Sarah R. Soltau, Ph.D.

Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439

630-252-5474 (work)
soltausr@anl.gov

EDUCATION:

Ph.D., Chemistry, January 2014, **Boston University**, Boston, MA
Advisor: Professor John Caradonna
Dissertation: *Studies toward the mechanism of allosteric activation in phenylalanine hydroxylase*

MA, Chemistry, May 2010, **Boston University**, Boston, MA

BA, Chemistry-Biochemistry, May 2007, **Skidmore College**, Saratoga Springs, NY

RESEARCH EXPERIENCE:

Argonne National Laboratory*,* Postdoctoral Appointee 2013-Present
Chemical Sciences and Engineering Division, *Postdoctoral Advisor:* Dr. Lisa Utschig-Johnson

- Developed novel photosensitizer-electron transfer protein-catalyst biohybrid complexes to perform artificial photosynthetic hydrogen production; published in *Chemical Communications*
- Characterized electron transfer in biohybrid complexes by electron paramagnetic resonance, transient optical spectroscopy, electrochemistry, and gas chromatography
- Characterized electron transfer pathways in thylakoid membranes for solar fuel production and solar water splitting chemistry

Boston University, Graduate Student Researcher 2008-2013
Chemistry Department, *Graduate Advisor:* Prof. John Caradonna

- Identified the location and investigated the allosteric effector binding site in phenylalanine hydroxylase using computational protein mapping and ligand docking algorithms
- Performed biophysical and molecular biological studies involving site-directed mutagenesis, fluorescence, enzyme activity, binding affinity assays, and photo-chemical crosslinking LC/MS studies to probe identified allosteric effector binding site
- Characterized binding affinity of L-Phe by surface acoustic wave spectroscopy and L-Phe binding kinetics by stopped flow fluorescence spectroscopy

Skidmore College, Undergraduate Researcher 2006-2007
Chemistry Department, *Research Advisor:* Prof. Steven Frey

- Investigated kinetic parameters of an aminopeptidase while immobilized on a layered double hydroxide clay
- Analyzed structural features of enzyme-clay complex using scanning electron microscopy

TEACHING EXPERIENCE:

Argonne National Laboratory, Science Mentor 2013-Present
Argonne-ACT-SO High School Research Program

- Mentored four African-American high school students in chemistry and biochemistry research projects for local and national competitions, resulting in 1 national gold medalist
- Guided students with experimental design, laboratory work, data analysis, and presentation of original data

Boston University, Instructor Summer 2011
Chemistry Department

- Life Science Chemistry I (CH 171) Instructor, Summer I 2011
- Developed and taught survey of general chemistry course for 20 students
- Evaluated student performance on lecture quizzes and exams
- Coordinated teaching with two teaching fellows for laboratory and discussion components

Boston University, Teaching Fellow 2007-2013
Chemistry Department

- Instructed students in laboratory methods and safety
- Evaluated student laboratory performance, reports, and notebooks
- Taught discussions, pre-laboratory lectures, and demonstrations of key concepts

Courses taught:

CH 101/102	General Chemistry Lab and Demonstrations
CH 171/172	Life Science Chemistry Lab (survey of general, organic, and biochemistry sequence)
CH 421/422	Biochemistry Lab and Discussion

Research Mentor for Undergraduate Researchers 2010-Present

Boston University: Elif Agaoglu (2011); Kim Ching (2011); Carmen Chow (2011); Alan Zhou (2012); Alexandria Georgadarellis (2014); Nicholas Porter (2014)
Argonne National Laboratory: Garrett Ginell, Cornell College (2018)

- Provided guidance in experimental design, data collection and analysis, and presentation skills
- Students gained increasing independence and individual projects with experience

AWARDS:

Outstanding Teaching Fellow in Chemistry, Graduate School of Arts and Sciences, Boston University, 2010-2011

Outstanding Teaching Fellow, Department of Chemistry, Boston University, 2008-2009, 2009-2010

PUBLICATIONS:

Soltau, SR; Niklas, J; Dahlberg, PD; Tiede, DM; Poluektov, OG; Mulfort, KL; Utschig, LM. Aqueous light-driven hydrogen production by a Ru-Ferredoxin-Co biohybrid. *Chemical Communications*, **2015**, *51*, 10628-31.

Highlighted by the journal as a "hot article" of very significant interest.

Utschig, LM; **Soltau, SR**; Tiede, DM. Light driven hydrogen production from photosystem-I catalyst hybrids. *Current Opinion in Chemical Biology*, **2015**, *25*, 1-8.

Frey, ST; Guilmet, SL; Egan, RG; Bennett, A; **Soltau, SR**; Holz, RC. Immobilization of the aminopeptidase from Aeromonas proteolytica on Mg^{2+}/Al^{3+} layered double hydroxide particles. *ACS Applied Materials & Interfaces*, **2010**, *2*, 2828-32.

Frey, MW; Frey, ST; **Soltau, SR**. Exploring the pH dependence of L-leucine-p-nitroanilide cleavage by aminopeptidase aeromonas proteolytica: a combined buffer-enzyme kinetics experiment for the general chemistry laboratory. *Chemical Educator*, **2010**, *15*, 117-20.

