

## Invited Oral Presentation at International Conference

- 6) **Gary Hastings** (2022)  
International Congress on Photosynthesis Research 2022. Dunedin, New Zealand.  
Time-resolved FTIR Difference Spectroscopy for the Study of Photosystem I With High-potential Naphthoquinones Incorporated into the A<sub>1</sub> Binding Site.
  - 5) **Gary Hastings** (2019)  
European Conference on the Spectroscopy of Biological Molecules 2019. August 2019. Dublin, Republic of Ireland. Fourier Transform Visible and Infrared Difference Spectroscopy for the Study of P700 in Photosystem I from *F. thermalis* Cells Grown Under White Light and Far-red Light: Evidence that the A<sub>1</sub> Cofactor is Chlorophyll *f*.
  - 4) **Gary Hastings** (2019)  
10<sup>th</sup> International Conference on. Advanced Vibrational Spectroscopy. July 2019. Auckland, New Zealand. Time-resolved FTIR difference spectroscopy in combination with quantum chemical calculations for the study of pigments in protein complexes.
  - 3) **Gary Hastings** (2009)  
5<sup>th</sup> International Conference on. Advanced Vibrational Spectroscopy. July 2009. Melbourne, Australia. Viral Infection of Cells in Culture Detected Using Infrared Microscopy.
  - 2) **Gary Hastings** (2005)  
3rd. International Conference on Advanced Vibrational Spectroscopy. Delavan, WI.  
Solar Conversion In Plants and Bacteria Studied Using Time-resolved Step-scan Fourier Transform Infra-red Difference Spectroscopy”
  - 1) **Gary Hastings** (2004)  
13th International Conference Of Photosynthesis. Montreal, Canada.  
A<sub>1</sub> Reduction in Intact Cyanobacterial Photosystem I Studied Using Time-resolved Step-scan Fourier Transform Infra-red Difference Spectroscopy In Combination With Isotope Labeling and Quinone Exchange Experiments.
- c.4.2) Oral Presentations at Conference** (presenter underlined).
- 63) **Hiroki Makita**, Philip Simon, **Gary Hastings** and Jan Kern (2022)  
Polarized Infrared Microspectroscopy of Single Photosystem I Microcrystals.  
48<sup>th</sup> Midwest/Southeast Photosynthesis Conference, Conference Booklet, p15.
  - 62) **Julia Kirpich**, Lujun Luo, Michael Nelson, Neva Agarwala, Wu Xu and **Gary Hastings** (2022)  
A<sub>1</sub> chlorophylls contribute to P700 spectrum in photosystem I: photoaccumulated FTIR difference spectroscopy of the mutants near the A<sub>1</sub> chlorophylls (PsaA-N600M and PsaB-N582M) of photosystem I from *Synechocystis* sp. PCC 6803.  
48<sup>th</sup> Midwest/Southeast Photosynthesis Conference, Conference Booklet, p12.
  - 61) **Will Chandler**, **Gary Hastings** and Yi Jiang (2022)  
How did they die? FTIR Spectra of T-cell Apoptosis Analyzed.  
Molecular Basis of Disease Summer Undergraduate Fellows Luncheon. July. 2022.
  - 60) **Gary Hastings** (2022)  
Suddath Symposium. Virtual. Jan. 13-14. Virtual (Georgia Institute of Technology).  
Infrared Difference Spectroscopy for the Study of P700 in Photosystem I.
  - 59) **Gary Hastings** (2021)  
Photosynthetic Systems Principal Investigators Meeting. Virtual. Nov. 16-17. Time-resolved Infrared Difference Spectroscopy for the Study of Cofactors Involved in Electron Transfer in Photosystem I.
  - 58) **Gary Hastings** (2021)  
Photosynthetic Systems Principal Investigators Meeting. Virtual event. Nov. 16-18.  
Time-resolved FTIR Difference Spectroscopy for the Study of Cofactors Involved in Electron Transfer in Photosystem I.

