Today, approximately 8 million patients suffer from myocardial infarction (heart attack), where part of the heart wall dies. When part of the heart wall dies, the patient’s pump function is decreased. To help solve this issue and provide a technology that actively contracts, researchers at WPI have developed a novel fibrin-based microvascular network for potential use in the creation of cell-seeded scaffolds. The concept of the network has been fabricated and demonstrated its capability for continuous fluid flow throughout and perfusion, which will increase cellular viability. The results are promising in both accounts.

Studies conducted at WPI demonstrate that a fluid inside a microvascular network, created using photolithography, within a fibrin film continuously spread over time. When applied as a scaffold, this feature would improve delivery of oxygen and nutrients to cells, thus improving cell viability and increasing the probable success of regeneration. Further tests used a single channel within the film show that cells can indeed survive inside of the film, particularly when cell culture medium is perfused through the channel. The developed network shows great promise and versatility, and is the first of its kind to combine two different tissue layers in this configuration.