

STATEMENT OF RESEARCH INTEREST :

Humanity's energy demands are predicted to increase by 50 percent in the next decade, and the Sun is our most promising sustainable energy resource, striking the Earth's surface with enough energy in 1.5 hours to meet an entire year's energy needs. Photosynthetic organisms are the main life forms to harness this energy resource, doing so with pigment-protein reaction centers that harvest solar energy with an internal quantum efficiency approaching 100 percent. As current photovoltaics have only achieved quantum efficiencies of approximately 20 percent, the application of highly efficient photosynthetic reaction centers for developing next-generation biophotovoltaics and bio-hydrogen cells is of great interest to try help meet the planet's mounting energy crisis and represents a new major area of research in sustainable, low-cost photovoltaics research.

EDUCATION :

Ph.D, Genome Science and Technology

University of Tennessee at Knoxville and Oak Ridge National Labs

In Progress

Knoxville, Tennessee

B.S, Biochemistry

American Society for Biochemistry and Molecular Biology (ASBMB) Certified Degree Recipient

Virginia Polytechnic Institute and State University

May 2016

Blacksburg, Virginia

RESEARCH EXPERIENCE :

PhD Candidate

August 2016-Current

- Doctoral candidate in Dr. Barry Bruce's lab at the University of Tennessee at Knoxville
- Ph.D thesis research is focused on electron transfer kinetics of redox mediators to photosynthetic reaction centers for biophotovoltaic research, including native, nonnative and synthetic mediators

National Institutes of Health PEER Graduate Fellow

August 2016-August 2018

- Awarded a Program for Excellence & Equity in Research Fellowship for first two years of graduate education
- Participated in various professional development seminars and workshops committed to diversity inclusion

National Institutes of Health IMSD Undergraduate Scholar

August 2015-May 2016

- Awarded an NIH Trainee Fellowship at Virginia Tech for research excellence
- Attended and presented research at national conferences, including ABRCMS 2015 and SACNAS 2015
- Attended weekly seminars and forums, building networking and research presentation experience

Multicultural Academic Opportunity Program Research Intern

May 2015-August 2016

- Participated in a summer REU dedicated to academic excellence and increasing diversity in the sciences
- Performed research in the Gillaspay lab at Virginia Tech, and wrote a literature review
- Presented a poster and an oral presentation at the end of the 10 week program

Undergraduate Research Assistant

January 2015- May 2016

- Worked in Gillaspay lab at Virginia Tech working on gene characterization, plant metabolism and energy sensing

PUBLICATIONS :

Functional Characterization of Bipyridine Cobalt (II/III) Redox Mediators As Photosystem I Electron Donors For Biophotovoltaic Applications

Alexandra H. Teodor, Eu-Jee Ooi, Jackeline Medina, Miguel Alarcon, Michael D. Vaughn, Barry D. Bruce, Jesse J. Bergkamp
(submitted, *ACS Applied Energy Materials*)

The Plastidial RNA Helicase ISE2 Is Involved In Regulation of Photosynthesis and Proper Plastid Development

Elena Ganusov, Jessica Fernandez, **Alexandra H. Teodor**, Barry D. Bruce, Tessa Burch-Smith
(in preparation)

POSTERS AND TALKS :

Bio-Hybrid Solar Cells: Putting Photosystem I to Work

Alexandra H. Teodor, Jyotirmoy Mondal, Michael D. Vaughn, Jesse J. bergkamp, Barry D. Bruce
International Society of Electrochemistry Annual Meeting
International Conference – Talk, Advances in Bioelectrochemistry Symposium: Durban, South Africa **August 2019**

Approaches to Applied Photosynthesis : Growing Green Electricity

Alexandra H. Teodor
NIH IMSD/PREP Fellowship Orientation – Invited Keynote Talk, Virginia Tech, Blacksburg VA **August 2018**

Strategies for Enhancement of Sustainable Electron Transfer to Photosystem I for Bioenergy Applications

Alexandra H. Teodor
ISPR – Photosynthesis: From Light to Life Conference in Conjunction with ASPB
International Conference – Talk, Photosynthesis in A Changing World Session: Montreal, Canada **July 2018**

Strategies for Native, Non-Native, and Synthetic Enhancement of Sustainable Electron Transfer to Photosystem I for Bioenergy Applications

