

# Joshua T. Atkinson, Ph.D. | Curriculum Vitae

NSF Postdoctoral Fellow  
Department of Physics & Astronomy  
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## Education

2019	Ph.D., Systems, Synthetic, and Physical Biology <i>Thesis: 'Controlling bioenergetic systems using protein design and synthetic biology'</i>	Rice University
2012	B.S., Microbiology with minor in Asian Studies	University of Michigan

## Research Experience

2020 – Present	NSF Postdoctoral Fellow	Moh El-Naggar lab	University of Southern California
2019 – 2020	Postdoctoral Research Assoc.	Jonathan Silberg's lab	Rice University
2018 – 2019	Vaughn Graduate Fellow	Jonathan Silberg's lab	Rice University
2017 – 2018	DoE SCGSR Fellow	Caroline Ajo-Franklin's lab	Lawrence Berkeley National Lab
2014 – 2018	NSF Graduate Fellow	Jonathan Silberg's lab	Rice University
2011 – 2013	Lab Technician	Vaccine and Antimicrobial R&D	NanoBio Corporation
2009 – 2011	Undergraduate Researcher	Paul Dunlap's lab	University of Michigan

## Honors and Awards

2020 – 2023	NSF Postdoctoral Research Fellowship in Biology – ‘Integrative Research Investigating the Rules of Life’
2020	Gordan and Betty Moore Foundation Fellow of the Life Sciences Research Foundation, <i>Declined</i>
2018	‘Best Talk’ – International Society of Microbial Electrochemistry and Technology N. American Meeting
2018 – 2019	Lodieska Stockbridge Vaughn Fellowship
2017 – 2018	DOE Office of Science Graduate Research (SCGSR) Fellowship
2014 – 2017	NSF Graduate Research Fellowship
2014	NASA Space Technology Research Fellowship, <i>Declined</i>

## Peer-reviewed Publications (\*co-first authors)

12. **J.T. Atkinson\***, L. Su\*, X. Zhang, G.N. Bennett, J.S. Silber, C.M. Ajo-Franklin. Real-time environmental monitoring of contaminants using living electronic sensors *bioRxiv* [10.1101/2021.06.04.447163] (2021)
11. I.J. Campbell, D. Kahanda, **J.T. Atkinson**, O.N. Sparks, J. Kim, C.P. Tseng, R. Verduzco, G.N. Bennett, J.J. Silberg. Recombination of 2Fe-2S ferredoxins reveals differences in the inheritance of thermostability and midpoint potential. *ACS Synth. Biol.* 9(12):3245-3253 (2020)
10. E.M. Fulk, D. Huh, **J.T. Atkinson**, M. Lie, C.A. Masiello, J.J. Silberg. A split methyl halide transferase AND gate that reports by synthesizing an indicator gas. *ACS Synth. Biol.* 9(11):3104-3113 (2020)
9. **J.T. Atkinson**, A.J. Jones, V. Nanda, and J.J. Silberg. Protein tolerance to random circular permutation correlates with thermostability and local energetics of residue-residue contacts. *Protein Eng Des Sel.* gzaa012 (2020) – Editor’s Choice Article
8. I.J. Campbell, J.L. Olmos, W. Xu, D. Kahanda, **J.T. Atkinson**, O.N. Sparks, M.D. Miller, G.N. Phillips, G.N. Bennett, J.J. Silberg. *Prochlorococcus* phage ferredoxin: structural characterization and interactions with cyanobacterial sulfite reductases. *J. Biol. Chem.* jbc.RA120.013501 (2020)
7. B.Y. Wu, **J.T. Atkinson**, D. Kahanda, G.N. Bennett, and J.J. Silberg. Combinatorial design of chemical-dependent protein switches for controlling intracellular electron transfer. *AIChE J.* e16796. (2019)
6. **J.T. Atkinson**, I.J. Campbell, S.C. Bonitatibus, S.J. Elliot, G.N. Bennett, and J.J. Silberg, Metalloprotein switches that display chemical-dependent electron transfer, *Nat. Chem. Bio.* 15:189-195. (2019)
5. **J.T. Atkinson\***, A.J. Jones\*, Q. Zhou, and J.J. Silberg. Circular permutation profiling by deep sequencing libraries created using transposon mutagenesis. *Nucleic Acids Res.* 46(13):e76. (2018)
4. **J.T. Atkinson**, I. J. Campbell, G.N. Bennett, and J.J. Silberg. Cellular assays for ferredoxins: a strategy to understand electron flow through protein carriers that link metabolic pathways. *Biochemistry*. 55(51):7047-7064. (2016)
3. A.M. Jones, M.M. Mehta, E.E. Thomas, **J.T. Atkinson**, T.H. Segall-Shapiro, S. Liu, and J. J. Silberg. The structure of a thermophilic kinase shapes fitness upon random circular permutation. *ACS Synth Biol.* 5:415-425. (2016)
2. D.W. Howell, S.P. Tsai, K. Churion, J. Patterson, C. Abbey, **J.T. Atkinson**, D. Porterpan, Y.H. You, K.E. Meissner, K.J. Bayless, and S.E. Bondos. Identification of multiple dityrosine bonds in materials composed of the *Drosophila* protein Ultrabithorax. *Adv. Funct. Mater.* 25(37):5988-98. (2015)

