

University of Pittsburgh

INNOVATION SHOWCASE 2018

 **innovation**
INSTITUTE
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2018 INNOVATION SHOWCASE PARTICIPANTS

1: INSERT

For sports organizations like the NCAA that have athletes who suffer injuries from improper knee angles in sports that require frequent jumps, our product is a nonobstructive knee angle detector that provides knee angles and foot pressure statistics of the user in real time. Unlike competitor VERT, we have a knee angle detection function with no battery replacement requirement.

Innovation Team: Jingtong Hu, Jia Zheng, Riheng Zhu, and Yawen Wu

2: FRED

For population health management firms that assess risk and disease mitigation strategies, FRED is a software platform that simulates the spread of disease, mitigation strategies, resource allocation, and policy implications. Unlike other agent-based modeling platforms, FRED is designed to model large populations, requires no computer programming, uses supercomputing power, and has a built-in synthetic population with behavioral and social dynamics.

Innovation Team: Mark Roberts, John Cordier, Don Burke, and John Grefenstette

3: Solifi

For filtration industries that want to save time, effort, and material, thereby reducing cost and increasing productivity, Solifi is a software model that mimics the filtration process without any experimental quantities and helps users to design efficient operating methods to achieve their filtration needs. Unlike other filtration consulting partners, we use Solifi's unique algorithm that highly improves simulation accuracy without the use and waste of any experimental raw materials.

Innovation Team: Joseph McCarthy, Megan Cala, and Siying Zhang

4: miniSTORM

For the agriculture, food processing, and health care industries, which need super-resolution nanoscopy for imaging, miniSTORM is a smart nanoscopy device that automatically determines the optimal imaging parameters and provides state-of-the-art imaging results with resolution up to 10 nm (compared to current solutions with resolution of 20 nm). Unlike existing commercial nanoscopes, miniSTORM costs significantly less, is easy to use and maintain, and doesn't require a clean room environment.

Innovation Team: Hongqiang Ma and Wenting Wang

5: PittGrub

PittGrub is an analytics service that reduces food waste generated at events by enabling data-driven food purchasing decisions for event hosts. PittGrub will enter the market as a food redistribution service. This will provide us with field experience, inform our development road map, and build a unique data set while generating positive social impact by notifying our consumer end-users of free leftover food at events. Unlike other food redistribution services, PittGrub will use the historical event-specific data generated from previous events to eradicate the root cause of event-related food waste: overordering and misordering.

Innovation Team: Alexandros Labrinidis, Anthony Sicilia, and Mark Silvis

6: WheelFit

WheelFit is a smart wellness management platform for manual wheelchair users that provides data about the quantity and quality of wheelchair-related movements and the condition of the wheelchairs so that users can receive personalized feedback, customized exercises, and tips to keep their chairs in optimal condition, thereby enabling them to be more efficient in their everyday activities, preventing shoulder injuries and encouraging a mindful approach to improving their physical fitness. Unlike the Apple Watch, the only activity tracker currently available for manual wheelchair users that provides push counts (similar to step counts), WheelFit provides information about the quality of wheelchair users' propulsion.

Innovation Team: Deepan Kamaraj, Lynn Worobey, and Garrett Grindle

7: TriaGel

TriaGel is a comprehensive eye care solution for the management of ocular wounds at the point of injury. It is a first-of-its-kind topical gel bandage designed for safety product distribution companies that are looking for innovative, differentiated eye protection products. Point of injury application of TriaGel not only manages wound hydration and provides tissue support but also controls inflammation, unlike current products, which simply consist of water and gauze.

Innovation Team: Morgan Fedorchak and Michael Washington

8: Manual Wheelchair Virtual Coach (MW-VC)

For wheelchair users, MW-VC is the best device to instill and maintain good repositioning habits to prevent the development of pressure ulcers. Unlike competing products, MW-VC coaches users to perform effective pressure relief, measures their success, provides reminders only when they are needed, and is built to withstand the rigors of even the most active lifestyles.

Innovation Team: Rory Cooper, S. Andrea Sundaram, Garrett Grindle, Rosemarie Cooper, John Brown, and Matt Landis

9: OK2StandUP

For older adults admitted to hospitals and long-term care facilities who are at an increased risk of falling upon standing due to dizziness, OK2StandUP is a fall-prevention device that provides increased freedom of mobility to the patient, more available time to medical staff, and peace of mind to loved ones. Unlike current fall-detection methods, such as floor mat alarms, OK2StandUP provides a warning of increased fall risk to the wearer ahead of time, without the need for any staff supervision.

