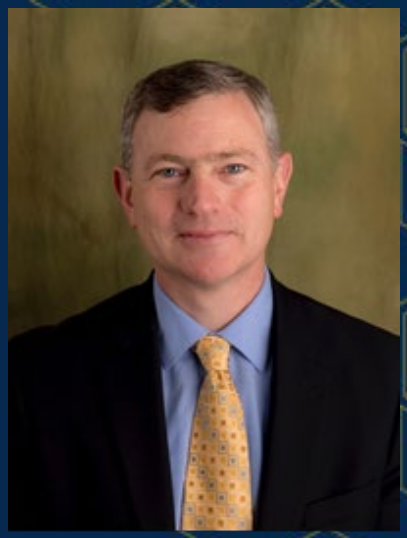
Materials Science and Engineering Department

# Winter Seminar Series

## Surface-Eroding, Self-Healing and Shape-Memory Materials Based on Polyanhydrides


**Prof. Devon A. Shipp**

**Department of Chemistry & Biomolecular Science, and Center for Advanced Materials Processing, Clarkson University**

**February 9, 2022**
**3-4PM**
**Zoom Link:** https://drexel.zoom.us/j/85921647294


Polyanhydrides have found a niche in the degradable polymer field, largely because they often u ndergo surface erosion, but demanding synthesis conditions are one reason for the lack of wides pread use. To address this problem, we have developed novel polyanhydrides that are based on radical-mediated thiol-ene polymerization, an easy to conduct step-growth mechanism of poly merization that can be applied to make materials that have relatively uniform network structure. This allows us to harness the robustness of thiol-ene polymerization, which can be photo-, redox - or thermally-initiated and may use a wide variety of monomers. Furthermore, one intriguing property of these polymers is the ability of the anhydride moiety to undergo dynamic covalent ex change, thus making them a covalent adaptable network (CAN) system. We have exploited this process to create stress-free network (crosslinked) polyanhydrides that can be recycled. Addition ally, we have developed polyanhydride-poly(e-caprolactone) composites that are not only capa ble of exhibiting shape memory properties but the dynamic covalent exchange between anhyd ride moieties also allows for permanent shape re configuration of the crosslinked polymer.


Prof. Devon A. Shipp completed a B.Sc. (Hons) in chemistry (1993), and then Ph.D. (1998) at the University of Melb ourne (Australia). He then accepted the Bayer Postdoctoral Research Fellowship at Carnegie Mellon University (Pitt sburgh, Pennsylvania) with Prof. Kris Matyjaszewski. In 1999 he began his independent research career at Clarkson University in northern New York State where he currently full Professor and Director of Clarkson's New York State-f unded Center for Advanced Materials Processing. He was formerly the chair of the Department of Chemistry & Bio molecular Science at Clarkson. His research group focuses on new polymer chemistries, particularly radical polyme rizations, nanocomposites, and degradable polymers for bio-related applications. He was a Fulbright Scholar in Sl ovenia 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 both Polymer Reviews and the Australian Journal of Chemistry. His website URL is: people.clarkson.edu/~dshipp.

DREXEL UNIVERSITY
College of
Engineering

**FOR MORE INFORMATION**

**Email: kn52@drexel.edu**

**drexel.edu/materials**