

## Brian S. Rolczynski, Ph.D.

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### EDUCATION

<b>Northwestern University</b> , Evanston, IL Ph.D., Physical Chemistry	<b>2007–2013</b>
<b>University of Washington</b> , Seattle, WA BS, Chemistry and BA, English (with honors)	<b>2002–2007</b>

### FELLOWSHIPS

Jerome and Isabella Karle Distinguished Scholar Fellowship	<b>2021–2022</b>
American Society for Engineering Education Fellowship	<b>2018–2021</b>
Argonne Graduate Fellowship	<b>2010–2012</b>

### EXPERIENCE

<b>The University of Nevada, Reno</b> , Reno, NV Assistant Professor, Department of Chemistry	<b>2024</b>
<b>US Naval Research Laboratory</b> , Washington, DC Research Chemist, Electronics Science and Technology Division	<b>2018–2023</b>
<b>The University of Chicago</b> , Chicago, IL Postdoctoral Fellow, Department of Chemistry and The James Franck Institute	<b>2013–2018</b>
<b>Northwestern University</b> , Evanston, IL and concurrently at <b>Argonne National Laboratory</b> , Lemont, IL	<b>2007–2013</b> <b>2010–2012</b>
Graduate Researcher, Department of Chemistry and ANSER Center	

### PUBLICATIONS

[Google Scholar link](#)

H-index: 21

31. **Rolczynski, B. S.**; Diaz, S. A.; Goldman, E. R.; Medintz, I. L.; Melinger, J. S. Investigating the Dissipation of Heat and Quantum Information from DNA-Scaffolded Chromophore Networks. *J. Chem. Phys.* 2024, 160, 034105.
30. **Rolczynski, B. S.**; Diaz, S. A.; Kim, Y. C.; Mathur, D.; Klein, W. P.; Medintz, I. L.; Melinger, J. S. Determining Interchromophore Effects for Energy Transport in Molecular Networks Using Machine-Learning Algorithms. *Phys. Chem. Chem. Phys.* 2023, 25, 3651.  
\*Selected by the editors for the *HOT PCCP article collection of 2023*.
29. Huff, J.; Diaz, S.; Barclay, M.; Chowdhury, A.; Chiriboga, M.; Ellis, G.; Mathur, D.; Patten, L.; Roy, S.; Sup, A.; Biaggne, A.; **Rolczynski, B. S.**; Cunningham, P.; Li, L.; Lee, J.; Davis, P.; Yurke, B.; Knowlton, W.; Medintz, I.; Turner, D.; Melinger, J.; Pensack, R. Tunable Electronic Structure via DNA-Templated Heteroaggregates of Two Distinct Cyanine Dyes. *J. Phys.*

Chem. C 2022, 126(40), 17164.

