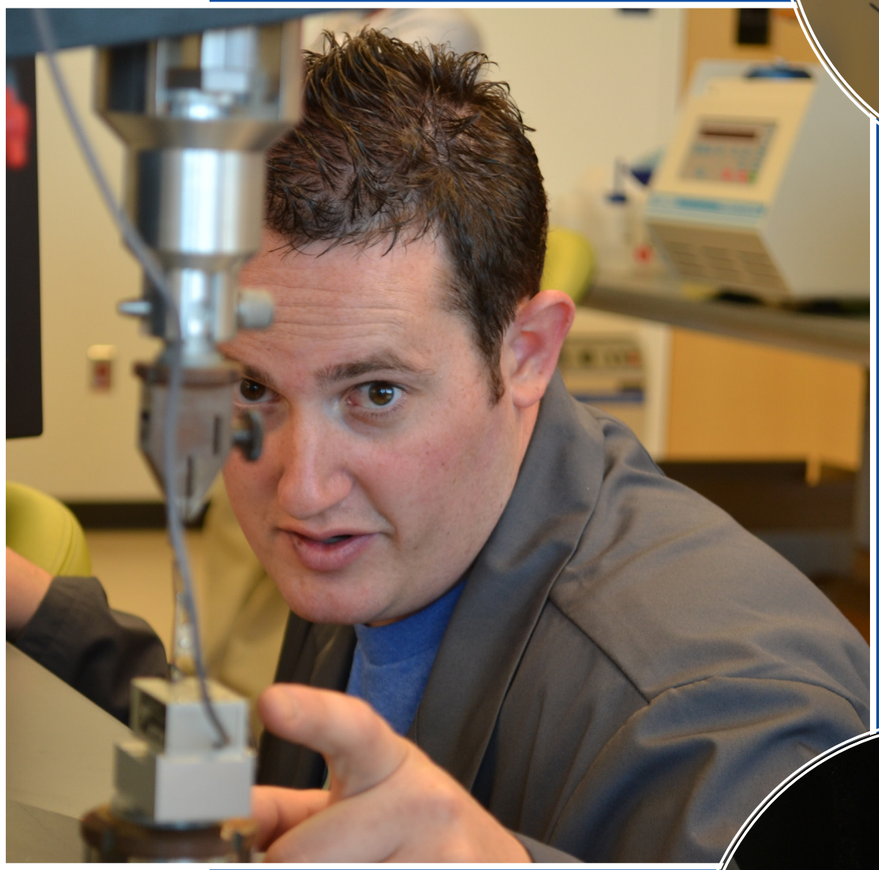
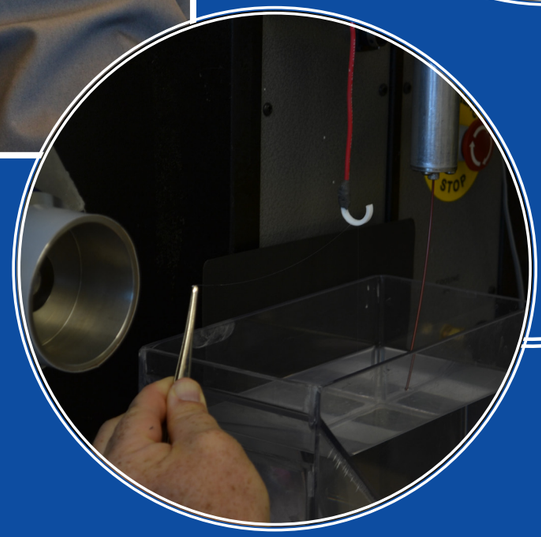
Biological Engineering

Cameron Copeland

Bioproducts





Proteins are the most diverse molecules known. Their functions range from enzymatic activity to advanced biomaterials with an array of different properties.

Spider-silk, which is constructed solely of proteins, has been proven to be the strongest biomaterial. Unfortunately, spiders are cannibalistic and territorial, making them impossible to farm. The alternative is to create a synthetic spider-silk. The spider-silk lab at Utah State University has produced synthetic spider-silk in E. coli, silkworms, goats, and alfalfa plants.

The current technique for synthetic fiber formation has yet to be optimized to equal the elasticity and strength of the native silk. Research has shown that different parameters in the spin dope, spinning, and post-spin draw of spider-silk fibers can greatly affect its mechanical properties. Thus, the goal my research is to discover how parameters such as solvents, temperature, speed, additives, and post-spin modifications, affect the properties of synthetic spider-silk proteins extracted from goat's milk. It is anticipated that, in addition to discovering how these parameters affect the fibers, synthetic silk will be produced that has the elasticity and tensile strength characteristic of native silk.

COLLEGE of ENGINEERING
UtahStateUniversity

Spider Silk