

Christopher J. Gisriel

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Education

Arizona State University	2013 – 2017
Ph.D., Biochemistry	
Arizona State University	2009 – 2013
B.S., Biochemistry	

Research Experience

Yale University	<i>Postdoctoral Fellow, 2019 – present</i>
Advisor: Gary W. Brudvig , Benjamin Silliman Professor of Chemistry, Director of the Yale Energy Sciences Institute	
Research: Single-particle cryo-electron microscopy of photosynthetic systems and method development in cryo-EM.	
Arizona State University	<i>Postdoctoral Fellow, 2018 – 2019</i>
Advisor: Petra Fromme , Paul V. Galvin Professor of Chemistry and Biochemistry, Regents Professor, Director of the Biodesign Center for Applied Structural Discovery	
Research: Protein microcrystallization and X-ray free-electron laser crystallography of photosynthetic systems.	
Arizona State University	<i>Graduate Research Assistant, 2013 – 2017</i>
Advisor: Kevin E. Redding , Professor of Chemistry and Biochemistry, Director of the Center for Bioenergy & Photosynthesis	
Research: X-ray crystallography and ultrafast spectroscopy of photosynthetic systems.	

Funding, Honors, and Awards

Chemical Abstracts Service (CAS) Future Leaders Top 100	2023
Outstanding Oral Presentation, Annual Research Frontier Symposium	2022
Best Oral Postdoctoral Presentation, Midwest Photosynthesis Conference	2021
<u>Pathway to Independence (K99/R00), Nat'l Institutes of Health (NIGMS)</u>	2021-present
USDA/AFRI NIFA Postdoctoral Fellowship (2021-2023): DECLINED	2021
Outstanding Oral Presentation, Annual Research Frontier Symposium	2021
Yale University-endowed Brown postdoctoral fellowship for plant science	2020
College of Liberal Arts and Sciences Outstanding Graduate, ASU	2017
College of Liberal Arts and Sciences Graduate Excellence Award, ASU	2017
College of Liberal Arts and Sciences CLAS Leader, ASU	2017
Johnston Endowment Scholar award recipient, ARCS Foundation	2017
Richard Malkin Award recipient, Western Photosynthesis Conference	2017
Wayne W. Luchsinger Chemistry Scholarship recipient, ASU	2012

Publications

*represents first author(s), †represents corresponding author(s)