28. **Rolczynski, B. S.**; Diaz, S. A.; Kim, Y. C.; Medintz, I. L.; Cunningham, P. D.; Melinger, J. S. Understanding Disorder, Vibronic Structure and Delocalization in Electronically Coupled Dimers on DNA Duplexes. *J. Phys. Chem. A* 2021, 125(44), 9632.
27. **Rolczynski, B. S.**; Yeh, S.-H.; Navotnaya, P.; Lloyd, L. T.; Ginzburg, A. R.; Zheng, H.; Allodi, M. A.; Otto, J. P.; Ashraf, K.; Gardiner, A. T.; Cogdell, R. J.; Kais, S.; Engel, G. S. Time-domain Line-shape Analysis from 2D Spectroscopy to Precisely Determine Hamiltonian Parameters for a Photosynthetic Complex. *J. Phys. Chem. B* 2021, 125(11), 2812.
26. Mathur, D.; Kim, Y. C.; Diaz, S. A.; Cunningham, P. D.; **Rolczynski, B. S.**; Ancona, M. G.; Medintz, I. L.; Melinger, J. S. Can a DNA Origami Structure Constrain the Position and Orientation of an Attached Dye Molecule? *J. Phys. Chem. C* 2020, 125, 1509.
25. Klein, W. P.; **Rolczynski, B. S.**; Oliver, S. M.; Zadegan, R.; Buckhout-White, S.; Ancona, M. G.; Cunningham, P. D.; Melinger, J. S.; Vora, P. M.; Kuang, W.; Medintz, I. L.; Díaz, S. A. DNA Origami Chromophore Scaffold Exploiting HomoFRET Energy Transport to Create Molecular Photonic Wires. *ACS Appl. Nano Mater.* 2020, 3(4), 3323.  
\*Awarded NRC/ASEE Postdoctoral Research Publications Award in 2021.
24. Allodi, M. A.; Otto, J. P.; Sohail, S. H.; Saer, R. G.; Wood, R. E.; **Rolczynski, B. S.**; Massey, S. C.; Ting, P.-C.; Blankenship, R. E.; Engel, G. S. Redox Conditions Affect Ultrafast Exciton Transport in Photosynthetic Pigment-Protein Complexes. *J. Phys. Chem. Lett.* 2018, 9, 89.
23. **Rolczynski, B. S.**; Zheng, H.; Singh, V. P.; Navotnaya, P.; Ginzburg, A. R.; Caram, J. R.; Ashraf, K.; Gardiner, A. T.; Yeh, S.-H.; Kais, S.; Cogdell, R. J.; Engel, G. S. Correlated Protein Environments Drive Quantum Coherence Lifetimes in Photosynthetic Pigment-Protein Complexes. *Chem* 2018, 4, 138.  
\*Highlighted in: Maiuri, M.; Scholes, G. 2D Spectroscopy Helps Visualize the Influence of Spectral Motion on Chromophore Response. *Chem* 2018, 4, 20.  
\*Selected as an editor's top article of 2018
22. Flanagan, M. L.; Long, P. D.; Dahlberg, P. D.; **Rolczynski, B. S.**; Massey, S. C.; Engel, G. S. Mutations to *R. sphaeroides* Reaction Center Perturb Energy Levels and Vibronic Coupling but Not Observed Energy Transfer Rates. *J. Phys. Chem. A* 2016, 120(9), 1479.
21. Cho, S.; **Rolczynski, B. S.**; Xu, T.; Yu, L.; Chen, L. X. Solution Phase Exciton Diffusion Dynamics of a Charge-Transfer Copolymer PTB7 and Homopolymer P3HT. *J. Phys. Chem. B* 2015, 119(24), 7447.
20. Blackburn, A. K.; Sue, A. C.-H.; Shveyd, A. K.; Cao, D.; Tayi, A.; Narayanan, A.; **Rolczynski, B. S.**; Szarko, J. M.; Bozdemir, O. A.; Wakabayashi, R.; Lehrman, J. A.; Chen, L. X.; Nassar, M. S.; Stupp, S. I.; Stoddart, J. F. Lock-arm supramolecular ordering: A molecular construction set for cocrystallizing organic charge transfer complexes. *J. Am. Chem. Soc.* 2014, 136, 17224.  
\*Over 50 citations.
19. **Rolczynski, B. S.**; Szarko, J. M.; Son, H. J.; Yu, L.; Chen, L. X. Effects of Exciton Polarity in Charge Transfer Polymer/PCBM Bulk Heterojunction Films. *J. Phys. Chem. Lett.* 2014, 5(11), 1856.
18. Szarko, J. M.; **Rolczynski, B. S.**; Lou, S. J.; Xu, T.; Strzalka, J.; Marks, T. J.; Yu, L.; Chen, L. X. Photovoltaic Function and Exciton/Charge Transfer Dynamics in a Highly Efficient Semiconducting Copolymer. *Adv. Funct. Mater.* 2014, 24(1), 10.  
\*Over 150 citations.
17. Zheng, H.; Caram, J. R.; Dahlberg, P. D.; **Rolczynski, B. S.**; Viswanathan, S.; Dolzhenkov, D. S.; Khadivi, A.; Talapin, D. V.; Engel, G. S. Dispersion-free continuum two-dimensional electronic spectrometer. *Applied Optics* 2014, 53(9), 1909.
16. Caram, J. R.; Zheng, H.; Dahlberg, P. D.; **Rolczynski, B. S.**; Griffin, G. B.; Dolzhenkov, D. S.;

Talapin, D. V.; Engel, G. S. Exploring size and state dynamics in CdSe quantum dots using two-dimensional electronic spectroscopy. *J. Chem. Phys.* 2014, 140(8), 084701.

