ABSTRACT: One of the greatest challenges facing mankind in the next century is energy management amidst consumption of a finite and diminishing amount of energy resources. In this spirit, my talk will discuss nanofabrication techniques developed to construct templates optimized for efficient energy device applications. This includes the synthesis and transfer of hierarchical self-assembled single-walled carbon nanotube materials into controllable, complex 3-D architectures and nanofabrication routes to graft complex chemical architectures into atomically-thin transferred graphene sheets. I will then discuss how these tunable materials can be utilized as bottom-up templates to build a range of efficient energy systems. This includes solid-state, mechanically robust capacitive energy storage materials, counter-electrodes for dye-sensitized solar cells, and photon-management electrodes for efficient solar-to-fuel conversion devices. Finally, I will close with a discussion of future plans aimed toward the development of efficient and integrated energy storage and conversion systems utilizing controlled nanomaterial fabrication techniques.

BIO: Dr. Cary L. Pint is currently a Research Scientist in the Extreme Technology Research Group at Intel Labs pursuing research in the area of efficient energy devices. Cary received his Ph.D. from Rice University in 2010 and spent one year as a postdoctoral fellow at the University of California, Berkeley before joining Intel. Cary has authored nearly 40 publications in top journals, has over 10 patents submitted, is a coauthor on a book on carbon nanomaterials soon to be published, and has been the recipient or finalist for numerous national awards, including the APS LeRoy Apker Award, the Vanderbilt Prize, and the AVS Dorothy and Earl Hoffman Scholarship.