

## Benjamin E. Partridge, Ph.D.

Assistant Professor of Chemistry and Levinson-Shapiro Faculty Scholar  
University of Rochester | Department of Chemistry  
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### PROFESSIONAL EXPERIENCE

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<b>University of Rochester</b> , Rochester, NY <i>Assistant Professor of Chemistry</i> <i>Levinson-Shapiro Faculty Scholar</i> <i>Faculty Member, Materials Science Program, Hajim School of Engineering</i>	2022–present
<b>Northwestern University</b> , Evanston, IL <i>International Institute for Nanotechnology Postdoctoral Fellow</i> <u>Advisor</u> : Chad A. Mirkin	2019–2022

### EDUCATION

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<b>University of Pennsylvania</b> , Philadelphia, PA <i>HHMI International Student Research Fellow and Thouron Fellow</i> Ph.D. in Chemistry; Certificate in College and University Teaching   <u>Advisor</u> : Virgil Percec	2013–2018
<b>University of Oxford</b> , Oxford, United Kingdom M.Chem. (Undergraduate Masters) in Chemistry   <u>Advisor</u> : Paul D. Beer	2009–2013

### AWARDS AND HONORS

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Levinson-Shapiro Faculty Scholar, University of Rochester	2022–present
International Institute for Nanotechnology Outstanding Researcher Award	2021
International Institute for Nanotechnology Postdoctoral Fellowship	2019–2022
Branco Weiss Fellowship, ETH Zürich – Shortlisted (top 5% of 657 applicants)	2019
SETARAM Best Student Award, North American Thermal Analysis Society	2017
Student Travel Award, Thermal Analysis Forum of Delaware Valley	2017
International Student Research Fellowship, Howard Hughes Medical Institute	2015–2018
Outstanding Performance by a Teaching Assistant, University of Pennsylvania	2014
Thouron Award, University of Pennsylvania	2013–2015
Inorganic Chemistry Part II Thesis Prize ( <i>Proxime Accesserunt</i> ), University of Oxford	2013

### RESEARCH EXPERIENCE (SELECTED)

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<b>IIN Postdoctoral Fellow</b> , Northwestern University, Evanston, IL	2019–2022
<ul style="list-style-type: none"><li>Developed expertise in DNA and protein synthesis, protein crystallography and nanoparticle assembly</li><li>Elaborated a method to program protein crystal structure by design using DNA hybridization (<i>JACS</i> <b>2021</b>)</li><li>Programmed the spatial location and relative interaction strength of DNA on a protein surface to define protein assembly along hierarchical multistep pathways (<i>PNAS</i> <b>2021</b>)</li><li>Discovered design rules for the assembly of gold nanoparticles into crystals with defined valency (<i>Nat. Mater.</i> <b>2022</b>) and controllable porosity (<i>Nature</i> <b>2022</b>)</li><li>Led a team in the preparation of an NSF-BMAT proposal, from conception to submission and execution (\$525k)</li><li>Led Programmable Nanomaterials subgroup, with responsibility for overseeing ~20 students and postdocs</li></ul>	
<b>Graduate Student</b> , University of Pennsylvania, Philadelphia, PA	2013–2018
<ul style="list-style-type: none"><li>Investigated structure-property relationships in assemblies of perylene bisimides (<i>JACS</i> <b>2015</b>, <b>2019</b>, <b>2020</b>)</li><li>Discovered a supramolecular epitaxy effect in condensed soft matter (<i>ACS Nano</i> <b>2016</b>, <b>2017</b>)</li><li>Developed expertise in organic synthesis, supramolecular assembly, fiber X-ray diffraction, circular dichroism/UV-vis spectroscopy, thermal analysis (differential scanning calorimetry)</li><li>Laboratory Safety Coordinator (2014–2018) responsible for leading in-lab safety efforts</li></ul>	

## PEER-REVIEWED PUBLICATIONS

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Before University of Rochester:

