Research in my laboratory over the past nine years has focused on the generation of hydrogel biomaterials to support the formation of a reparative niche within diseased or injured sites that can block or prevent inhibitory signals from dominating the repair process, while providing pro-repair signals that can guide new tissue formation. The goal of our approach is to use engineered materials to “unlock” the regenerative capacity of damaged or diseased tissue to promote repair. The premise of our approach is that all tissues in the body have the capacity to repair through local stem or progenitor cells, but that due to unfavorable environmental conditions during the normal healing process they are not able to do so. Our general strategy has been to combine our biomaterials engineering with designing materials that promote the formation of a space filling vascular plexus that could serve as part of a reparative niche directly at the wound site. The idea is that this vascular plexus would lay the groundwork for the recruitment of endogenous stem cells located in the local tissue surrounding the damaged area and generate an environment that would foster repair rather than scaring.

In this talk we focus on our efforts to bioengineer hydrogels for brain repair after stroke. In particular our efforts to engineer injectable hydrogel materials that gel in situ and present multivalent aggregates of vascular endothelial growth factor (VEGF), fibronectin fragment proteins, and the appropriate mechanical properties.

Tuesday, May 1, 2018
Lecture at 4:00 p.m.
Room 1610, Engineering Hall
Refreshments will be served at 3:45 p.m.