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Kink-Resistant Electrospun Vascular Grafts with Additive Manufacturing Reinforcement KIRAN ADHIKARI, University of Alabama at Birmingham, JORDAN ZIMMERMAN, The University of Oklohoma, VINOY THOMAS, University of Alabama at Birmingham — Failure in the implanted small caliber vascular grafts is caused by the mechanical mismatch between the native vessels and the implanted graft. Mechanical issues persist with longer, smaller-diameter vascular grafts, which are needed to treat peripheral arterial diseases (PADs) or replace vessels such as the small saphenous vein, since mimicking native vessels' properties and eliminating kinks and loops in longer grafts has seen little success. Electrospinning and 3D printing are two fabrication techniques that have recently garnered considerable attention and were used in conjunction during this project to maximize their respective benefits for longer, smaller-diameter vascular grafts. Marrying these technique to improve the mechanical properties, we report improved apparent elastic moduli, most notably in the radial direction, as well as substantial reduction of kink radii. SEM images shows the mesh structure in the nanoscale which mimics the ECM of native blood vessels.

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