1. Li, Y.; Zhou, W.; Tanriver, I.; Hadibrata, W.; **Partridge, B. E.**; Lin, H.; Hu, X.; Lee, B.; Liu, J.; Dravid, V. P.; Aydin, K.; Mirkin, C. A. Open-Channel Metal Particle Superlattices. *Nature* **2022**, *611*, 695.
2. Wang, S.; Lee, S.; Du, J. S.; **Partridge, B. E.**; Cheng, H. F.; Zhou, W.; Dravid, V. P.; Lee, B.; Glotzer, S. C.; Mirkin, C. A. The Emergence of Valency in Colloidal Crystals through Electron Equivalents. *Nat. Mater.* **2022**, *21*, 580.
3. Sahoo, D.; Peterca, M.; Imam, M. R.; **Partridge, B. E.**; Xiao, Q.; Percec, V. Conformationally Flexible Dendronized Cyclotetramertrylene (CTTV) Self-Organize a Large Diversity of Chiral Columnar, Frank-Kasper, and Quasicrystal Phases, *Giant* **2022**, *10*, 100096.
4. Percec, V.; Huang, N.; Xiao, Q.; **Partridge, B. E.**; Sahoo, D.; Imam, M. R.; Peterca, M.; Graf, R.; Spiess, H.-W.; Zeng, X.; Ungar, G. Self-Organization of Rectangular Bipyramidal Helical Columns by Supramolecular Orientational Memory Epitaxially Nucleated from a Frank-Kasper  $\sigma$  Phase, *Giant* **2022**, *9*, 100084.
5. **Partridge, B. E.**; Winegar, P. H.; Han, Z.; Mirkin, C. A. Redefining Protein Interfaces within Protein Single Crystals with DNA. *J. Am. Chem. Soc.* **2021**, *143*, 8925.
6. Hayes, O. G.<sup>†</sup>; **Partridge, B. E.**<sup>†</sup>; Mirkin, C. A. Encoding Hierarchical Assembly Pathways of Proteins with DNA. *Proc. Natl. Acad. Sci. U. S. A.* **2021**, *118*, e2106808118. (<sup>†</sup> denotes equal contribution)
7. Ebrahimi, S. B.; Samanta, D.; **Partridge, B. E.**; Kusmierz, C. D.; Cheng, H. F.; Grigorescu, A. A.; Chávez, J. L.; Mirau, P. A.; Mirkin, C. A. Programming Fluorogenic DNA Probes for Rapid Detection of Steroids. *Angew. Chem. Int. Ed.* **2021**, *60*, 15260.
8. Percec, V.; Wang, S.; Huang, N.; **Partridge, B. E.**; Wang, X.; Sahoo, D.; Hoffman, D. J.; Malineni, J.; Peterca, M.; Jezorek, R. L.; Zhang, N.; Daud, H.; Sung, P. D.; McClure, E. R.; Song, S. L. An Accelerated Modular-Orthogonal Ni-Catalyzed Methodology to Symmetric and Nonsymmetric Constitutional Isomeric AB<sub>2</sub> to AB<sub>9</sub> Dendrons Exhibiting Unprecedented Self-Organizing Principles, *J. Am. Chem. Soc.* **2021**, *143*, 17724.