31. **Gisriel, C.***, Elias, E.*., Shen, G., Soulier, N., Brudvig, W., Croce, R.†, Bryant, D.† (2023) Structural comparison of allophycocyanin variants reveals the molecular basis for their spectral differences, *Photosynthesis Research*, *In press*. DOI: 10.1007/s11120-023-01048-4
30. **Gisriel, C.***, Flesher, D.*., Long, Z., Liu, J., Wang, J., Bryant, D., Batista, V., Brudvig, G.† (2023) A quantitative assessment of (bacterio)chlorophyll assignments in the cryo-EM structure of the *Chloracidobacterium thermophilum* reaction center, *In press*. DOI: 10.1007/s11120-023-01047-5
29. **Gisriel, C.*†** (2023) The cards you have been dealt: How an intertidal green macroalgae absorbs blue-green light, *Structure*, 31 (10) 1145-1147. DOI: 10.1016/j.str.2023.08.017
28. **Gisriel, C.*†**, Elias, E., Shen, G., Soulier, N., Flesher, D., Gunner, M., Brudvig, G.†, Croce, R.†, Bryant, D.† (2023) Helical allophycocyanin nanotubes absorb far-red light in a thermophilic cyanobacterium, *Science Advances*, 9 (12). DOI: 10.1126/sciadv.adg0251
27. **Gisriel, C.*†**, Shen, G., Flesher, D., Kurashov, V., Golbeck, J., Brudvig, G., Amin, M., Bryant, D.† (2023) Structure of a dimeric photosystem II complex from a cyanobacterium acclimated to far-red light, *Journal of Biological Chemistry*, 299 (1) 102815. DOI: 10.1016/j.jbc.2022.102815
26. Wang, J.*†, Liu, J., **Gisriel, C.**, Wu, S., Maschietto, F., Flesher, D., Lolis, E., Lili, G., Brudvig, G., Xiong, Y., Batista, V. (2022) How to correct relative voxel scale factors for calculations of vector-difference Fourier maps in cryo-EM, *Journal of Structural Biology*, 214 (4) 107902. DOI: 10.1016/j.jsb.2022.107902
25. **Gisriel, C.***, Cardona, T.*., Bryant, D., Brudvig, G.† (2022) Molecular evolution of far-red light-acclimated photosystem II, *Microorganisms*, 10 (7) 1270. DOI: 10.3390/microorganisms10071270
24. Flesher, D.*., Liu, J.*., Wiwczar, J.*., Reiss, K., Yang, K., Wang, J., Askerka, M., **Gisriel, C.**, Batista, V., Brudvig, G.† (2022) Glycerol binding at the narrow channel of photosystem II stabilizes the low-spin S₂ state of the oxygen-evolving complex, *Photosynthesis Research*, 152 (2) 167-175. DOI: 10.1007/s11120-022-00911-0
23. **Gisriel, C.***, Brudvig, G.† (2022) Comparison of PsbQ and Psb27 in photosystem II provides insight into their roles, *Photosynthesis Research*, 152 (2) 177-191. DOI: 10.1007/s11120-021-00888-2
22. MacGregor-Chatwin, C.*., Nürnberg, D.*., Jackson, P.*., Vasilev, C., Hitchcock, A., Ho, M-Y., Shen, G., **Gisriel, C.**, Wood, W., Mahbub, M., Selinger, M., Johnson, M., Dickman, M., Rutherford, W., Bryant, D., Hunter, N.† (2022) Changes in supramolecular organisation of cyanobacterial thylakoid membrane complexes in response to far-red light photoacclimation, *Science Advances*, 8 (6). DOI: 10.1126/sciadv.abj4437
21. **Gisriel, C.***, Shen, G., Ho, M-Y., Kurashov, V., Flesher, D., Wang, J., Armstrong, W., Golbeck, J., Gunner, M., Vinyard, D., Debus, R., Brudvig, G.†, Bryant, D.† (2022) Structure of a monomeric photosystem II core complex from a cyanobacterium acclimated to far-red light reveals the functions of chlorophylls d and f, *Journal of Biological Chemistry*, 298 (1) 101424. DOI: 10.1016/j.jbc.2021.101424
20. **Gisriel, C.***, Flesher, D.*., Shen, G., Wang, J., Ho, M-Y., Brudvig, G.†, Bryant, D.† (2022) Structure of photosystem I-ferredoxin complex from a marine cyanobacterium provides insights into far-red light photoacclimation, *Journal of Biological Chemistry*, 298 (1) 101408. DOI: 10.1016/j.jbc.2021.101408
19. **Gisriel, C.***, Wang, J., Liu, J., Flesher, D., Reiss, K., Huang, H-L., Yang, K., Armstrong, W., Gunner, M., Batista, V., Debus, R., Brudvig, G.† (2022) High-resolution cryo-EM

