Brian S. Rolczynski, Ph.D.

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EDUCATION

Northwestern University, Evanston, IL **2007 – 2013**
PhD, Physical Chemistry
University of Washington, Seattle, WA **2002 – 2007**
BS, Chemistry and BA, English (with honors)

FELLOWSHIPS

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

EXPERIENCE

The University of Nevada, Reno, Reno, NV **2024**
Assistant Professor, Departments of Chemistry and Chemical Physics
US Naval Research Laboratory, Washington, DC **2018 – 2023**
Research Chemist, Electronics Science and Technology Division
The University of Chicago, Chicago, IL **2013 – 2018**
Postdoctoral fellow, Department of Chemistry and The James Franck Institute
Northwestern University, Evanston, IL **2007 – 2013**
and concurrently at **Argonne National Laboratory**, Lemont, IL **2010 – 2012**
Graduate researcher, Department of Chemistry and ANSER Center

PUBLICATIONS

30. **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.
29. **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.*
28. 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.
27. **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.

26. **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.
25. 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.
24. 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.
23. 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.
22. **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
21. 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.
20. 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.
19. 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.
18. **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.
17. 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.
16. Zheng, H.; Caram, J. R.; Dahlberg, P. D.; **Rolczynski, B. S.**; Viswanathan, S.; Dolzhnikov, D. S.; Khadivi, A.; Talapin, D. V.; Engel, G. S. Dispersion-free continuum two-dimensional electronic spectrometer. Applied Optics 2014, 53(9), 1909.
15. Caram, J. R.; Zheng, H.; Dahlberg, P. D.; **Rolczynski, B. S.**; Griffin, G. B.; Dolzhnikov, 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.

14. 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.
13. 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.
12. 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.
11. 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 400 citations.
10. **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 150 citations.
9. 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.
8. 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 400 citations.
7. 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.
6. 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.
5. 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.
4. **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.

3. 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.
2. 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.
1. 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.

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

24. **Rolczynski, B. S.** "Understanding Structure and Transport in Scaffolded Molecular Networks" Invited talk, Cal State U, Chico. Chico, CA. 11/15/24.
23. **Rolczynski, B. S.** "Understanding Electronic Energy Transport in DNA-Scaffolded Molecular Networks Using Machine-Learning Methods." 65th Electronic Materials Conference. Santa Barbara, CA. 6/29/23.
22. **Rolczynski, B. S.** "How Structure Can Assist Energy Transport in Scaffolded Molecular Networks." University of Nevada, Reno. Reno, NV. 4/10/23.
21. **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.
20. **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.
19. **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.
18. **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.
17. **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.
16. **Rolczynski, B. S**. "Correlated Protein Environments Prolong Quantum Coherence." Invited talk. NIST, Gaithersburg, MD. 5/14/19.
15. **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.

14. **Rolczynski, B. S.**, and Engel, G. S. "Correlated Protein Environments Prolong Quantum Coherence." Carnegie Mellon University, Pittsburgh, PA. 1/21/19.
13. **Rolczynski, B. S.** and Engel, G. S. "Correlated Protein Environments Prolong Quantum Coherence." US Naval Research Laboratory, Washington, DC. 5/3/18.
12. **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.
11. **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.
10. **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.
9. **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.
8. **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.
7. **Rolczynski, B. S.** and Engel, G. S. "Correlated exciton environments in the Fenna-Matthews-Olson complex." Photosynthesis conference. Marshall, IN. 11/5/16.
6. **Rolczynski, B. S.** and Engel, G. S. "Transcribing light's orbital angular momentum to materials." Spinos VI conference. Chicago, IL. 10/17/16.
5. **Rolczynski, B. S.** and Engel, G. S. "Long-lived coherences through correlated environments." ACS Meeting. Philadelphia, PA. 8/22/16.
4. **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.
3. **Rolczynski, B. S**. "Lessons from Alternating Copolymer Dynamics: Reconsidering the model for charge carrier dissociation in organic photovoltaic devices." U. C. Berkeley. Berkeley, CA. 9/26/12.
2. **Rolczynski, B. S**. "Lessons from Alternating Copolymer Dynamics: Reconsidering the model for charge carrier dissociation in organic photovoltaic devices." U. Chicago. Chicago, IL. 8/16/12.
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

University of Nevada, Reno

General Chemistry II (Chem 122A)	Spring 2024
Advanced Physical Chemistry (Chem 450/650)	Fall 2024

MENTORING

University of Nevada, Reno

Graduate students (Krishna Gautam, Kipper Riemersma, Nabin Humagain)	2024

SERVICE

Chair, Membership Committee, ACS, Wash. DC Chapter	2022
Board Secretary (elected), ACS, Wash. DC Chapter	2022 – 2023
Member, Committee on Minority Affairs, ACS, Wash. DC Chapter	2022 – 2023

Instructor, Gateway Science Workshop, Northwestern University 2008 – 2009