9. Kostina, N. Y.; Soeder, D.; Haraszti, T.; Xiao, Q.; Rahimi, K.; **Partridge, B. E.**; Klein, M. L.; Percec, V.; Rodriguez-Emmenegger, C. Enhanced Concanavalin A Binding to Preorganized Mannose Nanoarrays in Glycodendrimersomes Revealed Multivalent Interactions, *Angew. Chem. Int. Ed.* **2021**, *60*, 8352.
10. Wang, L.; **Partridge, B. E.**; Huang, N.; Olsen, J. T.; Sahoo, D.; Zeng, X.; Ungar, G.; Graf, R.; Spiess, H. W.; Percec, V. Extraordinary Acceleration of Cogwheel Helical Self-Organization of Dendronized Perylene Bisimides by the Dendron Sequence Encoding their Tertiary Structure. *J. Am. Chem. Soc.* **2020**, *142*, 9525.
11. Park, S. S.; Urbach, Z. J.; Brisbois, C. A.; Parker, K. E.; **Partridge, B. E.**; Oh, T.; Dravid, V. P.; Olvera de la Cruz, M.; Mirkin, C. A. DNA- and Field-Mediated Assembly of Magnetic Nanoparticles into High-Aspect Ratio Crystals. *Adv. Mater.* **2020**, *32*, 1906626.
12. Holerca, M. N.; Peterca, M.; **Partridge, B. E.**; Xiao, Q.; Lligadas, G.; Monteiro, M. J.; Percec, V. Monodisperse Macromolecules by Self-Interrupted Living Polymerization, *J. Am. Chem. Soc.* **2020**, *142*, 15265.
13. Huang, N.; Imam, M. R.; Sienkowska, M. J.; Peterca, M.; Holerca, M. N.; Wilson, D. A.; Rosen, B. M.; **Partridge, B. E.**; Xiao, Q.; Percec, V. Supramolecular Spheres Assembled from Covalent and Supramolecular Dendritic Crowns Dictate the Supramolecular Orientational Memory Effect Mediated by Frank-Kasper Phases, *Giant* **2020**, *1*, 100001.
14. **Partridge, B. E.**; Wang, L.; Sahoo, D.; Olsen, J. T.; Leowanawat, P.; Roche, C.; Ferreira, H.; Reilly, K. J.; Zeng, X.; Ungar, G.; Heiney, P. A.; Graf, R.; Spiess, H. W.; Percec, V. Sequence-Defined Dendrons Dictate Supramolecular Cogwheel Assembly of Dendronized Perylene Bisimides. *J. Am. Chem. Soc.* **2019**, *141*, 15761.
15. Wilson, D. A.; Andreopoulou, K. A.; Peterca, M.; Leowanawat, P.; Sahoo, D.; **Partridge, B. E.**; Xiao, Q.; Huang, N.; Heiney, P. A.; Percec, V. Supramolecular Spheres Self-Assembled from Conical Dendrons are Chiral. *J. Am. Chem. Soc.* **2019**, *141*, 6162.
16. Rodriguez-Emmenegger, C.; Xiao, Q.; Kostina, N. Y.; Sherman, S. E.; Rahimi, K.; **Partridge, B. E.**; Li, S.; Sahoo, D.; Reveron Perez, A. M.; Buzzacchera, I.; Han, H.; Kerzner, M.; Malhotra, I.; Möller, M.; Wilson, C. J.; Good, M. C.; Goulian, M.; Baumgart, T.; Klein, M. L.; Percec, V. Encoding Biological Recognition in a Bicomponent Cell-Membrane Mimic. *Proc. Natl. Acad. Sci. U. S. A.* **2019**, *116*, 5376.