Alexandra H. Teodor, Khoa D. Nguyen, Michael D. Vaughn, Jesse J. Bergkamp, Barry D. Bruce
ISPR – Photosynthesis: From Light to Life Conference in Conjunction with ASPB
International Conference – Poster Presentation: Montreal, Canada **July 2018**

Strategies for Native, Non-Native, and Synthetic Enhancement of Sustainable Electron Transfer to Photosystem I for Bioenergy Applications

Alexandra H. Teodor, Khoa D. Nguyen, Michael D. Vaughn, Jesse J. Bergkamp, Barry D. Bruce
American Society of Plant Biologists Annual Meeting
International Conference – Poster Presentation: Montreal, Canada **July 2018**

Characterization of Cobalt Redox Mediators For Integration In Photosystem I Based Bio-Hybrid Solar Cells (Updated)

Alexandra H. Teodor, Eu-Jee Oi, Michael D. Vaughn, Jesse J. Bergkamp, Barry D. Bruce
Cynthia B. Peterson Poster Competition
Division of Biology University Competition- Poster Presentation: Knoxville, TN, USA **March 2018**

Characterization of Trimeric PSI Encapsulated Within A Styrene Maleic Acid Lipid Particle (Updated)

Nathan G. Brady, Jonathan Nguyen, **Alexandra Teodor**, Yue Ma, Meng Li, Barry D. Bruce
27th Western Photosynthesis Conference
Regional Conference – Poster Presentation: Oracle, AZ, USA

January 2018

Characterization of Cobalt Redox Mediators For Integration In Photosystem I Based Bio-Hybrid Solar Cells

Alexandra H. Teodor, Eu-Jee Oi, Michael D. Vaughn, Jesse J. Bergkamp, Barry D. Bruce
27th Western Photosynthesis Conference
Regional Conference – Poster Presentation: Oracle, AZ, USA

January 2018

Characterization of Trimeric PSI Encapsulated Within A Styrene Maleic Acid Lipid Particle

Nathan G. Brady, Jonathan Nguyen, **Alexandra Teodor**, Yue Ma, Meng Li, Barry D. Bruce
Photosynthesis and Hydrogen Energy Research for Sustainability – 2017
International Conference – Poster Presentation: Hyderabad, India

November 2017

Fabrication and Characterization of Mesoporous Protein Microspheres: Photosystem I Applications for Biohybrid Devices

Madison Chan, **Alexandra H. Teodor**, Joseph W. Jackson, Barry D. Bruce
University of Tennessee at Knoxville Summer STEM Research Symposium
University Symposium – Poster Presentation: Knoxville, TN, USA

August 2017

Comparative Dynamics of Cyanobacterial Cytochrome c_6 Electron Transfer to Photosystem I by *in silico* Biomolecular Brownian Dynamics Simulations and *in vitro* Laser Flash Photolysis

Alexandra H. Teodor, Nathan G. Brady, John R. Ossyra, Khoa D. Nguyen, Xiaolin Cheng, Jeremy C. Smith, Barry D. Bruce
American Society of Plant Biologists Annual Meeting: Honolulu, HI, USA
International Conference – Poster Presentation

June 2017

Interactions Between NSC60339 and the AcrA Subunit of the AcrAB-TolC Bacterial Multidrug Efflux Pump

Alexandra H. Teodor, Adam T. Green, Jerry M. Parks, Jerome Baudry, Jeremy C. Smith
Cynthia B. Peterson Poster Competition
Division of Biology University Competition – Poster Presentation: Knoxville, TN, USA

March 2017

Environmentally Modulated Native Cosuppression of An Overexpressed Malate Dehydrogenase Enzyme in *Arabidopsis thaliana*

Alexandra Teodor, Jiun Yen, Glenda Gillaspay
Mid-Atlantic PREP/IMSD Research Symposium (MAPRS)
Regional Conference – Poster Presentation : Raleigh, NC, USA

May 2016

Engineering A More Photosynthetically Efficient Diatom Through Overexpression of SLC4 Family Carbonic Acid Transporters

Alexandra Teodor

Advanced Applications of Molecular Life Sciences

Oral Grant Proposal Presentation: Blacksburg, VA, USA

May 2016

Characterizing the Role of Inositol Pyrophosphates in Energy Sensing in *Arabidopsis thaliana* (Updated)