- 57) **Gary Hastings** (2019)  
Eastern Regional Photosynthesis Conference. May 3-5, 2019. Woods Hole, MA.  
Fourier Transform Visible and Infrared Difference Spectroscopy for the Study of P700 in Photosystem I from *F. thermalis* Cells Grown Under White Light and Far-red Light: Evidence that the A<sub>1</sub> Cofactor is Chlorophyll *f*.
- 56) **Gary Hastings** (2019)  
Photosynthetic Systems Principal Investigators Meeting. Gaithersburg Marriott, Washingtonian Center, Gaithersburg, MD. Oct. 21-23.  
Time-resolved FTIR Difference Spectroscopy for the Study of Different Quinones in the A<sub>1</sub> Binding Site in Photosystem I.
- 55) **Neva Agarwala**, Hiroki Makita and **Gary Hastings** (2019)  
Photosystem I with halogenated naphthoquinones incorporated into the A<sub>1</sub> binding site studied using time resolved FTIR difference spectroscopy.  
45<sup>th</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 25-27. Conference booklet, p8.
- 54) **Hiroki Makita** and **Gary Hastings** (2019)  
Vibrational Modes of Neutral State Quinones in Photosystem I.  
45<sup>th</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 25-27. Conference booklet, p35.
- 53) **Leyla Rohani** and **Gary Hastings** (2019)  
ONIOM Modeling of the A<sub>1</sub> Binding Site in Photosystem I.  
45<sup>th</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 25-27. Conference booklet, p43.
- 52) **Gary Hastings** (2019)  
European Conference on the Spectroscopy of Biological Molecules 2019. August 2019. Dublin, Republic of Ireland. Fourier Transform Visible and Infrared Difference Spectroscopy for the Study of P700 in Photosystem I from *F. thermalis* Cells Grown Under White Light and Far-red Light: Evidence that the A<sub>1</sub> Cofactor is Chlorophyll *f*.
- 51) **Gary Hastings** (2019)  
10<sup>th</sup> International Conference on. Advanced Vibrational Spectroscopy. July 2019. Auckland, New Zealand. Time-resolved FTIR difference spectroscopy in combination with quantum chemical calculations for the study of pigments in protein complexes.
- 50) **Gary Hastings**, Hiroki Makita, Neva Agarwala, Leyla Rohani, Gaozhong Shen, Donald Bryant (2019). Light-induced (P700<sup>+</sup>-P700) FTIR Difference Spectra Obtained Using Photosystem I from *Fischerella thermalis* Cells Grown Under White Light and Far-red Light.  
Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p24.
- 49) **Leyla Rohani** and **Gary Hastings** (2019). QM/MM, ONIOM-Type Vibrational Frequency Calculations for Simulating Time-resolved FTIR Difference Spectra. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p8.
- 48) **Neva Agarwala**, Hiroki Makita and **Gary Hastings** (2019). Photosystem I with high potential naphthoquinones incorporated into the A<sub>1</sub> binding site studied using time resolved infrared difference spectroscopy. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p8.
- 47) **Hiroki Makita** and **Gary Hastings** (2018)  
Inverted-region electron transfer in PSI, and incorporation of benzoquinones into the A<sub>1</sub> binding site. Photosynthesis: From light to life conference. Montreal, Canada. July 16-20.
- 46) **Leyla Rohani** and **Gary Hastings** (2018)  
QM/MM Studies of semiquinones in the A<sub>1</sub> binding site of photosystem I.

- 44th Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 26-28. Conference booklet, p22.
- 45) **Gary Hastings** (2018)  
FTIR Microscopy for Probing the Molecular Composition of Microalgal Cells Grown Under Nutrient Stress. 35<sup>th</sup> Eastern Regional Photosynthesis Conference, Wood's Hole, MA. May 4-6.
- 44) **Gary Hastings** (2018)  
FTIR Microscopy for Assessment of the Molecular Composition of Microbial Cells Grown Under Nutrient Stress. Annual Research Symposium, Alabama State University. Montgomery, AL. March 14-15.
