Elijah Gruszecki

Email: elijah.gruszecki@gmail.com

Education

Rensselaer Polytechnic Institute, Troy, NY

B.S in Physics, Fall 2022 (Expected), GPA: 3.92

Northampton High School, Northampton, MA
June 2019 GPA: 3.89

High School Honors Program, Boston University, Boston, MA
Aug 2018 GPA: 3.85

Coursework

NMR Spectroscopy, Inorganic Chemistry I, Microscopic Physical Chemistry, Thermodynamics and Statistical Mechanics, Experimental Physics, Advanced Calculus, Introduction to Quantum Mechanics, Numerical Computing, Theoretical Mechanics, Introduction to Biology with Lab, Introduction to Differential Equations, Passion for Physics, Honors Physics 1, Quantum Physics 1, Computer Science 1, Quantum Physics 2, Multivariable Calculus and Matrix Algebra, Great Ideas in Philosophy, Honors Physics 2, General Psychology, Introduction to Logic, Bioethics, Philosophy of Science

Experience

Research at RPI October 2019−Present
Working with Prof. K. V. Lakshmi on the application of DFT calculations and HYSCORE spectroscopy to study the structure and function of the charge-transfer cofactors in type I and II photosynthetic reaction center proteins.

Research at Yale August 2021−Present
Worked in the Batista Lab to model use of the semiconductor Gallium Nitride for use in solar based water oxidation.

Employment

IT Intern at RPI (maintaining the NSF REU and lab web sites)

IT Intern at Palmer Foundry (wrote documentation and html code)

Volunteer at Lily Library (Helped patrons locate books, organized books on shelves)

Skills

Experience with Python, Java, LaTeX, Microsoft Office, VBA, Matlab

Basic knowledge of HTML and PHP

Experience with technical writing

Proficiency with ORCA software for DFT calculations

Proficiency in using VASP for ab initio QM calculations

Experience with molecular modelling software (Gaussview, Avogadro, VMD, Vesta, Discovery Studio)

Honors/ Awards

Dean's Honor List

Rensselaer Leadership Award

Publications

1. M. Gorka, E. Gruszecki, P. Charles, V. Kalendra, K. V. Lakshmi and J. H. Golbeck "Two-dimensional HYSCORE Spectroscopy Reveals Histidine as the Axial Ligand to Chl_{3A} in the M688HPsaA Genetic Variant of Photosystem I" (2021) Biochim. Biophys. Acta- Bioenergetics, 1862, 7, 2021, 148424, https://doi.org/10.1016/j.bbabio.2021.148424.
2. M. Gorka, A. Baldansuren, E. Gruszecki, A. Malnati, J. H. Golbeck and K. V. Lakshmi "Shedding Light on Primary Donors in Photosynthetic Reaction Centers" (2021) Frontiers in Microbiology, 12, 2021, https://doi.org/10.3389/fmicb.2021.735666
3. E. Gruszecki, R. Blow, V. Kalendra and K. V. Lakshmi, **"**Understanding the Role of Chlorophylls as Charge-transfer Cofactors Using Pulsed EPR Spectroscopy and Density Functional Theory", Manuscript in Preparation.
4. A. Baldansuren, E. Gruszecki, A. Malnati, D. Xiao, J-J. Benoit and K. V. Lakshmi "DFT Studies of the Quinone Electron Acceptor of Photosystem II and Related Model Systems", Manuscript in Preparation.
5. D. Méndez-Hernández, S. J. Mora, E. Gruszecki, A. Baldansuren, R. Blow, V. Kalendra, T. A. Moore, A. L. Moore and K. V. Lakshmi "BiP-PF_{15} as a Mediator for Water Oxidation in Artificial Photosynthesis: Influence of Steric Effects on Proton-coupled Electron Transfer Reactions" Manuscript in Preparation.

Conference Presentations

1. J.Aguirre, E. Gruszecki, R. Blow, V. Kalendra, S. Mora, T. Moore, A. Moore, K. Lakshmi, D. Mendez. "2D HYSCORE and DFT studies of one-electron–two-

proton transfer in a bioinspired artificial photosynthetic reaction center" American Chemical Society Conference, March, 2022.

2. M. Gorka, A. Baldansuren, A. Malnati, E. Gruszecki, J. H. Golbeck, K. V. Lakshmi. "SHEDDING LIGHT ON PRIMARY DONORS IN PHOTOSYNTHETIC REACTION CENTERS" 31st Western Photosynthesis Conference, March, 2022
3. M. Gorka, E. Gruszecki, P. Charles, V. Kalendra, K. V. Lakshmi, J. H. Golbeck. "REVEALING THE DIMERIC NATURE OF THE PRIMARY ACCEPTOR IN PHOTOSYSTEM I" 47th Annual Midwest/Southeast Photosynthesis Conference, October, 2021
4. M. Gorka, A. Baldansuren, A. Malnati, E. Gruszecki, J. H. Golbeck, K. V. Lakshmi. "SHEDDING LIGHT ON PRIMARY DONORS IN PHOTOSYNTHETIC REACTION CENTERS", Biophysical Society Meeting, February, 2022.
5. M. Gorka, P. Charles, E. Gruszecki, V. Kalendra, K. V. Lakshmi, J. H. Golbeck. "Shedding light on the dimeric nature of the primary acceptor in photosystem I" American Chemical Society Middle Atlantic Regional Meeting, June, 2022.
6. E. Gruszecki, M. Gorka, P. Charles, V. Kalendra, K. V. Lakshmi, J. H. Golbeck. "Spectroscopic and computational analysis of the dimeric chlorophyll acceptor in the M688HPsaA genetic variant of Photosystem I" The First Annual New York Capital Region Applied Spectroscopy Symposium, May, 2022.
7. E. Gruszecki, M. Gorka, P. Charles, V. Kalendra J. H. Golbeck, K. V. Lakshmi. "Spectroscopic and computational analysis of the dimeric chlorophyll acceptor in the M688HPsaA genetic variant of Photosystem I" American Chemical Society Middle Atlantic Regional Meeting, June, 2022.
8. E. Gruszecki, M. Gorka, P. Charles, V. Kalendra, J. H. Golbeck, K. V. Lakshmi. "Spectroscopic and computational analysis of the dimeric chlorophyll acceptor in the M688HPsaA genetic variant of Photosystem I" American Physical Society Conference, April, 2022.