- structure of photosystem II from the mesophilic cyanobacterium, *Synechocystis* sp. PCC 6803, Proceedings of the National Academy of Sciences U.S.A., 119 (1) e2116765118. DOI: 10.1073/pnas.2116765118
18. Orf, G.* , **Gisriel, C.**, Granstrom, J., Baker, P., Redding, K.† (2022) The PshX subunit of the photochemical reaction center from *Helio bacterium modesticaldum* acts as a low-energy antenna. Photosynthesis Research, 151 (1) 11-30. DOI: 10.1007/s11120-021-00871-x
17. Wang, J.*†, **Gisriel, C.**, Reiss, K., Huang, H-L., Armstrong, W., Brudvig, G., Batista, V. (2021) Heterogeneous composition of oxygen-evolving complexes in crystal structures of dark-adapted photosystem II. Biochemistry, 60 (45) 3374-3384. DOI: 10.1021/acs.biochem.1c00611
16. **Gisriel, C.*†**, Huang, H-L.* , Reiss, K., Flesher, D., Batista, V., Bryant, D., Brudvig, G., Wang, J. (2021) Quantitative assessment of chlorophyll types in cryo-EM maps of photosystem I acclimated to far-red light. BBA Advances, 1, 100019. DOI: 10.1016/j.bbadv.2021.100019
15. **Gisriel, C.*†**, Azai, C., Cardona, T. (2021) Recent advances in the structural diversity of reaction centers. Photosynthesis Research, 149 (3), 329-343. DOI: 10.1007/s11120-021-00857-9
14. Singh, A.* , Mandal, S., Chen, Shaojiang, Liu, M., **Gisriel, C.**, Carey, A., Yan, H., Seo, D-K., Lin, S., Woodbury, N. W.† (2021) Interfacing photosystem I reaction centers with a porous antimony-doped tin oxide electrode to perform light-driven redox chemistry. ACS Applied Electronic Materials, 3 (5), 2087-2096. DOI: 10.1021/acsaeml.1c00101
13. Tros, M.* , Mascoli, V.* , Shen, G., Ho, M-Y., Bersanini, L., **Gisriel, C.**, Bryant, D., Croce, R.† (2021) Breaking the red-limit: Efficient trapping of long-wavelength excitations in chlorophyll f-containing Photosystem I. Chem, 7 (1), 155-173. DOI: 10.1016/j.chempr.2020.10.024
12. **Gisriel, C.***, Fromme, P., Martin-Garcia, J.† (2021) “Methods for Crystallization and Structural Determination of M-T7 Protein from Myxoma Virus” in: “Viruses as Therapeutics”, Volume 2225 on Methods in Molecular Biology (Alexandra Lucas, eds. in chief Henry Rodgers and Vishnu Prakash) Springer Nature, New York, New York, pp. 125-162. DOI: 10.1007/978-1-0716-1012-1
11. **Gisriel, C.***, Zhou, K., Huang, H-L., Debus, R., Xiong, Y., Brudvig, G.† (2020) Cryo-EM structure of monomeric Photosystem II from *Synechocystis* sp. PCC 6803 lacking the water-oxidation complex. Joule, 4 (10), 2131-2148. DOI: 10.1016/j.joule.2020.07.016
10. Wang, J.*†, Perez-Cruet, J., Huang, H-L., Reiss, K., **Gisriel, C.**, Banerjee, G., Kaur, D., Ghosh, I., Dziarski, A., Gunner, M., Batista, V., Brudvig, G.† (2020). Identification of a Na⁺-binding site near the oxygen-evolving complex of spinach photosystem II. Biochemistry, 59 (30), 2823-2831. DOI: 10.1021/acs.biochem.0c00303
9. **Gisriel, C.*†**, Wang, J., Brudvig, G., Bryant, D. (2020). Opportunities and challenges for assigning cofactors in cryo-EM density maps of chlorophyll-containing proteins. Communications Biology, 3 (408). DOI: 10.1038/s42003-020-01139-1
8. **Gisriel, C.***, Shen, G., Kurashov, V., Ho, M-Y., Zhang, S., Williams, D., Golbeck, J., Fromme, P., Bryant, D.† (2020). The structure of Photosystem I acclimated to far-red light illuminates an ecologically important acclimation process in photosynthesis. Science Advances, 6 (6). DOI: 10.1126/sciadv.aay6415
7. Kaur, D.* , **Gisriel, C.†**, Burnap, R., Fromme, P., Govindjee, G.† (2019). Gordon Research Conference 2019: From the biophysics of natural and artificial photosynthesis to bioenergy conversion. Current Plant Biology, 22,100129. DOI: 10.1016/j.cpb.2019.100129
6. **Gisriel, C.***, Coe, J.* , Letrun, R., Yefanov, O., Luna-Chavez, C., Stander, N., Lisova, S., Mariani, V., Kuhn, M., Aplin, S., Grant, T., Dörner, K., Sato, T., Echelmeier, A., Cruz

