1153-92-300 **Samuel Britton*** (sbrit004@ucr.edu), **Oleg Kim**, **Francesco Pancaldi**, **Zhiliang Xu**, **Rustem Litvinov**, **John Weisel** and **Mark Alber**. *Contribution of Cohesive Fiber-Fiber Interactions to the Non-Linear Elastic Behavior of Fibrin Networks.*

Fibrin is a viscoelastic polymer that determines the deformability and integrity of blood clots and fibrin-based biomaterials in response to external forces. Here, a new structural mechanism of fibrin clots' mechanical response to external tensile loads is validated using confocal microscopy and tested with a three-dimensional computational model. This mechanism is based on previously neglected cohesive pairwise interactions between individual fibers (crisscrossing) in fibrin networks and is shown to influence local strain-stiffening of individual fibers as well as global stiffening of the entire network. Confirmation of fiber-fiber crisscrossing during fiber reorientation was achieved using 3D imaging of experimentally obtained stretched fibrin clots. The computational model enabled us to study structural details and quantify mechanical effects of the fiber-fiber cohesive crisscrossing during stretching of fibrin at various spatial scales. These results show that the crisscrossing of fibers in stretched fibrin networks comprise an underappreciated structural mechanism underlying the mechanical response of fibrin to (patho)physiological stresses that determine the possible course and outcomes of thrombotic and hemostatic disorders, such as heart attack and ischemic stroke. (Received August 30, 2019)