmackal LT, Harkner C, Ortiz-Rodriguez LA, Limcaoco J, Vecchiarelli AG, Biteen JS **(Feb. 2023)**. "Single-molecule imaging of the McdA ATPase reveals mechanistic details of carboxysome trafficking." 67th Biophysical Society Annual Meeting. San Diego, CA.

Azaldegui CA, Tran L, Vecchiarelli AG, Biteen JS **(July 2022)**. "Single-molecule imaging of the carboxysome trafficking system." Single Molecule Approaches to Biology Gordon Research Seminar. Castelldefels, Spain.

Azaldegui CA, Regan C, Garlick J, Foster N, Burks R, Mapp A **(Oct. 2018)**. "Colorimetric sensor array for the characterization of the transcriptional coactivators Med25-AcID and CBP-KIX." 27th National Ronald E. McNair Research Conference. Schaumburg, IL.

PROFESSIONAL SERVICE

Single Molecule Approaches to Biology Gordon Research Seminar, Co-chair	2024
Student Representative, Operating Committee of Program in Chemical Biology	2023
Program in Chemical Biology Student Council, U. Michigan	2023
Outreach Co-Chair, U. Michigan SACNAS Chapter	2022
Feria de Ciencias Organizer (Science Fair in Spanish), En Nuestra Lengua	2021 - 2022
Mentor, Graduate Student Engagement and Community Program, Cientifico Latino	2021 - 2022
Graduate School Mentorship Initiative, Mentor, Cientifico Latino	2019 - 2022
Social Co-Chair, U. Michigan SACNAS Chapter	2021
Program in Chemical Biology Peer Mentor, U. Michigan	2021
First-Generation Student Advisory Board, University of Michigan	2020
President, St. Edward's University ACS Student Chapter	2018 - 2019
Resident Assistant, St. Edward's University	2017 - 2019
Cesar Chavez M.S. Science Show, Center for Educational Outreach, U. of Michigan	2019
Treasurer, St. Edward's University ACS Student Chapter	2017 - 2018
National Chemistry Week Demos, ACS Central Texas Chapter, Austin, TX	2016 - 2018

TEACHING

Instructor, Detroit Area Pre-College Engineering Program, U. of Michigan	2020
Math Tutor, Department of Mathematics, St. Edward's University	2016 - 2018
Chemistry Tutor, ACS Student Chapter, St. Edward's University	2017 - 2019

PROFESSIONAL SOCIETY AFFILIATIONS

Biophysical Society	2021-
American Chemical Society	2018 - 2024
American Society of Cell Biology	2021 - 2022
Society for the Advancement of Chicanos/Hispanics and Native Americans in Science	2018 - 2023

REFERENCES

Peter Dahlberg, Ph.D.
Assistant Professor of Photon Science and Structural Biology
Stanford University, *Stanford, CA*
pdahlb@stanford.edu
Research supervisor

Julie S. Biteen, Ph.D.
Professor of Chemistry and Biophysics
University of Michigan, *Ann Arbor, MI*
jsbiteen@umich.edu
Ph.D. thesis advisor

Anthony G. Vecchiarelli, Ph.D.
Associate Professor of Molecular, Cellular, and Developmental Biology
University of Michigan, *Ann Arbor, MI*
ave@umich.edu
Ph.D. thesis co-advisor