- 43) **Leyla Rohani** and **Gary Hastings** (2018)  
Vibrational Spectroscopy: Study of Quinones in the A<sub>1</sub> Binding Site in Photosystem I. Women in Physics Conference. Georgia State University. April 2018.
- 42) **Leyla Rohani**, Hiroki Makita and **Gary Hastings** (2017)  
Vibrational Spectroscopy: Study of Quinones in the A<sub>1</sub> Binding Site in Photosystem I. Physics Graduate Student Association Annual Meeting. Dec. 1, 2017.
- 41) **Leyla Rohani**, Hiroki Makita and **Gary Hastings** (2017)  
Vibrational frequency calculations for quinones in the A<sub>1</sub> binding site in Photosystem I. 43<sup>rd</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park. Marshal IN. Oct. 27-29. Conference Booklet, p22.
- 40) **Hiroki Makita** and **Gary Hastings** (2017)  
Photosystem I with different benzoquinone analogues incorporated into the A1 binding site. 43<sup>rd</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park. Marshal IN. Oct. 27-29. Conference Booklet, p21.
- 39) **Hiroki Makita** and **Gary Hastings** (2017)  
Electron transfer processes of photosystem I. Molecular Basis of Disease Graduate Fellows Meeting. Oct. 17.
- 38) **Michael Nelson** and **Gary Hastings** (2017)  
Probing electron transfer processes of photosystem I. Molecular Basis of Disease Summer Undergraduate Fellows Luncheon. July. 24.
- 37) **Hiroki Makita** and **Gary Hastings** (2017)  
Biological Electron Transfer in Photosystem I. Molecular Basis of Disease Fellows Presentation. March 23, 2017. Georgia State University. Atlanta GA.
- 36) **Hiroki Makita** and **Gary Hastings** (2016)  
The A<sub>1</sub> Binding Site in Photosystem I Studied by Time-Resolved FTIR Difference Spectroscopy. 42<sup>nd</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park. Marshal IA. Nov. 4-6, 2016. Abstracts Booklet p16.
- 35) **Hiroki Makita** and **Gary Hastings** (2015)  
Solar Energy Conversion in Plants and Bacteria. Molecular Basis of Disease Focus Group Research Conference. June 2015. Georgia State University. Atlanta GA.
- 34) **Hiroki Makita** and **Gary Hastings** (2015)  
Biological Electron Transfer in Photosystem I. Physics Graduate Student Association Annual Conference. April. 24.
- 33) **Hiroki Makita** and **Gary Hastings** (2015)  
P700<sup>+</sup>A<sub>1</sub><sup>-</sup> Charge Recombination in Photosystem I Occurs in the Marcus Inverted Region. 32<sup>nd</sup> Annual Eastern Regional Photosynthesis Conference. Woods Hole. MA. April. 17-19. Conference Program and Abstract Booklet Page 31.
- 32) **Hiroki Makita** and **Gary Hastings** (2014)  
Time-Resolved Visible and Infrared Difference Spectroscopy for the Study of Photosystem I With Different Quinones Incorporated Into the A1 Binding Site.

- 40<sup>th</sup> Annual Midwest/Southeast Photosynthesis Meeting.  
Turkey Run State Park. Marshal IA. Oct. 24-26, 2014. Abstracts Booklet p18.
- 31) Nan Zhao, Hiroki Makita and **Gary Hastings** (2014)  
Time-resolved spectroscopic studies of photosystem I particles with different quinones occupying the A<sub>1</sub> binding site. 31<sup>st</sup> Eastern regional photosynthesis conference. Woods Hole. MA. April. 4-6. Conference Program and Abstract Booklet Page 12.
- 30) Samuel Mula, Michael McConnell, Amy Ching, Nan Zhao, Heather Gordon, **Gary Hastings**, Kevin Redding and Art van der Est. (2013)  
Introduction of a Hydrogen Bond between Phylloquinone PhQA and a Threonine Side-chain OH Group in Photosystem I. 30<sup>th</sup> Eastern regional photosynthesis conference. Woods Hole. MA. April. 12-14. Abstract Booklet Page 8.