- Urbanczyk, H., Y. Ogura, T.A. Hendry, A.L. Gould, N. Kiwaki, **J.T. Atkinson**, T. Hayashi, and P.V. Dunlap. Genome Sequence of *Photobacterium mandapamensis* svers.1.1., bioluminescent symbiont of the cardinalfish *Siphamia versicolor*. *J Bacteriol.* 193(12):3144-5. (2011)

## Book Chapters and Articles

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- J.T. Atkinson**. Life simplified: recompiling a bacterial genome for synonymous codon compression. *Synthetic Biology*. 4:1. (2019)
- J.T. Atkinson**, B.Y. Wu, L. Segatori, and J.J. Silberg. Overcoming component limitations in synthetic biology through transposon-mediated protein engineering. Ch. 15 *Methods in Enzymology*. 621:191-212. (2019)
- A.M. Jones, **J.T. Atkinson**, and J. J. Silberg. PERMutation Using Transposase Engineering (PERMUTE): a simple approach for constructing circularly permuted protein libraries. Ch.19 *Methods in Molecular Biology*. 1498:295-308. (2016)

## Patents

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J.J. Silberg, **J.T. Atkinson**, I.J. Campbell, and G.N. Bennett. Regulating electron flow using split proteins, US Patent App. 16/186226 (2017)

## Oral Presentations

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**J.T. Atkinson**, A.M. Jones, V. Nanda, and Silberg, J.J. (2020) Protein tolerance to random circular permutation correlates with thermostability and local energetics of residue-residue contacts (PEDS Protein Engineering and Design Webinar)  
– PEDS Editor's Choice Article – Invited Talk

**J.T. Atkinson**, L. Su, G.N. Bennett, C. Ajo-Franklin, and Silberg, J.J. (2020) Using engineered protein switches to control extracellular electron transfer in *Escherichia coli*. (Engineering Biology Research Consortium – Cell-Material Interface Virtual Seminar) – Invited Talk

**J.T. Atkinson**, L. Su, I.J. Campbell, G.N. Bennett, C. Ajo-Franklin, and Silberg, J.J. (2019) Creating living bioelectronic sensors using ferredoxin-dependent electron transport chains (Rice SynBio Hangout, Houston, TX) – Invited Talk

**J.T. Atkinson**, L. Su, I.J. Campbell, G.N. Bennett, C. Ajo-Franklin, and Silberg, J.J. (2018) Creating living bioelectronic sensors using ferredoxin-dependent electron transport chains (North America-International Society of Microbial Electrochemistry and Technology, Minneapolis, MN) – Selected Talk – Won 'Best Talk'

## Conference Presentations

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**J.T. Atkinson**, L. Su, I.J. Campbell, G.N. Bennett, C. Ajo-Franklin, and Silberg, J.J. (2019) Creating living bioelectronic sensors using ferredoxin-dependent electron transport chains (1<sup>st</sup> Bioelectronics Gordon Research Conference, Andover, NH)

**J.T. Atkinson**, L. Su, I.J. Campbell, G.N. Bennett, C. Ajo-Franklin, and Silberg, J.J. (2018) Creating living bioelectronic sensors using ferredoxin-dependent electron transport chains (DeLange Bioelectronics, Houston, TX)

**J.T. Atkinson**, L. Su, I.J. Campbell, G.N. Bennett, C. Ajo-Franklin, and Silberg, J.J. (2018) Creating living bioelectronic sensors using ferredoxin-dependent electron transport chains (Synthetic Biology: Engineering, Evolution & Design, Scottsdale, AZ)

**J.T. Atkinson**, I.J. Campbell, G.N. Bennett, and Silberg, J.J. (2018) Design of an allosteric 2Fe-2S ferredoxin switch that displays chemical-dependent electron transfer (39th Steenbock Symposium, Madison, WI)

**J.T. Atkinson**, I.J. Campbell, G.N. Bennett, and Silberg, J.J. (2017) Chemical-Responsive Protein Electron Carriers To Control Electron Flow (2<sup>nd</sup> Annual Asilomar Bioelectronics Conference, Pacific Grove, CA)

**J.T. Atkinson**, I.J. Campbell, J. Torres, G.N. Bennett, and Silberg, J.J. (2017) Controlling Energy Flow in Bacteria Using Engineered Ligand-Responsive Protein Electron Carriers (Molecular Foundry User Meeting, Lawrence Berkeley National Lab, Berkeley, CA)

**J.T. Atkinson**, I.J. Campbell, J. Torres, G.N. Bennett, and Silberg, J.J. (2017) Controlling Energy Flow in Bacteria Using Engineered Ligand-Responsive Protein Electron Carriers (Synthetic Biology: Engineering, Evolution & Design, Vancouver, BC, CAN)