- Villarreal, J., Hunter, M., Wiedorn, M., Knoska, J., Mazalova, V., Roy-Chowdhury, S., Yang, J.-H., Jones, A., Bean, R., Bielecki, J., Kim, Y., Mills, G., Weinhausen, B., Meza, J., Al-Qudami, N., Bajt, S., Brehm, G., Botha, S., Boukhele, D., Brockhauser, S., Bruce, B., Coleman, M., Danilevski, C., Discianno, E., Dobson, Z., Fangohr, H., Martin-Garcia, J., Gevorkov, Y., Hauf, S., Hosseini-zadeh, A., Januscheck, F., Ketawala, G., Kupitz, C., Maia, L., Manetti, M., Messerschmidt, M., Michelat, T., Mondal, J., Ourmazd, A., Previtali, G., Sarrou, I., Schön, S., Schwander, P., Shelby, M., Silenzi, A., Sztuk-Dambietz, J., Szuba, J., Turcato, M., White, T., Wrona, K., Xu, C., Abdellatif, M., Zook, J., Spence, J., Chapman, H., Barty, A., Kirian, R., Frank, M., Ros, A., Schmidt, M., Fromme, R., Mancuso, A., Fromme, P.[†], Zatsepin, N.[†] (2019). Membrane protein megahertz crystallography at the European XFEL. *Nature Communications*, 10 (1), 5021. DOI: 10.1038/s41467-019-12955-3
5. Orf, G.*, **Gisriel, C.***, Redding, K.[†] (2018). Evolution of photosynthetic reaction centers: insights from the structure of the heliobacterial reaction center. *Photosynthesis Research*, 138 (1), 11-37. DOI: 10.1007/s11120-018-0503-2
 4. **Gisriel, C.***, Saroussi, A., Ramundo, S., Fromme, P., Govindjee, G.[†] (2017). Gordon Research Conference on photosynthesis: Photosynthetic plasticity from the environment to synthetic systems. *Photosynthesis Research*, 136 (3), 393-405. DOI: 10.1007/s11120-017-0472-x
 3. **Gisriel, C.***, Sarrou, I., Ferlez, B., Golbeck, J., Redding, K., Fromme, R.[†] (2017). Structure of a symmetric photosynthetic reaction center–photosystem. *Science*, 357 (6355), 1021-1025. DOI: 10.1126/science.aan5611
 2. Herrera-Theut, K.*, **Gisriel, C.**, Laureanti, J., Orf, G., Baker, P., Jones, A., Redding, K.[†] (2017). Evaluating the role of a multi-heme cytochrome c in electron transfer from an electrode surface to *Heliobacterium modesticaldum*. *The FASEB Journal*, 31, 913.13-913.13
 1. Ferlez, B.*, Cowgill, J., Dong, W., **Gisriel, C.**, Lin, S., Flores, M., Walters, K., Cetnar, D., Redding, K.[†], Golbeck, J.[†] (2016). Thermodynamics of the electron acceptors in *Heliobacterium modesticaldum*: An exemplar of an early homodimeric type I photosynthetic reaction center. *Biochemistry*, 55(16), 2358-2370. DOI: 10.1021/acs.biochem.5b01320

Selected Presentations

Invited speaker:

Gordon Conference on Photosynthesis (Sunday River, ME)	2023
Int'l Conference on Photosynthesis Research for Sustainability (Istanbul, TR)	2023
CBMS Workbench at Brookhaven National Lab (Online)	2022
Int'l Symposium on Photosynthetic Prokaryotes (Liverpool, UK)	2022
Int'l Congress on Photosynthesis Research Water Splitting Satellite Meeting (Online)	2022
Int'l Congress on Photosynthesis Research (Online)	2022
Middle Atlantic Regional Meeting of the American Chem. Soc. (Ewing Township, NJ)	2022
Eastern Regional Photosynthesis Conference (Wood's Hole, MA)	2022
Half Hollows Hills High School, Nat'l Honors Soc. (Online)	2022
Dissertation Writing Camp (Graduate and Professional Student Association, ASU)	2018
Caltech GeoClub Seminar (Pasadena, CA)	2018
Center for Bioenergy and Photosynthesis (ASU)	2018
Gordon Research Seminar on Photosynthesis (Newry, ME)	2017

Speaker:

Eastern Regional Photosynthesis Conference (Wood's Hole, MA)	2023
New England Cryo-EM Symposium (Harvard Med. School)	2022
Yale Plant Molecular Biology Seminar (New Haven, CT)	2022
New England Cryo-EM Symposium (Online)	2022
Western Photosynthesis Conference (Online)	2022
Annual Research Frontier Symposium (Online)	2022
Yale Plant Molecular Biology Seminar (Online)	2022
Sussex Symposium of Plant Biology (Online)	2021
Midwest Photosynthesis Conference (Online)	2021
Annual Research Frontier Symposium (Online)	2021
Midwest Photosynthesis Conference (Online)	2020
Eastern Regional Photosynthesis Conference (Online)	2020
Western Photosynthesis Conference (Friday Harbor, WA)	2019
Int'l Symposium on Phototrophic Prokaryotes (Vancouver, CD)	2018
Western Photosynthesis Conference (Oracle, AZ)	2018
Int'l Congress on Photosynthesis Research (Maastricht, NLD)	2016