- 29) Yasser Hussein and **Gary Hastings** (2012)  
Solar energy conversion processes in plants and bacteria studied using nanosecond time-resolved visible and infrared spectroscopy. (Presentation open to the public).  
Qatar Sustainability Expo. Renewable Energy & Water Management Session. Dec. 1, 2012. Qatar International Exhibition Centre.
- 28) Hari Lamichhane and **Gary Hastings** (2011).  
The Q<sub>A</sub> Ubiquinone in *Rhodobacter sphaeroides* Photosynthetic Reaction Centers Is Not Strongly Hydrogen Bonded. 28th Annual eastern regional conference in photosynthesis. Woods Hole. MA. April. 1-3 2011. Abstract Booklet Page 27.
- 27) Nan Zhao and **Gary Hastings** (2010).  
Time-resolved FTIR Difference Spectroscopy for the Study of A<sub>1</sub>, the Secondary Electron Acceptor in Photosystem I.  
36th Annual midwest/southeast photosynthesis meeting. Turkey Run State Park. Marshal IA. Oct. 29-31 2010. Abstract Booklet Page 15.
- 26) Hari P. Lamichhane and **Gary Hastings** (2010).  
ONIOM method for the exploration of double difference spectra of ubiquinone in the Q<sub>A</sub> binding site of Rb. Sphaeroides.  
36th Annual midwest/southeast photosynthesis meeting. Turkey Run State Park. Marshal IA. Oct. 29-31 2010. Abstract Booklet Page 24.
- 25) Nan Zhao and **Gary Hastings** (2010)  
Molecular Details of Cofactors involved in Solar Energy Conversion in Plants and Bacteria  
5th Annual Molecular Basis of Disease Focus Group Research Conference. May 2010. Georgia State University. Atlanta GA.
- 24) **Gary Hastings**, Peter Krug, Ruili Wang, Jing Guo, Hari Lamichhane, Tian Tang, Yu-sheng Hsu, John Ward, David Katz and Julia Hilliard (2009)  
Viral Infection of Cells in Culture Detected Using Infrared Microscopy  
Abstract NC.00006. 76th Annual Meeting of the Southeastern Section of American Physical Society. Nov. 2009. Atlanta GA.
- 23) **Gary Hastings** and Sreeja Parameswaran  
Modifying P700, An Important Chlorophyll Species Involved In Solar Energy Conversion in Plants and Bacteria. Abstract NC.00007. 76th Annual Meeting of the Southeastern Section of American Physical Society. Nov. 2009. Atlanta GA.
- 22) Nan Zhao and **Gary Hastings** (2009)  
FTIR Difference Spectroscopy for the Study of A<sub>1</sub> in Photosystem I.  
Abstract NC.00005. 76th Annual Meeting of the Southeastern Section of American Physical Society. Nov. 2009. Atlanta GA.
- 21) Hari Lamichhane and **Gary Hastings** (2009)  
Calculated and Experimental Vibrational Properties of P700 and the Iron Sulfur Cluster in Photosystem I. Abstract NC.00004. 76th Annual Meeting of the Southeastern Section of American Physical Society. Nov. 2009. Atlanta GA.

- 20) **Gary Hastings**, Peter Krug, Ruili Wang, Jing Guo, Hari P. Lamichhane, Tian Tang, Yu-sheng Hsu, John Ward, David Katz and Julia Hilliard. (2009)  
5th International Conference on. Advanced Vibrational Spectroscopy. July 2009. Melbourne, Australia. Viral Infection of Cells in Culture Detected Using Infrared Microscopy.
- 19) **Hari Prasad Lamichhane** and **Gary Hastings** (2008)  
34<sup>th</sup> Midwest/Southeast Regional Conference in Photosynthesis. Oct. 2008.  
