ITHS and WRF Summer Commercialization Fellowship Projects 2017

1) Project: Neonatal Education and Simulation-Based Training Program
UW Principal Investigators: Rachel Umoren MD, MS, Megan Gray, MD and Patrick Motz, MD
Department: UW Medicine Pediatrics/Neonatology
UW CoMotion Technology Manager: Gene Yelden
EIRs: Mike Robinson and Eric Larsen

Numerous studies have documented improvements in patient safety and satisfaction as a result of the increasing use of team training and simulation-based education for healthcare providers. Virtual simulation is particularly valuable in the healthcare setting because virtual reality (VR) and augmented reality (AR) simulations are not subject to the same constraints or considerations as standardized patients or physical simulation environments: limitations on availability, unpredictable behavior, non-uniform experiences, etc. Virtual standardized patients provide a standardized approach to education and assessment which is particularly helpful for navigating difficult patient interactions in a "safe" environment. One such situation is when a pregnancy is complicated by premature labor or a birth defect is discovered on pregnancy testing. A medical doctor provides prenatal counseling in this situation to inform the patient and her family about the baby's condition and chance of survival in a conversation that assists families with making difficult decisions for care before and after the baby is born. Due to the challenging nature of this conversation, healthcare providers would greatly benefit from opportunity to practice these skills. This is because poor communication skills and a failure to express empathy during these critical interactions may lead to loss of trust in the healthcare provider and hospital leading to loss of referrals and revenue. UW investigators propose to develop an AR standardized patient to develop and assess communication skills needed to build patient trust during difficult conversations. The Neonatal Education and Simulation-Based Training program (nestprogram.org) is involved in physical and virtual simulation development and testing for outreach education to the WWAMI area.

A summer fellow would advise the NEST program on the business case and would contribute to the development of a business plan.

2) Project: Alpenglow Optics
UW Principal Investigators: Jonathan Liu, Adam Glaser, Lawrence True, MD, and Nicholas Reder, MD
Departments: UW Departments of Mechanical Engineering and UW Medicine, Pathology
UW CoMotion Technology Manager: Forest Bohrer
EIR: Mike Connolly

Over 200,000 women each year receive the devastating news of a breast cancer diagnosis. They are faced with the difficult decision of whether to undergo a limited resection and risk leaving residual cancer (a lumpectomy), or opt for a larger and more disfiguring operation to remove the entire tumor (a mastectomy). We have designed a microscope that rapidly scans the removed tissue for quick assessment of tumor edges to inform the surgeon whether more tissue must be removed. Our device can greatly reduce the number of women with residual cancer after lumpectomy, thus reducing re-operations, improving patient outcomes, and reducing stress for patient and family. Alpenglow Optics is a joint venture between investigators from the Department of Mechanical Engineering (Dr. Jonathan Liu, Dr. Adam Glaser) and Department of Pathology (Dr. Lawrence True, Dr. Nick Reder). Our close collaboration between engineers and pathologist end-users has produced a microscope with an ideal balance of resolution, contrast, speed, cost, and ease-of-use. Our project has won multiple grants and generated interest from engineers, pathologists, and industry, but we need assistance in developing a go-to market plan.

We believe our project would be ideal for a summer fellow who is interested in assessing the market, determining product pricing, investigating FDA regulatory pathways, and evaluating the pros and cons of start-up versus licensing opportunities.

3) Project: TransCellular Therapeutics
UW Principal Investigators: Michael Chin, MD
Department: UW Medicine
UW CoMotion Technology Manager: Andrea Valladao
EIR: Craig Phillips

Our team, led by Dr. Michael Chin and Craig Philips, is developing a disease-modifying therapy for the treatment of Barth Syndrome, a devastating and rare inherited disorder occurring in 1:300,000 live births. Children with Barth Syndrome develop heart failure, muscle weakness, and low white blood cell counts during infancy and childhood resulting in death at a young age. Patients with Barth Syndrome have a mutation in the gene encoding tafazzin, a key mitochondrial enzyme. To date, there are no approved treatments or effective therapies for the disease. We have developed a recombinant form of tafazzin that can be used in enzyme replacement therapy.

We are looking for summer fellow with a background in life sciences interested in helping put together a business development plan including assessing market size and trends for Barth Syndrome, investigating the history and burden of the disease, evaluating FDA regulatory pathways, and identifying patient advocacy groups and potential customers.

4) Project: Artery Mapper
UW Principal Investigators: Sheena Hembrador, MD
Department: UW Medicine Anesthesiology and Pain Medicine
UW CoMotion Technology Manager: Ryan Buckmaster
EIR:

For many critical medical procedures, including anesthesia and blood gas sampling, it is necessary to insert an arterial line to measure the arterial blood pressure or sample arterial blood. However, unlike veins, which can be seen through the skin, arteries cannot be seen and have to be found by feel. The result is that even experienced doctors and nurses often need several attempts to find an artery, which causes costly operating room delays, great patient pain and potentially serious complications such as blocked arteries and hematomas. A team of UW physicians and engineers have teamed up together to create the Artery Mapper, an easy to use, non-invasive device that shows doctors and nurses exactly where the artery is so it can be found on the first try. The Artery Mapper uses pressure sensitive materials to detect the arterial pulse and display the location of the artery on a small screen. In fact, the Artery Mapper is so sensitive it is able to measure arterial pulsations through the skin to determine blood pressure as well, potentially replacing the slow and inaccurate blood pressure cuff with a simple watch-like device.