Teaching Experience and Training

Postdoctoral Certificate of College Teaching Preparation, Yale U., Poorvu Center for Teaching and Learning	2022
Center for the Integration of Research, Teaching and Learning Course, "Advancing Learning Through Evidence-Based STEM Teaching"	2022
Advanced Teaching Workshops, Yale U., Poorvu Center for Teaching and Learning: Classroom Teaching Observation, First Generation and Non-Traditional Students, Online Teaching, Mental Health in the Classroom, Gathering and Interpreting Feedback, Preparing and Delivering an Effective Lecture	2022
Postdoctoral Mentor, for David A. Flesher, Yale U.	2020 – present
Poorvu Center Chem. Peer Mentoring Workshop, Participant, Yale U.	2020
Postdoctoral Mentor, for Shota Shimizu (Okayama University), ASU	2019
Photosynthesis Team Leader, Fromme Lab, ASU	2018 – 2019
Biochemistry 463, Teacher's Assistant, ASU (two semesters)	2017
Biochemistry 462, Teacher's Assistant, ASU	2016
Biochemistry 392, Graduate Mentor for Kathryn Herrera, ASU	2015 – 2016
Biochemistry 462, Teacher's Assistant, ASU	2015
Biochemistry 392, Graduate Mentor for Dustin Luu, ASU	2014 – 2015
Biochemistry 463, Teacher's Assistant, ASU	2014
Biochemistry 462, Teacher's Assistant, ASU	2013

Service

<i>Ad hoc journal reviewer:</i> Nature, Nature Communications, Nature Plants, Communications Biology, eLife, Structure, Journal of Physical Chemistry, Biochemistry, Trends in Microbiology, Biochimica et Biophysica Acta – Bioenergetics, Biochemical Journal, Journal of the Royal Society Interface, Photosynthesis Research, Free Radical Biology and Medicine, Geobiology	2016 – present
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CURRICULUM VITAE

Christopher J. Gisriel

Ad hoc grant reviewer: Department of Energy (Office of Basic Energy Sciences), and King Abdullah University of Science and Technology Annual Research Frontier Symposium, Student committee chair	2021 – present
Yale Chemistry “ The Periodical” Art Zine , Co-founder and board member	2022
Yale Chemistry Peer Group “Postdoctoral Career Discussion”, Organizer	2021 – present
Yale Chemistry Diversity and Climate Committee, Member	2021 – present
Eastern Regional Photosynthesis Conference, Moderator	2021
Annual Research Frontier Symposium, Student committee chair	2021
Gordon Research Seminar Chair	2019

Membership

American Chemical Society, Member	2023 – present
American Society for Biochem. and Molecular Biology (ASBMB), Member	2021 – present
BioXFEL Scholar	2018 – present
International Society of Photosynthesis Research (ISPR), Member	2018 – present
Achievement Rewards for College Scientists (ARCS) Scholar	2017 – present

Selected Press

YaleNews “Soaking up sunlight with a microscopic molecular device”	2023
Department of Energy “Understanding the Secrets of Photosynthesis in the Shade”	2022
Yale Scientific Mag. “Visualizing the heart of photosynthesis”	2022
ASBMB Today “How a cyanobacterium makes far-red light mean ‘go’”	2022
YaleNews “A superstar enzyme is ready for its close-up”	2021
YaleNews “Bright Future for Crops Revealed by Photosynthesis in the Shade”	2021
YaleNews “Yale Chemistry Postdoc Awarded Esteemed Career-Starter Award”	2021
YaleNews “In portrait: nature’s master thief as a young enzyme”	2020
AAAS “Scientists solve structure enabling cyanobacteria to thrive in low light”	2020
AAAS “Photosynthesis seen in a new light by rapid X-ray pulses”	2019
Department of Energy “A New View on a Very Old Problem: Evolution of the Photochemical Reaction Centers”	2019
Wired Magazine, “Scientists are rewriting the history of photosynthesis”	2017
Advanced Photon Source, “The Origins of Photosynthesis in a Sun-loving Bacteria”	2017
Quanta Magazine, “Simple Bacteria Offer Clues to the Origins of Photosynthesis”	2017

Additional Information

Protected Veteran: 3/116 th Light Infantry, VA Army National Guard (Afghanistan) Battalion Unit Logistics Specialist	2003 – 2006
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