Light induced FTIR difference spectroscopy of photosynthetic reaction centers in the frequency region between 1000-250 cm<sup>-1</sup>.
- 18) **Sreeja Parameswaran** and **Gary Hastings** (2008)  
34<sup>th</sup> Annual Midwest/Southeast Regional Conference in Photosynthesis. Oct. 2008.  
Calculation of the properties of P700.
- 17) **Gary Hastings**, Sreeja Parameswaran and Ruili Wang (2008)  
25<sup>th</sup> Eastern Regional Photosynthesis Conference in Photosynthesis.  
Calculation of the Vibrational Properties of Chlorophyll-*a* In Solution.
- 16) **Sreeja Parameswaran** and **Gary Hastings** (2007)  
24<sup>th</sup> Eastern Regional Photosynthesis Conference in Photosynthesis.  
Calculated Electronic Spectra of Chlorophyll-*a*.
- 15) **Sreeja Parameswaran** and **Gary Hastings** (2006)  
23<sup>rd</sup> Annual Eastern Regional Conference in Photosynthesis.  
On the Origin of the 1656(+)/1637(-) cm<sup>-1</sup> Difference Band in (P700<sup>+</sup>-P700) FTIR Difference Spectra: Low Temperature FTIR Difference Spectroscopy for the Study of P700 IN Y(B718)T Mutant Cyanobacterial PS I particles.
- 14) **Priyangika Bandaranayake** and **Gary Hastings** (2006)  
23<sup>rd</sup> Annual Eastern Regional Conference in Photosynthesis, Woods Hole, MA.  
Time-resolved FTIR Difference Spectroscopy Used To Study Photosystem I Particles With Different Quinones Occupying The A<sub>1</sub> Binding Site.
- 13) **Ruili Wang** and **Gary Hastings** (2006)  
23<sup>rd</sup> Annual Eastern Regional Conference in Photosynthesis, Woods Hole, MA.  
Density Functional Theory Based Calculations for the Study of the Vibrational Properties of Chlorophyll *a*.
- 12) **Gary Hastings** (2005)  
3rd. International Conference on Advanced Vibrational Spectroscopy. Delavan, WI.  
Solar Conversion In Plants and Bacteria Studied Using Time-resolved Step-scan Fourier Transform Infra-red Difference Spectroscopy”
- 11) **Gary Hastings** and Priyangika Bandaranayake (2005)  
31st Annual Midwest/Southeast Regional Conference in Photosynthesis. Marshall, IN.  
A<sub>1</sub> Reduction in Intact Cyanobacterial Photosystem I Studied Using Time-resolved Step-scan FTIR Difference Spectroscopy In Combination With Isotope Labeling, Site Directed Mutagenesis, Quinone Exchange and Density Functional Theory Calculations.
- 10) Priyangika K.M. Bandaranayake and **Gary Hastings** (2005)  
22<sup>nd</sup> Annual Eastern Regional Conference in Photosynthesis, Woods Hole, MA.  
A<sub>1</sub> Reduction in Photosystem I Studied Using Time-resolved Step-scan Fourier Transform Infra-red Difference Spectroscopy.
- 9) **Gary Hastings** (2004)  
13th International Conference Of Photosynthesis. Montreal, Canada.  
A<sub>1</sub> Reduction in Intact Cyanobacterial Photosystem I Studied Using Time-resolved Step-scan Fourier Transform Infra-red Difference Spectroscopy In Combination With Isotope Labeling and Quinone Exchange Experiments.
- 8) **Gary Hastings** and Priyangika Bandaranayake (2004)  
21<sup>st</sup> Annual Eastern Regional Conference in Photosynthesis, Woods Hole, MA.

- Time-resolved Step-scan Fourier Transform Infra-red Difference Spectroscopy and Isotope Labeling For The Study of A<sub>1</sub> Reduction in Intact Cyanobacterial Photosystem I.