Soltau, SR; Napoleon RL; Hall, D; Kozakov, D; Gibson, D; Vajda, S; Caradonna, JP. Identification of the allosteric effector binding site in tetrameric phenylalanine hydroxylase. In preparation.

Soltau, SR; Georgadarellis, AG; Georgiadis, RM; Caradonna, JP. Differentiation of active and allosteric site binding of L-Phe in phenylalanine hydroxylase by surface acoustic wave spectroscopy. In preparation.

SELECTED PRESENTATIONS:

Soltau, SR. Protein-catalyst complexes for artificial photosynthetic hydrogen production. Sigma Xi Seminar, US Army Natick Soldier Systems Center, Natick Soldier Research, Development & Engineering Center (*invited talk*) Aug. 20, 2015, Natick, MA.

Soltau, SR; Niklas, J; Dahlberg, PD; Tiede, DM; Poluektov, OG; Mulfort, KL; Utschig, LM Solar fuel biohybrids: Aqueous light-driven hydrogen production by photosensitizer-protein-molecular catalyst systems. 250th American Chemical Society National Meeting (*talk*) Aug. 19, 2015, Boston, MA.

Soltau, SR; Niklas, J; Dahlberg, PD; Mulfort, KL; Poluektov, OG; Tiede, DM; Utschig, LM. Solar fuel production by photosensitizer-protein-molecular catalyst biohybrids. 250th American Chemical Society National Meeting (*poster*) Aug. 17, 2015, Boston, MA.

Soltau, SR; Utschig, LM. Aqueous light-driven hydrogen production by Ru-Ferredoxin-Co hybrid complexes. Bioinorganic Chemistry Gordon Research Seminar (*talk*) Jan. 31, 2015, Ventura, CA.

Soltau, SR; Niklas, J; Dahlberg, PD; Tiede, DM; Poluektov, OG; Mulfort, KL; Utschig, LM. Aqueous light-driven hydrogen production by Ru-Ferredoxin-Co hybrid complexes. Metals in Biology Gordon Research Conference (*poster*) Jan. 25-30, 2015, Ventura, CA.

Soltau, SR; Niklas, J; Dahlberg, PD; Tiede, DM; Poluektov, OG; Mulfort, KL; Utschig, LM. Aqueous light-driven hydrogen production by Ru-Ferredoxin-Co hybrid complexes. Argonne Postdoctoral Research Symposium (*poster*) Oct. 23, 2014, Argonne, IL.

Soltau, SR; Silver, SC; Mulfort, KL; Niklas, J; Poleuktov, OG; Dalhberg, PD; Tiede, DM; Utschig, LM. Ferredoxin-catalyst complexes for artificial photosynthetic hydrogen production. Photosynthesis Gordon Research Conference (*poster*) Aug. 10-15, 2014, West Dover, VT.

Soltau, SR; Utschig, LM. Ferredoxin-catalyst complexes for artificial photosynthetic hydrogen production. Photosynthesis Gordon Research Seminar (*talk*) Aug. 9, 2014, West Dover, VT.

Soltau, SR; Caradonna, JP. Identification and mechanistic studies of the allosteric effector binding site in phenylalanine hydroxylase. Boston Women in Chemistry Symposium (*poster*) Oct. 6, 2012, Cambridge, MA.

Soltau, SR; Caradonna, JP. Identification of the allosteric effector binding site in phenylalanine hydroxylase. Boston Women in Chemistry Symposium (*talk*) Sept. 24, 2011, Cambridge, MA.

Soltau, SR; Anarat, G; Napoleon, RL; Kozakov, D; Vajda, S; Caradonna, JP. Studies toward understanding the mechanism of allosteric activation in phenylalanine hydroxylase. 240th American Chemical Society National Meeting (*talk*) Aug. 25, 2010, Boston, MA.

SERVICE:

Argonne-ACT-SO High School Research Program, Co-Chair 2014-Present

- Facilitated program administration, public outreach, and student enrichment sessions for program of 20 African-American High School students and 10 research mentors
- Presented workshops on poster preparation and presentation skills

BU Women in Chemistry, Board Member 2009-2013
President (2010-2012), Secretary (2009-2010)

- Organized student-invited chemistry seminar speakers
- Hosted panel discussions and seminars with area scientists on career development
- Solicited grants from companies (Pfizer, Vertex, New England Biolabs) for program support, summer research programs for high school students, and conference support

LABORATORY SKILLS / TECHNIQUES:

LABORATORY:	Protein expression, purification, and characterization
	Enzyme assay development
	Standard molecular biological and biophysical approaches
	Photocatalysis

INSTRUMENTATION:	Fast protein liquid chromatography Gas chromatography Electron paramagnetic resonance UV-visible spectroscopy Fluorescence spectroscopy Stopped flow absorbance / fluorescence spectroscopy
COMPUTATIONAL:	Origin, PyMol, ChemBioOffice, React Lab, Microsoft Office, Auto Dock, COOT
AFFLIATIONS:	American Chemical Society, *Member*, 2007-Present Boston University Women in Chemistry, *Member*, 2008-2013 Boston University Young Chemists Committee, *Secretary*, 2009-2010