17. Holerca, M. N.; Sahoo, D.; **Partridge, B. E.**; Peterca, M.; Zeng, X.; Ungar, G.; Heiney, P. A.; Percec, V. Dendronized Poly(2-Oxazoline) Displays Within Only Five Monomer Repeat Units Liquid Quasicrystal, A15 and  $\sigma$  Frank-Kasper Phases. *J. Am. Chem. Soc.* **2018**, *140*, 16941.
18. Sahoo, D.; Imam, M. R.; Peterca, M.; **Partridge, B. E.**; Wilson, D. A.; Zeng, X.; Ungar, G.; Heiney, P. A.; Percec, V. Hierarchical Self-Organization of Chiral Columns from Chiral Supramolecular Spheres. *J. Am. Chem. Soc.* **2018**, *140*, 13478.
19. Sahoo, D.; Peterca, M.; Aqad, E.; **Partridge, B. E.**; Klein, M. L.; Percec, V. Losing Supramolecular Orientational Memory via Self-Organization of a Misfolded Secondary Structure. *Polym. Chem.* **2018**, *9*, 2370.
20. Andreopoulou, K. A.; Peterca, M.; Wilson, D. A.; **Partridge, B. E.**; Heiney, P. A.; Percec, V. Demonstrating the  $\delta_1$ -Helicity and Nanomechanical Function of Self-Organizable Dendronized Polymethacrylates and Polyacrylates. *Macromolecules* **2017**, *50*, 5271.
21. Sahoo, D.; Peterca, M.; Aqad, E.; **Partridge, B. E.**; Heiney, P. A.; Graf, R.; Spiess, H. W.; Zeng, X.; Percec, V. Tetrahedral Arrangements of Perylene Bisimide Columns via Supramolecular Orientational Memory. *ACS Nano* **2017**, *11*, 983.
22. Holerca, M. N.; Sahoo, D.; Peterca, M.; **Partridge, B. E.**; Heiney, P. A.; Percec, V. A Tetragonal Phase Self-Organized from Unimolecular Spheres Assembled from a Substituted Poly(2-Oxazoline). *Macromolecules* **2017**, *50*, 375.
23. Ho, M.-S.; **Partridge, B. E.**; Sun, H.-J.; Sahoo, D.; Leowanawat, P.; Peterca, M.; Graf, R.; Spiess, H. W.; Zeng, X.; Ungar, G.; Heiney, P. A.; Hsu, C.-S.; Percec, V. Screening Libraries of Semifluorinated Arylene Bisimides to Discover and Predict Thermodynamically Controlled Helical Crystallization. *ACS Comb. Sci.* **2016**, *18*, 723.
24. Peterca, M.; Imam, M. R.; Hudson, S. D.; **Partridge, B. E.**; Sahoo, D.; Heiney, P. A.; Klein, M. L.; Percec, V. Complex Arrangement of Orthogonal Nanoscale Columns via a Supramolecular Orientational Memory Effect. *ACS Nano* **2016**, *10*, 10480.
25. Sahoo, D.; Peterca, M.; Aqad, E.; **Partridge, B. E.**; Heiney, P. A.; Graf, R.; Spiess, H. W.; Zeng, X.; Percec, V. Hierarchical Self-Organization of Perylene Bisimides into Supramolecular Spheres and Periodic Arrays Thereof. *J. Am. Chem. Soc.* **2016**, *138*, 14798.
26. Roche, C.; Sun, H.-J.; Leowanawat, P.; Araoka, F.; **Partridge, B. E.**; Peterca, M.; Wilson, D. A.; Prendergast, M. E.; Heiney, P. A.; Graf, R.; Spiess, H. W.; Zeng, X.; Ungar, G.; Percec, V. A Supramolecular Helix that Disregards Chirality. *Nat. Chem.* **2016**, *8*, 80.
27. Guerra, S.; Iehl, J.; Holler, M.; Peterca, M.; Wilson, D. A.; **Partridge, B. E.**; Zhang, S.; Deschenaux, R.; Nierengarten, J.-F.; Percec, V. Self-Organisation of Dodeca-Dendronized Fullerene into Supramolecular Discs and Helical Columns Containing a Nanowire-Like Core. *Chem. Sci.* **2015**, *6*, 3393.
28. **Partridge, B. E.**; Leowanawat, P.; Aqad, E.; Imam, M. R.; Sun, H.-J.; Peterca, M.; Heiney, P. A.; Graf, R.; Spiess, H. W.; Zeng, X.; Ungar, G.; Percec, V. Increasing 3D Supramolecular Order by Decreasing Molecular Order: A Comparative Study of Helical Assemblies of Dendronized Non-Chlorinated and Tetrachlorinated Perylene Bisimides. *J. Am. Chem. Soc.* **2015**, *137*, 5210.
29. Wu, Y.-C.; Leowanawat, P.; Sun, H.-J.; **Partridge, B. E.**; Peterca, M.; Graf, R.; Spiess, H. W.; Zeng, X.; Ungar, G.; Hsu, C.-S.; Heiney, P. A.; Percec, V. Complex Columnar Hexagonal Polymorphism in Supramolecular Assemblies of a Semifluorinated Electron-Accepting Naphthalene Bisimide. *J. Am. Chem. Soc.* **2015**, *137*, 807.
30. Roche, C.; Sun, H.-J.; Prendergast, M. E.; Leowanawat, P.; **Partridge, B. E.**; Heiney, P. A.; Araoka, F.; Graf, R.; Spiess, H. W.; Zeng, X.; Ungar, G.; Percec, V. Homochiral Columns Constructed by Chiral Self-Sorting During Supramolecular Helical Organization of Hat-Shaped Molecules. *J. Am. Chem. Soc.* **2014**, *136*, 7169.
31. Mullaney, B. R.; **Partridge, B. E.**; Beer, P. D. A Halogen-Bonding Bis-Triazolium Rotaxane for Halide Selective Anion Recognition. *Chem.—Eur. J.* **2014**, *21*, 1660.
32. Noonan, G. M.; Hayter, B. R.; Campbell, A. D.; Gorman, T. W.; **Partridge, B. E.**; Lamont, G. M. Expanding the Scope of Silane-Mediated Hydrodehalogenation Reactions. *Tetrahedron Lett.* **2013**, *54*, 4518.

