W. Benjamin Rogers

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Education

2012 Ph.D., Chemical & Biomolecular Engineering, University of Pennsylvania
Advisor: John Crocker

2007 M.S., Chemical & Biomolecular Engineering, University of Pennsylvania

2005 B.S., Chemical Engineering, University of Delaware, Honors Degree with Distinction; *magna cum laude*

Professional Positions

2016–present Assistant Professor, Department of Physics, Brandeis University

2014–2015 Research Associate, Applied Physics, Harvard University

2012–2014 Postdoctoral Fellow, Applied Physics, Harvard University
Mentor: Vinothan Manoharan

Awards and Honors

2017 Smith Family Award for Excellence in Biomedical Research, Smith Family Foundation

2017 Provost's Research Award, Brandeis University

2016 Teaching Innovation Award, Brandeis University

2005 3M Graduate Research Fellowship, 3M

2005 H. Ted Davis Fellowship, University of Minnesota Foundation

2005 Industrial Sponsors Undergraduate Research Award, University of Delaware

2004 National Starch and Chemical Company Undergraduate Scholarship

2004 Robert L. Pigford Undergraduate Award, University of Delaware

Research Support

National Science Foundation (DMR-1710112), 2017–2020
Experimental studies of dynamic self-assembly and phase transitions in colloidal suspensions.
Total Costs: $568,793 (1 PI, role=PI)

Smith Family Foundation, 2018–2021
Experimental studies of RNA secondary structure and RNA-protein interactions.
Total Costs: $300,000 (1 PI, role=PI)

Research Interests

Self-assembly, DNA nanotechnology, active matter, biophysics, soft condensed matter physics, applied optics, statistical mechanics and computer simulations, single-molecule science

Publications

15. J. Lowensohn, B. Oyarzun, G. N. Paliza, B. M. Mognetti, **W. B. Rogers**, "Quantitative study of linker-mediated binding between DNA-grafted colloidal particles," *preprint*.

14. E. W. Gehrels, **W. B. Rogers**, V. N. Manoharan, "Using DNA strand displacement to control the temperature dependence of DNA-mediated colloidal interactions," *Soft Matter*, accepted.

13. A. Wang, **W. B. Rogers**, V. N. Manoharan, "Effects of contact-line pinning on the adsorption of nonspherical colloids at liquid interfaces," *Physical Review Letters* 119 (2017) 108004.

12. J.-G. Park, **W. B. Rogers**, S. Magkiriadou, T. Kodger, S.-H. Kim, Y.-S. Kim, V. N. Manoharan, "Photonic-crystal hydrogels with a rapidly tunable stop band and high reflectivity across the visible," *Optical Materials Express*, 7 (2017) 253-263.

11. **W. B. Rogers**, W. M. Shih, V. N. Manoharan, "Using DNA to program the self-assembly of colloidal nanoparticles and microparticles," *Nature Reviews Materials*, 1 (2016) 16008.

10. **W. B. Rogers**, V. N. Manoharan, "Programming colloidal phase transitions with DNA strand displacement," *Science*, 347 (2015) 639–642.

9. **W. B. Rogers**, M. Corbett, S. Magkiriadou, P. Guarillof, V. N. Manoharan, "Breaking tradeoffs between translucency and diffusion in particle-doped films," *Optical Materials Express*, 4 (2014) 2621–2631.

8. **W. B. Rogers**, J. C. Crocker, "A tunable line optical tweezers instrument with nanometer spatial resolution," *Review of Scientific Instruments*, 85 (2014) 043704.

7. **W. B. Rogers**, T. Sinno, J. C. Crocker, "Kinetics and non-exponential binding of DNA-coated colloids," *Soft Matter*, 9 (2013) 6412–6417.

6. M. T. Ung, R. T. Scarlett, **W. B. Rogers**, I. Jenkins, T. Sinno, J. C. Crocker, "Driving diffusionless transformations in colloidal crystals using DNA handshaking," *Nature Communications*, 3 (2012) 1209.

5. **W. B. Rogers**, J. C. Crocker, "Reply to Mognetti et al.: DNA handshaking interaction data are well described by mean-field and molecular models," *PNAS*, 109 (2012) E380.

4. **W. B. Rogers**, J. C. Crocker, "Direct measurements of DNA-mediated colloidal interactions and their quantitative modeling," *PNAS*, 108 (2011) 15687–15692.

