WRF/ITHS Summer Commercialization Fellows Projects 2022

Piccolo Biosystems – Analytical Lipid Signaling Platform
(Christopher Sims, Bioengineering)
We are looking to commercialize a novel microfabricated technology for measuring the biochemical activity of key lipid processing enzymes and their signaling pathways in living cells. These pathways are known to fuel disease processes including tumor formation and spread, autoimmunity, and viral infections. As such the technology could have wide ranging impact in drug screening for pharmaceutical and biotechnology companies working to identify efficacious drug candidates in a variety of fields. A summer fellow will help us better understand the pre-clinical drug screening market and explore which potential applications are likely to be the most attractive to the market.

Improving Asthma Care Together (IMPACT) – A Parent-Child Shared Asthma Monitoring System
(Jennifer Sonney, Child, Family, and Population Health Nursing)
Asthma affects over 6 million US children and is the most common chronic condition of childhood. Asthma symptoms are markers of asthma control and provide the earliest warning of a potential exacerbation. With more than half of school-age children having uncontrolled asthma and at least one attack per year, there is a critical need for asthma symptom monitoring solutions. In collaboration with children with asthma and their parents, we designed the IMPACT solution to meet this critical need. The IMPACT solution facilitates real-time asthma symptom monitoring via a child wearable device and a companion mobile app to track asthma symptom trends and guide users through asthma management responsibility planning. Building on our recent pilot study, a summer fellow will evaluate potential go-to-market and commercialization strategies for the IMPACT solution.

Improved Drug Toxicity Screening – High-Throughput Pre-clinical Testing for Liver Toxicity
(Kelly Stevens, Bioengineering/Pathology)
On average, a drug will take about 10 years from discovery to market and cost roughly $2.6 billion in R&D before being commercialized. About 60% of R&D costs are incurred during pre-clinical testing to identify a single lead drug candidate, but only 12% of lead candidates pass clinical trials with human liver toxicity being a common reason for candidate failure. Our laboratory specializes in high-throughput in vivo screening technologies, human liver organoid development, and bioprinting liver tissue. These specialties may be synergistically employed to help reduce the time and costs of pre-clinical drug testing by allowing early pre-clinical human liver toxicity screening. A summer fellow will explore what combination of these applications has the most promising path towards commercialization and potential target entry markets for improving pre-clinical drug testing.

Cell-Free Bioconversion – A Disruptive Approach for Sustainable Bioeconomy
(James Carothers, Chemical Engineering/Bioengineering)
The Carothers lab is using synthetic biology to develop cell-free systems (CFS) that can perform cost-effective bioconversion of CO_2 into industrial products. Most cell-free platforms used in industry today focus on high-value/low volume production of pharmaceuticals and biologicals. We are creating self-assembling CFSs to produce functional multi-enzyme systems that electrochemically drive the bioconversion of CO_2 into chemicals in real time. These chemicals can then be used in the polymer, beverage and food, textile, agricultural and pharmaceutical industries. This innovative approach may dramatically reduce costs for CFS technology and enable higher volume product production. A summer fellow will explore perceived market barriers to commercializing novel CFSs for industrial biomanufacturing and CO_2 capture in biorefineries. They will also help contextualize these technologies for scaled manufacturing, market penetration, and commercial deployment.