- 7) **Gary Hastings** (2003)  
Photosystem I Workshop. Sfb 498: Protein-Cofactor Interactions in Biological Processes. 15-17, May 2003. Fachbereich Physik, Freie Universitat, Berlin.  
FTIR Difference Spectroscopy in Combination With Site Directed Mutagenesis and Isotope Labeling for the Identification of the Carbonyl Modes of P700 and P700<sup>+</sup> in Photosystem I.
  - 6) **Ruili Wang, T. Wade Johnson and Gary Hastings** (2003)  
20<sup>th</sup> Annual Eastern Regional Conference in Photosynthesis. Woods Hole, MA.  
FTIR Difference Spectroscopy and Isotope Labeling for the Identification of The Carbonyl Modes of P700 in Photosystem I.
  - 5) **Gary Hastings, K. Redding, Y. Li, F. Rappaport, A. van der Est, F. Gu, F. Briggs** (2003)  
20<sup>th</sup> Annual Eastern Regional Conference in Photosynthesis, Woods Hole, MA.  
Mutation Induced Modulation of Hydrogen Bonding to P700 Studied Using FTIR Difference Spectroscopy.
  - 4) **Gary Hastings, R. Wang, V. Sivakumar, V. M. Ramesh, A. N. Webber, K. Redding** (2002)  
19<sup>th</sup> Annual Eastern Regional Conference in Photosynthesis. Woods Hole, MA.  
Infrared Spectroscopy For The Study of Amino Acids That Interact With P700.
  - 3) **Gary Hastings, Ramesh, V, Sivakumar, V. Wang, R. and Webber, A.** (2001)  
XII International Congress on Photosynthesis. Satellite Conference: Electron Transfer Processes in Oxygenic Photosynthesis. South Stradbroke Island, Australia.  
Primary Donor Photo-oxidation in Photosystem I Particles from *C. reinhardtii*. A Re-evaluation of (P700<sup>+</sup>-P700) Fourier Transform Infrared Difference Spectra.
  - 2) **Gary Hastings, Lin, S. Kleinherenbrink, F. A. M. and Blankenship, R. E.** (1994)  
XXII Annual Meeting of the American Society for Photobiology. Scottsdale, AZ.  
Energy and Electron Transfer Processes in Photosystem I.
  - 1) **Gary Hastings, Lin, S. Kleinherenbrink, F. A. M. and Blankenship, R. E.** (1993)  
XXI Annual Meeting of the American Society for Photobiology. Chicago, Ill. June 26-30, 1993.  
Reduction and Reoxidation of the Primary Electron Acceptor in Photosystem I.

### Poster Presentations

- 133) **Neva Agarwala, Art van der Est and Gary Hastings** (2022)  
Microsecond-Time-Resolved Infrared Difference Spectroscopy for the Study Di-substituted Quinones Incorporated into the A<sub>1</sub> Binding Site of Photosystem I.  
48<sup>th</sup> Midwest-Southeast Photosynthesis Conference. Oct. 28-30. Marshall, IA. Booklet, p27.  
(Won award: "Best poster by a graduate student")
- 132) **Michael Nelson and Gary Hastings** (2022)  
Highly-resolved P700<sup>+</sup> spectra from isolated PSI of several cyanobacterial strains.  
48<sup>th</sup> Midwest-Southeast Photosynthesis Conference. Oct. 28-30. Marshall, IA. Booklet, p47.
- 131) **Gary Hastings and Leyla Rohani**(2022).  
Calculated Vibrational Properties of the Phyllosemiquinone Anion in Different Photosynthetic Protein Binding Sites.  
48<sup>th</sup> Midwest-Southeast Photosynthesis Conference. Oct. 28-30. Marshall, IA. Booklet, p33.
- 130) **Leyla Rohani and Gary Hastings** (2022).  
Vibrational Properties of Semi-Phylloquinone in the Q<sub>A</sub> Binding Site of Purple Photosynthetic Bacteria.  
Scientific Computing Day 2022. Thursday, Sept. 26<sup>th</sup>, 2022. Poster number is 1034.