3. R. F. Meyer, **W. B. Rogers**, M. T. McClendon, J. C. Crocker, "Producing monodisperse drug-loaded polymer microspheres via cross-flow membrane emulsification: the effects of polymers and surfactants," *Langmuir*, 26 (2010) 14479–14487.

2. R. Vijay, R. J. Hendershot, S. Rivera, **W. B. Rogers**, B. J. Feist, C. M. Snively, J. Lauterbach, "Noble metal free NO_X storage catalysts using cobalt discovered via high-throughput experimentation," *Catalysis Communications*, 6 (2005) 167–171.

1. R. J. Hendershot, **W. B. Rogers**, C. M. Snively, B. A. Ogunnaike, J. Lauterbach, "Development and optimization of NO_X storage and reduction catalysts using statistically guided high-throughput experimentation," *Catalysis Today*, 98 (2004) 375–385.

Invited Talks

15. W. B. Rogers, "Unraveling and reprogramming self-assembly using DNA" *University of Massachusetts: Lowell*, Department of Physics, December 13, 2017.
14. W. B. Rogers, "No assembly required: Using DNA to study and build nanomaterials" *Smith College*, Department of Physics, December 1, 2017.
13. W. B. Rogers, "Using DNA to program pathways in colloidal self-assembly" *University of Massachusetts: Boston*, Physics Department, November 16, 2017.
12. W. B. Rogers, "Using DNA to program pathways in colloidal self-assembly" *University of Michigan*, Condensed Matter Seminar, September 19, 2017.
11. W. B. Rogers, "Using DNA to program pathways in colloidal self-assembly" *MIT*, Soft Materials and Soft Devices Colloquium, December 1, 2016.
10. W. B. Rogers, "Using DNA to program pathways in colloidal self-assembly" *Mt. Holyoke College*, Department of Physics, October 4, 2016.
9. W. B. Rogers, "Programming pathways to self-assembly" *Brookhaven National Lab*, Center for Functional Nanomaterials, April 1, 2016.
8. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *Wellesley College*, Physics Department, February 18, 2016.
7. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *Harvard University*, Squishy Physics, August 26, 2015.
6. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *FNANO15*, Foundations of Nanoscience Conference, April 14, 2015.
5. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *Brandeis University*, Martin A. Fisher School of Physics, February 26, 2015.
4. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *Yale University*, Department of Chemical and Environmental Engineering, February 24, 2015.
3. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *University of Wisconsin: Madison*, Department of Chemical and Biological Engineering, February 11, 2015.
2. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *UC Santa Barbara*, Materials Department, February 2, 2015.
1. W. B. Rogers, "Sculpting phase diagrams: freezing by heating, switchable crystals, and more," *Syracuse University*, Department of Physics, January 29, 2015.

Postdoctoral Scholars Advised

Simon Merminod, 2017-present.
Gael Prado, 2016, now in France.

Ph.D. Students Advised

Alex Hensley, Janna Lowensohn, Huang Fang, Daichi Hayakawa, James Sheehy, current students.

Teaching Experience

Physics 18a/b: Introductory Laboratory I/II, 2016-2017, Brandeis University
This is a new course that I designed with Prof. Melissa Kosinki-Collins for advanced undergraduates in the life sciences. It is designed to highlight the use of physical approaches to biology and to resemble modern biophysics experiments being performed in an academic research lab. Students use research-grade optical microscopes to conduct inquiry-based explorations into the behavior of living systems.

University and Professional Service

Graduate Admissions Committee, 2016–2018
Department Colloquium Committee, 2016–2017
Undergraduate Curriculum Committee, 2016–2018
Department Website Committee, 2017–2018
Reviewer/Referee: I have reviewed articles for journals relevant to my research field including *Nature*, *Physical Review Letters*, *Physical Review E*, *Soft Matter*, *Langmuir*, and *Journal of Chemical Physics*.

Outreach Activities

Portal to the Public Science Communications Fellow, Spring 2016
I participated in a program in which scientists engage in 10 hours of professional development workshops to learn effective outreach and communication skills. Subsequently each Fellow develops a hands-on activity to explain his or her research to the public. I developed an activity exploring the physics of complex fluids found in everyday life, which I presented at the Discovery Museums in Acton, MA on June 3, 2016.

Science Fair Judge, Massachusetts State Science & Engineering Fair, Spring 2016
Served as a judge for the High School Division of the Massachusetts State Science & Engineering Fair 2016.