



**Seminar Topic:
Photo and Voltage Initiated Tissue Adhesives--Non-biomimetic Approaches**

Assistant Professor Terry W.J. Steele

Abstract

Implantable tissue adhesives typically fall within two categories, being activated by either two-part mixing or photo-initiated designs. These curing strategies limit applications to superficial sites and prevent incorporation into minimally invasive surgeries. An unmet clinical need exists for adhesives that allow for manipulation and subsequent adhesive activation in wet or inaccessible locations. Herein, the latest developments towards an instant curing adhesive through photo- and voltage-activated designs. The one-pot adhesives are synthesized by grafting donor/acceptor internal additives on dendrimers to form transparent or conductive one-pot adhesives that crosslink upon energetic activation. Light or voltage initiation allows tuneable material properties, which are evaluated in real-time with photo/electro-rheology. The novel carbene insertion chemistry aims to mimic anisotropic tissue moduli with tough adhesive matrices. Crosslinking initiation and propagation are observed to be photon and ampere dependent, enabling tuning of both elasticity and adhesive strength. Adhesion bond strengths on a variety of natural and synthetic substrates will be presented to showcase cosmetic and clinical applications.

Biography

Dr Terry W.J. Steele currently holds an Assistant Professor position at School of Materials Science and Engineering in Nanyang Technological University. Currently he focuses energetic engineering students and graduate students into a research dream team, striving to solve today's most pressing adhesion related ailments. Formerly, Dr Steele has studied pulmonary drug delivery at the Philipps-Marburg University in Marburg, Germany and earned his PhD in Medicinal Chemistry at the University of Minnesota. His research interests include vascular medical devices, adhesives and biosensors.

**Wednesday, 14 August 2019 || Time: 2:00 – 3:00 pm
Venue: MSE Meeting Room (N4.1-01-28)
Hosted by: Associate Professor Aravind Dasari**