**J.T. Atkinson**, I.J. Campbell, J. Torres, G.N. Bennett, and Silberg, J.J. (2017) Controlling energy flow in bacteria using engineered protein electron carriers (25<sup>th</sup> Texas Protein Folders and Function Meeting, Cleveland, TX)

**J.T. Atkinson**, I.J. Campbell, G.N. Bennett, and Silberg, J.J. (2016) Tuning the electron transfer activity of a 2Fe2S ferredoxin using homologous recombination and an *Escherichia coli* selection (24<sup>th</sup> Texas Protein Folders and Function Meeting, Cleveland, TX)

**J.T. Atkinson**, I.J. Campbell, J. Torres, G.N. Bennett, and Silberg, J.J. (2016) Tuning the electron transfer activity of a 2Fe2S ferredoxin using homologous recombination and an *Escherichia coli* selection (Synthetic Biology: Engineering, Evolution & Design, Chicago, IL)

**J.T. Atkinson**, J. Torres., I.J. Campbell, J. Torres, G.N. Bennett, and Silberg, J.J. (2016) Rational design of split ferredoxins that function as electron transfer AND gates in *Escherichia coli* (4th Penn State Bioinorganic, State College, PA)

**J.T. Atkinson**, J. Torres., I.J. Campbell, J. Torres, G.N. Bennett, and Silberg, J.J. (2016) Two-fragment ferredoxins that function as electron transfer AND gates (72<sup>nd</sup> Annual ACS Southwest Regional Meeting, Galveston, TX)

**J.T. Atkinson**, M. Lie, G.N. Bennett and J.J. Silberg (2014) Using Laboratory Evolution to Discover Ferredoxins that Transduce Electrons from Fd-NADPH Oxidoreductase to Sulfite Reductase (24<sup>th</sup> Annual Keck Research Conference, Houston, TX)

## Mentoring and Teaching Experiences

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2021	Trained 1 PhD student rotating through El-Naggar lab from the Molecular and Cellular Biology graduate program (1 joined the El-Naggar lab)
F2019-S2021	BioBuilderClub Mentor for Westborough High School - Westborough, MA (Virtual)
2015 – 2019	Trained 9 PhD students rotating through Silberg lab from the Systems, Synthetic, and Physical Biology and Biochemistry & Cell Biology graduate programs (4 joined the Silberg lab)
2014 – 2019	Mentored 5 undergraduate students resulting in 6 poster presentations for campus wide undergraduate poster contests and 2 at the Beckman Scholars Conference
2015 – 2016	Graduate Advisor, Rice iGEM team (2015 was an international collaboration Rice-HKUST)
Oct. 2016	Guest lecturer - Electrochemistry, BIOC 352 Physical Chemistry for Biosciences
Aug. 2016	Course Designer, Systems, Synthetic, & Physical Biology Summer Bootcamp, Rice University
Fall 2015	Teaching Assistant for graduate course - SSPB 503: "Synthetic Biology"
Aug. 2014	Course Designer, Systems, Synthetic, & Physical Biology Summer Bootcamp, Rice University

## Outreach Activities

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June 2021	High school student mentor, Bridge Undergraduate Science Program Jr., University of Southern California
April 2021	Microbiology Judge - Senior Division, California Science and Engineering Fair
F2020-S2021	Directed Evolution Community Designer, International Directed Evolution Competition (iDEC)
Aug. 2019	Poster Judge, Rice BioSciences Research Symposium and Retreat
July 2018	Poster Judge, Rice Institute of Biosciences and Bioengineering Undergraduate Poster Symposium
Jan. 2017	Oral Presentation, How to find a NSF REU Summer Research Experience, San Jacinto Community College
Oct. 2016	Judge, Gulf Coast Consortia Undergraduate Symposium
Jan. 2016	Oral Presentation, How to find a NSF REU Summer Research Experience, San Jacinto Community College
April 2015	Poster Judge, Rice Undergraduate Research Symposium
April 2015	Poster Judge, Rice - Duncan College Undergraduate Research Symposium
June 2014	High school student mentor, Institute of Biosciences & Bioengineering Summer Academy, Rice University
Feb. 2014	Biochemistry/Microbiology Judge, Science Engineering Fair of Houston

## Community Activities

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2021	Organizer, International Society of Microbial Electrochemistry and Technology North American Meeting
2021	Reviewer, Frontiers in Microbiology
2020	Reviewer, Journal of Molecular Biology
2017-2019	Social Chair, Systems, Synthetic, and Physical Biology Graduate Student Association
2014	Recruitment Chair, Systems, Synthetic, and Physical Biology Graduate Program

## Professional Societies

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2018-21	International Society of Microbial Electrochemistry and Technology
2014-21	American Society of Microbiologists

## Collaborators

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Anne Jones (Arizona State University), Leonard Tender (Naval Research Laboratory), Caroline Ajo-Franklin (Lawrence Berkeley National Lab/Rice U.), Lin Su (Lawrence Berkeley National Lab), George N. Bennett (Rice U.), Rafael Verduzco (Rice U.), Sean J. Elliot (Boston U.), Sarah E. Bondos (Texas A&M)