The team is seeking a motivated and collaborative summer fellow to help characterize the potential hospital and general use markets, help determine how this product could impact clinic and hospital costs, and determine the best pricing and market strategy for the Artery Mapper.

5) Project: Hypoxia Protective Therapeutic
UW Principal Investigators: Michael Crowder, MD
Department: UW Medicine Anesthesiology and Pain Medicine
UW CoMotion Technology Manager: Andrea Valladao

Ischemia/reperfusion (IR) injury is the primary cause of cardiovascular and cerebrovascular diseases, such as myocardial infarction and stroke, which together are the leading cause of mortality in the US. Despite decades of intensive fundamental investigation resulting in numerous clinical trials, no effective treatment has been approved for cytoprotection from IR injury. These repeated failures suggest that a full understanding of the mechanisms of IR injury is lacking and that novel, unbiased approaches are needed to make breakthroughs. Towards this end, our team, led by Dr. Michael Crowder, has developed a small molecule screen in the nematode *C. elegans* for compounds that improve recovery when applied after the hypoxic insult. In a screen of 2000 compounds, we have identified six that confer significant protection of *C. elegans* from delayed death and two that significantly reduce infarction size in an *ex vivo* mouse ischemia/reperfusion model. To further the technology and its market potential, we are seeking the assistance of an MBA fellow to develop a business development plan.

The summer fellow would help assess the market, determine clinical and regulatory pathways for the various compounds we have identified, and evaluate licensing opportunities for the technology.

6) Project: ThruWave
UW Principal Investigators: Matt Reynolds
Department: Electrical Engineering
UW CoMotion Technology Manager: Gene Yelden

ThruWave provides state-of-the-art millimeter-wave (mmW) 3D imagers for markets ranging from quality control to security to robotics to construction. Currently, there is no human-safe nondestructive tool for seeing inside a wall or other structure after construction. Opening walls costs the property owner and the contractor time, money, and convenience. Human-safe millimeter waves can penetrate walls and other opaque surfaces to image the interior of the structure. The ThruWave imager merges 3D imaging technology with intuitive data visualization to solve this important problem in the construction market.

The summer fellow would work with the team to assess the market, explore distribution channel options, and recommend next steps.

7) Project: Pear Medical, Bosc system
UW Student Team Lead: Ryan James
Department: Biomedical and Health Informatics and Business
UW CoMotion Technology Manager: Jeff Katten

Bosc is a virtual and mixed reality (VR and AR) application that seeks to drastically improve the way medical students, physicians, patients and families interact with three-dimensional (3D) medical data. In our VR application, which runs on the Oculus Rift and HTC Vive, users can view and interact with three-dimensional models of anatomy. For example, a user can load a segmented 3D model of the heart, then use their hands and/or a controller to grab, rotate and zoom different parts of the heart to learn about them in an environment that mimics reality. The application has use in medical training to supplement or replace traditional learning methods or patient education. The application would allow a patient to preview the type of work that would be performed on them and help answer questions in a pre-operation consultation.

The summer fellow would work with the team to explore application options, research the competitive landscape, and recommend the best value proposition.

8) Project: MyHeart

UW Principal Investigators: Steve Seslar MD, Chris Howard, and Kris Patton MD
Department: Seattle Children's Hospital and Research Institute
Technology Transfer contact: Kim Folger Bruce

We are seeking MBA fellow assistance in developing a commercialization plan for a budding start up known as MyHeart™. MyHeart™ is conceived as a 3D heart and vascular model manufacturer. It's mission is to provide innovative patient-specific 3D digital and printing solutions for patients with congenital heart disease for a variety of applications, all with the goal of improving patient experience and care for individuals with congenital heart disease.

Current services include: (1) printing of patient-specific digital and physical heart/vascular models for patient education and entertainment, (2) printing of patient-specific and generic heart models for simulation-based medical training, (3) preservation of cadaveric specimens through the creation of 3D printed replicas, and (4) printing of patient-specific digital and physical heart/vascular models for pre-procedural preparation for electrophysiological, interventional and surgical congenital heart procedures. Future Services in development include: (1) operative planning and optimization using patient-specific computational and physical flow models and (2) creation of patient-specific, vascular and cardiac templates for use *during* electrophysiological, interventional and surgical congenital heart procedures. We have IP support through Seattle Children's Hospital and have secured the domain name www.buildMyHeartmodel.com and have applied for a federal trademark registration of the name MyHeart™. A provisional patent application has been filed for our modular training simulator. A provisional patent application is being constructed regarding the process of creating and using patient-tailored vascular scaffolds use in interventional procedures and surgical vascular reconstructions. Our team (Chris, Kris, and Steve) agrees to make itself available for the student and to use the information gathered by the student for commercialization of the product.