\*Over 50 citations.

15. Griffin, G. B.; Lundin, P. M.; **Rolczynski, B. S.**; Linkin, A.; McGillicuddy, R. D.; Bao, Z.; Engel, G. S. Ultrafast energy transfer from rigid, branched side-chains into a conjugated, alternating copolymer. *J. Chem. Phys.* 2014, 140(3), 034903.
14. Caram, J. R.; Zheng, H.; Dahlberg, P. D.; **Rolczynski, B. S.**; Griffin, G. B.; Fidler, A. F.; Dolzhnikov, D. S.; Talapin, D. V.; Engel, G. S. Persistent Interexcitonic Quantum Coherence in CdSe Quantum Dots. *J. Phys. Chem. Lett.* 2014, 5(1), 196.  
\*Over 50 citations.
13. Singh, V. P.; Fidler, A. F.; **Rolczynski, B. S.**; Engel, G. S. Independent phasing of rephasing and non-rephasing electronic spectra. *J. Chem. Phys.* 2013, 139(8), 084201.
12. Tayi, A. S.; Shveyd, A. K.; Sue, C.-H.; Szarko, J. M.; **Rolczynski, B. S.**; Sarjeant, A. A.; Stern, C. L.; Cao, D.; Paxton, W. F.; Wu, W.; Dey, S. K.; Fahrenbach, A. C.; Guest, J.; Mohseni, H.; Chen, L. X.; Wang, K. L.; Stoddart, J. F.; Stupp, S. I. Room Temperature Ferroelectricity in Supramolecular Networks of Charge Transfer Complexes. *Nature* 2012, 488, 485.  
\*Over 450 citations.
11. **Rolczynski, B. S.**; Szarko, J. M.; Son, H. J.; Liang, Y.; Yu, L.; Chen, L. X. Ultrafast Intramolecular Exciton Splitting Dynamics in Isolated Low-Band-Gap Polymers and Their Implications on Photovoltaic Materials Design. *J. Am. Chem. Soc.* 2012, 134(9), 4142.  
\*Over 200 citations.
10. Gothard, N. A.; Mara, M. W.; Huang, J.; Szarko, J. M.; **Rolczynski, B. S.**; Lockard, J. V.; Chen, L. X. Strong Steric Hindrance Effect on Excited State Structural Dynamics of Cu(I) Diimine Complexes. *J. Phys. Chem. A* 2012, 116(9), 1984.  
\*Over 100 citations.
9. Carsten, B.; Szarko, J. M.; Son, H. J.; Wang, W.; Lu, L.; He, F.; **Rolczynski, B. S.**; Lou, S. J.; Chen, L. X.; Yu, L. Examining the Effect of the Dipole Moment on Charge Separation in Donor-Acceptor Polymers for Organic Photovoltaic Applications. *J. Am. Chem. Soc.* 2011, 133(50), 20468.  
\*Over 450 citations.
8. Murray, I. P.; Lou, S. J.; Cote, L. J.; Loser, S.; Kadleck, C. J.; Xu, T.; Szarko, J. M.; **Rolczynski, B. S.**; Johns, J. E.; Huang, J.; Yu, L.; Chen, L. X.; Marks, T. J.; Hersam, M. C. Graphene Oxide Interlayers for Robust, High-Efficiency Organic Photovoltaics. *J. Phys. Chem. Lett.* 2011, 2, 3006.  
\*Over 150 citations.
7. Szarko, J. M.; Guo, J.; **Rolczynski, B. S.**; Chen, L. X. Nanoscale structure, dynamics and power conversion efficiency correlations in small molecule and oligomer-based photovoltaic devices. *Nano Rev.* 2011, 2, 7249.
6. Szarko, J. M.; Guo, J.; **Rolczynski, B. S.**; Chen, L. X. Current trends in the optimization of low band gap polymers in bulk heterojunction photovoltaic devices. *J. Mater. Chem.* 2011, 21(22), 7849.  
\*Over 50 citations.
5. **Rolczynski, B. S.**; Szarko, J. M.; Lee, B.; Strzalka, J.; Guo, J.; Liang, Y.; Yu, L.; Chen, L. X. Length-dependent self-assembly of oligothiophene derivatives in thin films. *J. Mater. Res.* 2011, 26, 296.
4. Szarko, J. M.; **Rolczynski, B. S.**; Guo, J.; Liang, Y.; He, F.; Mara, M. W.; Yu, L.; Chen, L. X. Electronic Processes in Conjugated Diblock Oligomers Mimicking Low Band-Gap Polymers: Experimental and Theoretical Spectral Analysis. *J. Phys. Chem. B* 2010, 114, 14505.
3. Szarko, J. M.; Guo, J.; Liang, Y.; Lee, B.; **Rolczynski, B. S.**; Strzalka, J.; Xu, T.; Loser, S.;