- 129) **William Chandler, Gary Hastings and Yi Jiang**  
How did they die? FTIR spectra of T cell apoptosis analyzed.  
Scientific Computing Day 2022. Thursday, Sept. 26<sup>th</sup>, 2022. Poster number is 9075.
- 128) **Michael Nelson and Gary Hastings** (2022).

- Highly resolved P700<sup>+</sup>/P700 spectra from PSI of several cyanobacterial strains.  
International Congress on Photosynthesis Research 2022. Dunedin, New Zealand.  
Virtual Poster and video back up.
- 127) Neva Agarwala and **Gary Hastings** (2022).  
Time-Resolved FTIR Difference Spectroscopy for the Study of Photosystem I with Non-Native Naphthoquinones Incorporated into the A<sub>1</sub> Binding Site.  
International Congress on Photosynthesis Research 2022. Dunedin, New Zealand.  
Virtual Poster and video back up.
- 126) Julia Kirpich and **Gary Hastings** (2022).  
A<sub>1</sub> chlorophylls contribute to P700 spectrum in photosystem I: photoaccumulated FTIR difference spectroscopy of the mutants near the A<sub>1</sub> chlorophylls (PsaA-N600M and PsaB-N582M) of photosystem I from *Synechocystis* sp. PCC 6803.  
International Congress on Photosynthesis Research 2022. Dunedin, New Zealand.  
Virtual Poster and video back up.
- 125) Leyla Rohani and **Gary Hastings** (2021).  
Vibrational Properties of Semi-Phylloquinone in the Q<sub>A</sub> Binding Site of Purple Photosynthetic Bacteria.  
47<sup>th</sup> Annual Midwest/Southeast Photosynthesis Meeting. Turkey Run State Park, Marshall, IN. Oct. 22-23 (Poster 12). Virtual.
- 124) Neva Agarwala, **Gary Hastings**, Nathan Brady, Jyotirmoy Mondal and Barry D. Bruce (2021).  
Comparative FTIR Spectroscopy of T. elongatus PSI isolated in Detergent Micelles and SMALP Nanoparticles. 47<sup>th</sup> Annual Midwest/Southeast Photosynthesis Conference. Marshall, IN. Oct. 22-23. (Poster 29). Virtual.
- 123) Komalpreet Singh, Neva Agarwala, Haijun Liu and **Gary Hastings** (2021).  
Monomeric and Trimeric PSI Particles Studied Using Time-Resolved Step Scan Fourier Transform Infrared Difference Spectroscopy. 47<sup>th</sup> Annual Midwest/Southeast Photosynthesis Conference. Marshall, IN. Oct. 22-23. (Poster 33). Virtual.
- 122) Lauren Becker and **Gary Hastings** (2021).  
Calculated Infrared Spectra of Flavin.  
15th Annual Georgia State Undergraduate Research Conference. April 14-15. Virtual.
- 121) Leyla Rohani and **Gary Hastings** (2021)  
Calculated Vibrational Frequencies for Reduced Plastoquinone in the A<sub>1</sub> Binding Site of Photosystem I. Annual Research Symposium, Alabama State University. Montgomery, AL. March 10-11.  
<https://docs.google.com/viewer?a=v&pid=sites&srcid=YWxhc3UuZWRIfGZzdGVtfGd4OjRjMjhjNjEwMGM2YTZlOGQ,p29> (outstanding poster by graduate student award)
- 120) Leyla Rohani and **Gary Hastings**. (2020).  
Calculated Vibrational Frequencies for Reduced Plastoquinone in the A<sub>1</sub> Binding Site of Photosystem I.  
46<sup>th</sup> Annual Midwest/Southeast Photosynthesis Meeting. Turkey Run State Park, Marshall, IN. Oct. 22-24: <https://prl.natsci.msu.edu/forty-six-midwest-photosynthesis/program/>.
- 119) Neva Agarwala, Art van der Est, and **Gary Hastings** (2020).  
