Taking cues from biological materials, we are interested in understanding the design rules employed in Nature and applying these strategies to the development of mechanically-enhanced and tunable materials. Fiber constructs are prevalent in natural systems, from collagen fiber networks in tendon to tough spider silk fibers. With these bio-inspired cues, we are intrigued by the impact of synthetic fiber orientation, alignment, manufacturing, and reinforcement on mechanics and functionality.

Recent innovations in multilayer co-extrusion technology have translated to the fabrication of melt-extruded polymeric rectangular fiber mats and composites. Distinct advantages of this modular approach over other traditional fiber processing techniques include scalability, environmentally-friendly conditions, and the ability to obtain cross-sectional dimensions on the nanoscale. Here, we describe the mechanics and structural features of biologically-relevant, high surface area fiber mats. Functional fiber substrates were obtained via facile surface modification and inclusion of therapeutics. We also focus on this fiber technology as a new platform for the development of reinforced hydrogels via an in situ approach. This manufacturing strategy allows for strategic control of hydrogel architecture, fiber alignment and loading, compressive stability and stiffness. Promising results related to cell adherence and growth are highlighted for these extruded hydrogel scaffolds.

**BIOGRAPHY**

LaShanda T.J. Korley joined the Departments of Materials Science and Engineering, and Chemical and Biomolecular Engineering at the University of Delaware in January 2018 as a Distinguished Associate Professor. Prior to Prof. Korley’s appointment at UD, she held the Climo Associate Professorship of Macromolecular Science and Engineering at Case Western Reserve University, where she started her independent career in 2007. Taking inspiration from nature, her research program involves understanding the design rules employed by nature and applying these strategies to the development of mechanically-enhanced and tunable materials. Prof. Korley is the Principal Investigator of the recently awarded National Science Foundation Partnerships for International Research and Education (NSF PIRE): Bio-inspired Materials and Systems.

She received a B.S. in both Chemistry & Engineering from Clark Atlanta University as well as a B.S. in Chemical Engineering from the Georgia Institute of Technology in 1999. Dr. Korley completed her doctoral studies at Massachusetts Institute of Technology in Chemical Engineering and the Program in Polymer Science and Technology in 2005. LaShanda Korley was the recipient of the Provost’s Academic Diversity Postdoctoral Fellowship at Cornell in 2005, where she completed a two-year postdoctoral appointment in the Department of Chemical and Biomolecular Engineering.