Marks, T. J.; Yu, L.; Chen, L. X. When Function Follows Form: Effects of Donor Copolymer Side Chains on Film Morphology and BHJ Solar Cell Performance. *Adv. Mater.* 2010, 22(48), 5468.

\*Over 350 citations.

2. Guo, J.; Liang, Y.; Szarko, J.; Lee, B.; Son, H. J.; **Rolczynski, B. S.**; Yu, L.; Chen, L. X. Structure, Dynamics, and Power Conversion Efficiency Correlations in a New Low Bandgap Polymer:PCBM Solar Cell. *J. Phys. Chem. B* 2010, 114(2), 742.

\*Over 150 citations.

1. Szarko, J.; Guo, J.; Liang, Y.; **Rolczynski, B.**; Yu, L.; Chen, L. X. The electron and energy transfer between oligothiophenes and thieno[3,4-b]thiophene units. *Proc. of SPIE* 2008, 7034, 703403.

#### PUBLICATIONS (NOT PEER-REVIEWED)

1. **Rolczynski, B. S.**; Navotnaya, P.; Sussman, H. R.; Engel, G. S. Cysteine-mediated mechanism disrupts energy transfer to prevent photooxidation. *Proc. Nat. Acad. Sci.* 2016. 113(31), 8562.

#### TALKS

21. **Rolczynski, B. S.** "Understanding Electronic Energy Transport in DNA-Scaffolded Molecular Networks Using Machine-Learning Methods." 65<sup>th</sup> Electronic Materials Conference. Santa Barbara, CA. 5/28/23.
20. **Rolczynski, B. S.** "How Structure Can Assist Energy Transport in Scaffolded Molecular Networks." University of Nevada, Reno. Reno, NV. 4/10/23.
19. **Rolczynski, B. S.**; Diaz, S. A.; Kim, Y. C.; Mathur, D.; Medintz, I. L.; and Melinger, J. S. "Understanding Energy-Transport Bottlenecks In Molecular Networks Using Machine-Learning Tools." BRICC Conference. Arlington, VA. 9/8/22.
18. **Rolczynski, B. S.**; Diaz, S. A.; Kim, Y. C.; Medintz, I. L.; Cunningham, P. D.; and Melinger, J. S. "Understanding Energy Levels and Structures in Modular Chromophore Networks Templated by DNA." ACS Meeting Fall 2022. Chicago, IL. 8/24/22.
17. **Rolczynski, B. S.**; Diaz, S. A.; Kim, Y. C.; Mathur, D.; Medintz, I. L.; and Melinger, J. S. "Machine-Learning Methods for Understanding Energy-Transport in Molecular Networks." ACS Meeting Fall 2022. Chicago, IL. 8/21/22.
16. **Rolczynski, B. S.**; Diaz, S. A.; Kim, Y. C.; Mathur, D.; Medintz, I. L.; Cunningham, P. D.; and Melinger, J. S. "Using Machine-Learning Tools to Understand and Optimize Molecular Networks Templated by DNA." Mid-Atlantic DNA Nanotechnology Symposium. Rockville, MD. 5/24/22.
15. **Rolczynski, B. S.**; Kim, Y.; Diaz, S.; Medintz, I.; Cunningham, P.; Melinger, J. "Deducing Energy and Structure in DNA-scaffolded Chromophores using Genetic Algorithms." IEEE NANO 2021 conference. Montreal, Canada. 7/29/21.
14. **Rolczynski, B. S.** "Correlated Protein Environments Prolong Quantum Coherence." Invited talk. NIST, Gaithersburg, MD. 5/14/19.
13. **Rolczynski, B. S.**; Klein, W.; Diaz, S.; Zadegan, R.; Ancona, M.; Kuang, W.; Medintz, I.; Melinger, J. "Understanding energy transport relays using machine-learning tools." Fnano conference. Snowbird, UT. 4/16/19.
12. **Rolczynski, B. S.**, and Engel, G. S. "Correlated Protein Environments Prolong Quantum Coherence." Carnegie Mellon University, Pittsburgh, PA. 1/21/19.
11. **Rolczynski, B. S.** and Engel, G. S. "Correlated Protein Environments Prolong Quantum Coherence." US Naval Research Laboratory, Washington, DC. 5/3/18.