Alexandra Teodor, Phoebe Williams, Olusegun Adepoju, Glenda Gillaspay

Annual Biomedical Research Conference for Minority Students (ABRCMS)

National Conference – Poster Presentation: Seattle, Washington, USA

November 2015

Characterizing the Role of Inositol Pyrophosphates in Energy Sensing and Hormone Signaling in *Arabidopsis thaliana*

Alexandra Teodor, Phoebe Williams, Olusegun Adepoju, Glenda Gillaspay

Virginia Tech Undergraduate Research Symposium: Blacksburg, VA, USA

University Symposium – Poster and Oral Presentation

August 2015

AWARDS AND FELLOWSHIPS :

| | |
|--|----------------------|
| Tennessee Plant research Center Travel Fellowship Winner | April 2019 |
| 28th Western Photosynthesis Conference Travel Award Winner | January 2019 |
| Best Poster by a Graduate Student, ISPR “Photosynthesis: From Light to Life” | July 2018 |
| ISPR “Photosynthesis: From Light to Life” Conference Travel Award Winner | June 2018 |
| Best Graduate Student Poster, 27th Western Photosynthesis Conference | January 2018 |
| 27th Western Photosynthesis Conference Travel Award Winner | January 2018 |
| University of Tennessee Graduate Student Senate Travel Award Winner | December 2018 |
| Tennessee Plant Research Center Travel Fellowship Winner | February 2017 |
| NIH Program For Excellence And Equity In Research (PEER) Fellowship | August 2016 |
| NIH Initiative For Maximizing Student Diversity (IMSD) Fellowship | August 2015 |

PROFESSIONAL SOCIETIES :

| | |
|--|---------------------------|
| International Society of Electrochemistry, Member | April 2019-Present |
|--|---------------------------|

The International Society of Photosynthesis Research, Member **April 2018-Present**

Tennessee Plant Research Center, Member **February 2017-Present**

American Society of Plant Biologists, Member **March 2017-Present**

American Society for Biochemistry and Molecular Biology, Member **July 2015-Present**

SERVICE :

Program Representative for Graduate Student Senate (GSS) **May 2017-May 2018**

- Became the first senator sent to the GSS for the Genome Science and Technology program at UTK
- Went to monthly GSS meetings and promoted graduate program and reported back on issues dealing with the graduate school at large
- Assisted in speaking out against outsourcing of facilities jobs and personnel as well as other political campus events

President of Program Graduate Student Organization (GSO) **May 2017-May 2018**

- Organized regular meetings for the Genome Science and Technology graduate student organization
- Planned social outings and networking events for all current students in the program to meet, collaborate, and network.

Vice Chair of PIPELINE **June 2017-December 2018**

- Helped to plan direction and focus for the STEM arm of the Commission for Women at the University of Tennessee at Knoxville, responsible for overseeing and keeping tabs on all committees
- Organized Women in STEM Research Symposium and helped to expand a mentoring program to include postdoctoral fellows and faculty members as well as undergraduate and graduate students

Ask A Scientist **January 2017-Present**

- Performed outreach to the public community in Knoxville, giving scientific talks at local venues and answering questions from the public on various topics
- Organized and put on science demos for elementary school children at the local zoo

Webmaster Officer for WiSTAR³ **May 2017-May 2018**

- Officer for the Women in STEM Advancing Research, Readiness, and Retention Graduate Student Group at UTK
- Attended monthly executive meetings to help direct our 500-member organization and plan events and panels for both professional development and a support network
- Arranged distribution of information regarding events through various online outlets, including social media

Head of Tutoring for Student Organization, Alpha Chi Sigma **May 2014-May 2015**

- Head of tutoring committee for 150-member professional student organization
- Supervised twice weekly free help services for undergraduates in all undergraduate chemistry courses
- Attended weekly executive meetings with other committee heads to plan organization direction for the year
- Organized community outreach through free tutoring at the local high school in STEM courses

500 Women in STEM Knoxville Pod Member **November 2016-Present**

- Member of women in STEM activism and outreach group
- Assisted in planning the Knoxville sister March for Science April 2017
- Currently writing an op-ed piece for the local newspaper on climate change research and sustainability
- Performed classroom outreach with underserved schools in local counties to help get hands-on STEM education into the classroom and show kids what "real" scientists are like