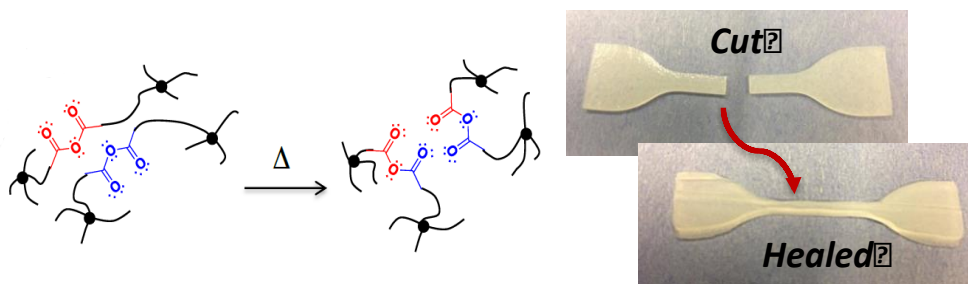


Clarkson University
Department of Chemical and Biomolecular Engineering
SEMINAR

“Leveraging Chemistry for Shape-Memory, Self-Healing, and Recycling Applications in Polymers”

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To reduce the world's dependence on plastics, much attention has recently focused on integrating dynamic functionality into polymer networks to produce new polymer-based materials having recycling, reconfiguring, and self-healing capabilities. Of particular interest are covalently adaptable networks (CANs), which are crosslinked polymeric systems that contain reversible covalent structures throughout their network that can be triggered by external stimuli (i.e., light, heat, the addition of a catalyst). The Shipp group has developed novel polyanhydride-based polymers fabricated by radical-mediated polymerizations. The anhydride group can undergo reversible covalent exchange, and using radical polymerizations provides a simple, straightforward method of synthesis that can be easily scaled for industrial needs. We have exploited the dynamic covalent exchange to create stress-free crosslinked network polyanhydrides that can be recycled and undergo self-healing. Additionally, we have developed polyanhydride-based composites that are not only capable of exhibiting shape memory properties but the dynamic covalent exchange between anhydride moieties also allows for permanent shape reconfiguration of the crosslinked polymer.



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Prof. Devon A. Shipp completed a B.Sc. (Hons) in chemistry (1993), and then Ph.D. (1998) at the *University of Melbourne* (Australia). He then accepted the Bayer Postdoctoral Research Fellowship at *Carnegie Mellon University* (Pittsburgh, Pennsylvania) with Prof. Kris Matyjaszewski. In 1999 he began his independent research career at *Clarkson University* in northern New York State where he is currently a full Professor and Director of Clarkson's New York State-funded *Center for Advanced Materials Processing*. He was formerly the chair of the Department of Chemistry & Biomolecular Science at Clarkson. His research group focuses on new polymer chemistries, particularly radical polymerizations, functional polymer systems, and degradable polymers for bio-related applications. He was a Fulbright Scholar in Slovenia in 2015, hosted by the *Slovenian National Institute of Chemistry* and the *Faculty of Chemistry and Chemical Technology at the University of Ljubljana*. He is an Associated Editor for *Polymer Reviews*. His website URL is: people.clarkson.edu/~dshipp.