10. **Rolczynski, B. S.** and Engel, G. S. "Correlated Protein Environments Drive Prolonged Quantum Coherence." Washington University in St. Louis, St. Louis, MO. 11/30/17.
9. **Rolczynski, B. S.** and Engel, G. S. "Correlated Motion for Prolonged Quantum Coherences in a Photosynthetic Protein." Invited talk. Loyola University, Chicago, IL. 4/20/17.
8. **Rolczynski, B. S.;** Navotnaya, P.; Engel, G. S. "Driving delocalized dynamics using the orbital angular momentum of light." ACS Meeting. San Francisco, CA. 4/5/17.
7. **Rolczynski, B. S.;** Yeh, S.; Navotnaya, P.; Ashraf, K.; Gardiner, A.; Cogdell, R.; Engel, G. S. "Resolving the detailed 2D spectral structure of the Fenna-Matthews-Olson complex." ACS Meeting. San Francisco, CA. 4/5/17.
6. **Rolczynski, B. S.;** Zheng, H.; Singh, V.; Navotnaya, P.; Caram, J.; Ashraf, K.; Gardiner, A.; Cogdell, R.; Engel, G. S. "Correlated vibrational motion in the Fenna-Matthews-Olson complex." ACS Meeting. San Francisco, CA. 4/2/17.
5. **Rolczynski, B. S.** and Engel, G. S. "Correlated exciton environments in the Fenna-Matthews-Olson complex." Photosynthesis conference. Marshall, IN. 11/5/16.
4. **Rolczynski, B. S.** and Engel, G. S. "Transcribing light's orbital angular momentum to materials." Spinos VI conference. Chicago, IL. 10/17/16.
3. **Rolczynski, B. S.** and Engel, G. S. "Long-lived coherences through correlated environments." ACS Meeting. Philadelphia, PA. 8/22/16.
2. **Rolczynski, B. S.** and Engel, G. S. "How Long Does a CdSe Quantum Dot Remember Its Excitation Energy?" Nanotalk Symposium. Chicago, IL. 2/25/14.
1. **Rolczynski, B. S.** and Chen, L. X. "The role of tuning push-pull interactions in small optical gap copolymers." Gordon Research Seminar. Easton, MA. 7/10/11.

## TEACHING

General Chemistry II

Spring 2024

## SERVICE

Board Secretary (elected), ACS, Wash. DC Chapter	2022-2023
Chair, Membership Committee, ACS, Wash. DC Chapter	2022
Member, Committee on Minority Affairs, ACS, Wash. DC Chapter	2020-2023
Instructor, Gateway Science Workshop, Northwestern University	2008-2009