Time-resolved Infrared Difference Spectroscopy for the Study of Photosystem I with Different Foreign Quinones Incorporated into the A<sub>1</sub> Binding Site. 46<sup>th</sup> Annual Midwest/Southeast Photosynthesis Conference. Marshall, IN. Oct. 22-24. <https://prl.natsci.msu.edu/forty-six-midwest-photosynthesis/program/>.
- 118) Neva Agarwala, Hiroki Makita and **Gary Hastings** (2019). Photosystem I with halogenated naphthoquinones incorporated into the A<sub>1</sub> binding site studied using time resolved FTIR difference spectroscopy. 45<sup>th</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 25-27. Conference booklet, p8.

- 117) Hiroki Makita and **Gary Hastings** (2019) Vibrational Modes of Neutral State Quinones in Photosystem I. 45<sup>th</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 25-27. Conference booklet, p35.
- 116) Leyla Rohani and **Gary Hastings** (2019). ONIOM Modeling for the A<sub>1</sub> Binding Site in Photosystem I. 45<sup>th</sup> Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 25-27. Conference booklet, p43.
- 115) Leyla Rohani, Hiroki Makita and Gary Hastings (2019). Time-Resolved FTIR Difference Spectroscopy for the Study of A<sub>1</sub>, the Secondary Electron Acceptor in Photosystem I Gordon Research Conference in Photosynthesis. Grand Summit Hotel at Sunday River, July 21-26. Newry, ME.
- 114) Leyla Rohani and **Gary Hastings** (2019). QM:MM, ONIOM-Type Vibrational Frequency Calculations for Simulating Time-resolved FTIR Difference Spectra. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p8.
- 113) Neva Agarwala and **Gary Hastings** (2019). Photosystem I with high potential naphthoquinones incorporated into the A<sub>1</sub> binding site studied using time resolved infrared difference spectroscopy. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p8.
- 112) Suresh Gnawali and Gary Hastings (2019). Fourier Transform Infrared Microscopy for the Study of Cyanobacterial Cells from Fischerella thermalis PCC 7521 Grown Under White Light and Far Red Light. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p44.  
(Best poster by a graduate student award).
- 111) Hiroki Makita and Gary Hastings (2019). Time-Resolved Step-Scan FTIR Spectroscopy of the Study of Triplet States in Photosystem I. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p47.
- 110) Daniel Ranke and **Gary Hastings** (2019). Visible and Infrared Spectroscopy for the Characterization of Cyanobacterial Cell Growth. Annual Research Symposium, Alabama State University. Montgomery, AL. March 13-14. *Front. Sci. Technol. Eng. Math. Vol. 3, Issue 1*, p36.
- 109) Hiroki Makita and **Gary Hastings** (2018). Inverted region electron transfer enhances photosynthetic solar energy conversion efficiency. Photosynthesis: From light to life conference. Montreal, Canada. July 16-20.
- 108) **Gary Hastings** and Hiroki Makita (2018). Efficient solar energy conversion in photosystem I requires inverted region electron transfer. International Conference on Microbial Photosynthesis. Vancouver, BC. Aug 9-12. Poster B119
- 107) Leyla Rohani and **Gary Hastings** (2018). ONIOM Vibrational Frequency Calculations for the Prediction of the Orientation of Pigments in Protein Binding Sites. Scientific Computing Day Georgia State University, Oct. 2018.
- 106) **Gary Hastings** (2018). FTIR Microscopy for Probing the Molecular Composition of Cyanobacterial and Algal Cells Grown Under Nutrient Stress. 44th Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 26-28.
- 105) Neva Agarwala, Hiroki Makita and **Gary Hastings** (2018). Time-resolved infrared spectroscopy for the study of photosystem I with high potential naphthoquinones incorporated into the A<sub>1</sub> binding site. 44th Midwest/Southeast Photosynthesis Conference. Turkey Run State Park, Marshall, IN. Oct. 26-28. Abstract booklet, p29.
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