9. E. Gruszecki, M. Gorka, P. Charles, V. Kalendra, J. H. Golbeck, K. V. Lakshmi. "Spectroscopic and computational analysis of the dimeric chlorophyll acceptor in the M688HPsaA genetic variant of Photosystem I" American Physical Society Conference, March, 2022.
10. E. Gruszecki, M. Gorka, P. Charles, V. Kalendra, J. H. Golbeck, K. V. Lakshmi. "Spectroscopic and computational analysis of the dimeric chlorophyll acceptor in the M688HPsaA genetic variant of Photosystem I" American Chemical Society Conference, March, 2022.
11. E. Gruszecki and K.V. Lakshmi "BiP-PF_{15} as a Mediator for Water Oxidation in Artificial Photosynthesis: Influence of Steric Effects on Proton-coupled Electron Transfer Reactions" Undergraduate Research Symposium (Troy, NY), April, 2021.
12. E. Gruszecki, A. Manalti, D. Xiao, J. Benoit, A. Baldansuren and K. V. Lakshmi "DFT Studies of the Quinone Electron Acceptor of Photosystem II and Related Model Systems" American Physical Society Conference, April, 2021.
13. E. Gruszecki, D. Xiao, A. Malnati, J-J. Benoit and K. V. Lakshmi "Density Functional Theory of Quinone Cofactors in Photosynthesis" (2021) American Chemical Society Conference, April, 2021.
14. E. Gruszecki, A. Manalti, D. Xiao, J-J. Benoit, A. Baldansuren and K. V. Lakshmi "DFT Studies of the Quinone Electron Acceptor of Photosystem II and Related Model Systems" 13th Annual ENY-ACS Undergraduate Research Symposium, April, 2021.
15. M. Gorka, P. Charles, V. Kalendra, E. Gruszecki, J. H. Golbeck and K. V. Lakshmi "Revealing the Dimeric Nature of the Primary Acceptor in Photosystem I" Western Regional Photosynthesis Conference, January, 2021.
16. M. Gorka, P. Charles, V. Kalendra, E. Gruszecki, J. H. Golbeck and K. V. Lakshmi "Revealing the Dimeric Nature of the Primary Acceptor in Photosystem I" Mid-western Regional Photosynthesis Conference, January, 2021.

17. M. Gorka, P. Charles, V. Kalendra, E. Gruszecki, J. H. Golbeck and K. V. Lakshmi "Revealing the Dimeric Nature of the Primary Acceptor in Photosystem I" 37th Eastern Regional Photosynthesis Conference, May, 2021.
18. A. Malnati, E. Gruszecki, J-J. Benoit, D. Xiao, A. Baldansuren and K. V. Lakshmi "Density Functional Theory Investigations of Change-Transfer Cofactors in Photosynthesis" American Physical Society Conference, April, 2021.
19. M. Gorka, P. Charles, V. Kalendra, E. Gruszecki, J. H. Golbeck and K. V. Lakshmi "Revealing the Dimeric Nature of the Primary Acceptor in Photosystem I" Annual Biophysical Society Conference, March, 2021.
20. A. Malnati, E. Gruszecki, J. Benoit, D. Xiao, A. Baldansuren and K. V. Lakshmi "Density Functional Theory Investigations of Change-Transfer Cofactors in Photosynthesis" American Physical Society Conference, March, 2021.
21. A. Malnati, E. Gruszecki, J. Benoit, D. Xiao, A. Baldansuren and K. V. Lakshmi "Density Functional Theory Investigations of Change-Transfer Cofactors in Photosynthesis" Women in Physics Conference, Columbia University (New York, NY), March, 2021.
22. E. Gruszecki, A. Manalti, D. Xiao, J-J. Benoit, A. Baldansuren and K. V. Lakshmi "DFT Studies of the Quinone Electron Acceptor of Photosystem II and Related Model Systems" American Physical Society Conference, March, 2021.
23. E. Gruszecki, R. Blow and K. V. Lakshmi "Comparison of Tetramesityl Porphyrin and Magnesium Tetramesityl Porphyrin Cations Using HYSCORE Spectroscopy and Computational Methods" Undergraduate Research Symposium (Troy, NY), April, 2020.
24. E. Gruszecki, R. Blow and K.V. Lakshmi "Understanding the Role of Chlorophylls as Charge-Transfer Cofactors Using EPR Spectroscopy and Density Functional Theory" Center for Materials, Devices and Integrated Systems (cMDIS) Annual Research Symposium, November, 2019.

Activities Member of Rensselaer Astrophysics Society 2019-Present

	Member of Society for Physics Student	2019-Present
	Member of RPI Fencing Team	2019-Present
	Treasurer of Rensselaer Astrophysical Society	2020-2021
	Undergrad Facilitator for Quantum Physics 1	2020-2020
	Vice President of Rensselaer Astrophysical Society	2021-2022
	President of Rensselaer Astrophysical Society	2022-Present
Interests	Fencing, Astronomy, Trivia	