## PATENTS

“Encoding Hierarchical Assembly Pathways of Proteins with DNA”. Mirkin, C. A.; Hayes, O. G.; Partridge, B. E. U.S. Patent Application; US 2022/0372062 A1; published November 24, 2022, provisionally filed May 24, 2021.

## PRESENTATIONS (SELECTED)

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4 <sup>th</sup> International Conference on Chemistry, Lahore Garrison University, Lahore, Pakistan (keynote)	March 2023
American Chemical Society Northeast Regional Meeting, Rochester, NY (oral)	October 2022
RSC Macrocyclic and Supramolecular Chemistry Young Scientist Series, Virtual (oral)	June 2022
Gordon Research Conference on Bioinspired Materials, Les Diablerets, Switzerland (poster)	June 2022
Gordon Research Symposium on Bioinspired Materials, Les Diablerets, Switzerland (oral)	June 2022
International Chemical Congress of Pacific Basin Societies (Pacifichem), Virtual Meeting (oral)	December 2021
Wesleyan University, Chemistry Department Colloquium, Middletown, CT (invited, oral)	October 2021
American Chemical Society National Meeting, Virtual Meeting (oral)	April 2021
American Chemical Society National Meeting, Boston, MA (poster, selected for Sci-Mix)	August 2018
North American Thermal Analysis Society Annual Meeting, Philadelphia, PA (plenary lecture)	August 2018
North American Thermal Analysis Society Annual Meeting, Newark, DE (award lecture)	August 2017
American Chemical Society National Meeting, Philadelphia, PA (talk)	August 2016

## RESEARCH PERSONNEL SUPERVISED

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Graduate Students:	( <i>current</i> ) Elizabeth Piedmont (G2), Hannah Claus (G1), Parbhat Kumar (G1), Abhishek Roy (G1)
Undergraduate Students:	( <i>current</i> ) Ubanni Opashi ('25), Camden Parker ('23), Grace van der Meer ('25), Aiden Ward ('25), Marvin Wu ('26)
Visiting International Students:	( <i>former</i> ) Áron Adorján (Hungary)

## TEACHING EXPERIENCE

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<b>Course Instructor</b> , University of Rochester CHEM 433 Advanced Organic Chemistry I	Fall 2022
<b>Teaching Assistant</b> , University of Pennsylvania CHEM 241 Organic Chemistry II	Spring 2017
CHEM 054 General Chemistry II Laboratory	Spring 2014
CHEM 053 General Chemistry I Laboratory	Fall 2013

## LEADERSHIP, OUTREACH, AND SERVICE (SELECTED)

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<b>Chair</b> , Natural Sciences Panel, Sproull and Provost Fellowship Committee, U. Rochester	2023
<b>Member</b> , <i>Protein Science</i> Early Career Reviewer Board	2023–present
<b>Member</b> , Dept. of Chemistry Graduate Recruiting Committee, University of Rochester	2022–present
<b>Member</b> , Dept. of Chemistry Diversity, Equity, Inclusion, and Outreach Committee, U. Rochester	2022–present
<b>Session Chair</b> , 2022 ACS Northeast Regional Meeting, Rochester, NY <i>Session: Organic Chemistry</i>	October 2022
<b>Poster Judge</b> , 2022 ACS Northeast Regional Meeting, Rochester, NY	October 2022
<b>Leader</b> , Programmable Nanomaterials Subgroup, Mirkin Group, Northwestern University	2020–2022
<b>Member</b> , Women in Chemistry Professional Advancement Committee, U. Pennsylvania	2016–2018
<b>Session Organizer</b> , 2016 ACS National Meeting, Philadelphia, PA <i>Session: From Bench-to-Bench and Beyond: Engaging People with High Impact Chemistry (GSSPC initiative)</i>	August 2016
<b>Graduate Chair</b> , International Student Advisory Board, U. Pennsylvania	2014–2016

## PROFESSIONAL AFFILIATIONS

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Royal Society of Chemistry (RSC)	2008–present
American Chemical Society (ACS) <i>Divisions: Chemical Health and Safety (CHAS), Colloids (COLL), Organic (ORGN), Polymers (POLY)</i>	2013–present
North American Thermal Analysis Society (NATAS)	2017–present
Protein Society	2019–present