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Ph.D., Physics, Brandeis University

Research Summary:

My Ph.D. research focused on the Colloidal Self-Assembly of Liquid Crystals, Membranes, and Ribbons, using filamentous viruses (bacteriophages) as building blocks. In simple mixtures of viruses and depleting polymers, a wide range of hierarchical self-assembly was observed and studied simultaneously at the nanometer and microscopic lengthscales. By varying physical properties of the viral building blocks through standard biological methods, the influence on macroscopic properties was investigated. As a Postdoctoral Fellow working in the James Franck Institute at the University of Chicago in the lab of Heinrich Jaeger, the chemical synthesis of nanoparticles and their self-assembly into monolayer membranes was studied.

Selected Recent Publications:

Reconfigurable self-assembly through chiral control of interfacial tension, T. Gibaud, E. Barry, M. J. Zakhary, M. Henglin, A. Ward, Y. Yang, C. Berciu, R. Oldenbourg, M. F. Hagan, D. Nicastro, R. B. Meyer and Z. Dogic. *Nature* 481, 348–351 (2012)

Entropy Driven Self-Assembly of Non-Amphiphilic Colloidal Membranes, E. Barry and Z. Dogic, *Proc. Natl. Acad. Sci.*, 107, 10348 (2010)

Awarded the 2010 Cozzarelli Prize in Engineering and Applied Sciences

Direct Measurement of the Twist Penetration Length in a Single Smectic-A Layer of Colloidal Virus Particles, E. Barry, Z. Dogic, R.B. Meyer, R.A. Pelcovits, and R. Oldenbourg *J.Phys.Chem (deGennes Memorial Issue)*, 113, 10348 (2009)

A Model Liquid Crystalline System Based on Rodlike Viruses with Variable Chirality and Persistence Length, E. Barry, D. Beller, and Z. Dogic, *Soft Matter*, 5, 2563-2570 (2009)

Bending Dynamics of Fluctuating Biopolymers Probed by Automated High-Resolution Filament Tracking, C.P. Brangwynne, G.H. Koenderink, E. Barry, Z. Dogic, F.C. MacKintosh and D.A. Weitz. *Biophys. J.*, 93, 346-359 (2007)

Entropy-Driven Formation of a Chiral Liquid-Crystalline Phase of Helical Filaments
E. Barry, Z. Hensel, Z. Dogic, M. Schribak and R. Oldenbourg, *PRL*, 96, 018305 (2006)

Self-diffusion of Rod-like Viruses in the Nematic Phase, M.P. Lettinga, E. Barry, and Z. Dogic. *Euro. Phys. Lett.*, 71, 692-698 (2005)