Innovation Team: Eunice Yang, Jinal Mistry, Vaidurya Paladugu, and Yelena Nelson

10: Affinity-enhanced Biotin-binding CAR T cells: An Adaptable Cancer Treatment

For pharmaceutical companies who are developing cancer immunotherapy, our product is a universal CAR T cell therapy that can target multiple cancer types or multiple proteins on the same cancer by combining it with different tumor-targeting antibodies. Unlike the U.S. Food and Drug Administration-approved CAR T cell therapies that target a single protein, we have a technology that can target multiple tumor proteins with tunable potency, potentially reducing toxic side effects.

Innovation Team: Olivera Finn and Jason Lohmueller

11: Quantitative Ultrasound to Prevent Tendon Injury (QUPTI)

Tendon overuse injuries are a significant clinical problem affecting athletes of all levels and in all sports. Currently, no clinical standard of care exists to prevent tendon overuse injuries. QUPTI proactively treats tendon overuse injuries by tracking tendon health across multiple time points in real time, thus protecting high-risk athletes before problems (i.e., pain or injury) arise.

Innovation Team: Richard Debski, Gerald Ferrer, Kang Kim, and Volker Musahl

12: Protein-Protein Interaction Detection System (PPIDS)

For ambitious researchers who aim to shed light on intracellular signaling, PPIDS provides a combination of highly selective, ultra-bright fluorescence readouts to monitor protein-protein interactions in real time. Unlike traditional approaches, PPIDS has no background noise while providing a cost-effective platform for rapid drug screening.

Innovation Team: Zachary Freyberg and Despoina Aslanoglou

13: Push to Spin (P2S)

For surgeons performing small-volume fat grafting to the face, breast, hand, or foot, our novel P2S syringe is an all-in-one device that extracts and processes fat for reinjection directly into the patient. With the P2S syringe, no external fat processing is necessary. Currently, the standard of care for external processing is tedious and time consuming, costing surgeons thousands of dollars a day in lost revenue. The P2S syringe creates negative pressure to harvest fat and a spinning inner chamber removes fluid to purify the fat. Using the same P2S device, the processed fat is injected directly into the patient. The worldwide market for more than 200 million annual small-volume fat grafting procedures would be impacted greatly by the cost savings provided by P2S.

Innovation Team: Jeffrey Gusenoff and Beth Gusenoff

14: Ventriculo-amniotic Shunt for Fetal Aqueductal Stenosis (VASFAS)

For clinicians treating pregnancies involving fetal hydrocephalus—fluid buildup within the brain—the approach to pregnancy management is problematic. Despite close observation and careful management, and because preterm delivery is common, the chance of complications or neurological damage is high. Our novel VASFAS is a customizable shunting device with a one-way valve system, which allows for fluid drainage without reflux in the fetal brain. Fluid drainage can continue in utero for months, allowing the pregnancy to progress to term while neurological function of the fetus is preserved.

Innovation Team: Stephen Emery, Stephanie Greene, and Young Jae Chun

15: PopSole

For patients who are unable to afford orthotics for painful foot conditions, our customizable over-the-counter waterproof insole is a cost-effective alternative foot off-loading device that fits in any shoe and alleviates foot pain. PopSole can be modified to provide pressure relief in select areas of the foot or in the entire foot. It helps to improve compliance with off-loading, reduces postoperative pain, maximizes healing and gets people back on their feet sooner.

Innovation Team: Jeffrey Gusenoff and Beth Gusenoff

16: Vital-Dent

For endodontists whose patients require root canal treatment, Vital-Dent significantly improves the success rate of the procedure. Vital-Dent is a root canal implant that recruits regenerative dental tissue, guards against invading bacteria, and restores vital tissues, including blood vessels and nerves in the treated tooth. Unlike conventional root canal treatments, Vital-Dent restores tooth sensation, prevents tooth discoloration, and saves time and money while maintaining tooth vitality.

Innovation Team: Juan Taboas, Herbert Ray, Jingming Chen, Adam Chin, Tyler Swenson, and Patrick Donnelly

17: Nose-on-Chip

For pharmaceutical companies, the production of robust human data to increase the success of target drugs in preclinical testing is challenging. Conventional two-dimensional static cell culture and animal models have shortcomings in that they do not accurately mimic the complexity of the human respiratory system. Our solution is a nose-on-a-chip micro-fluidic device that mimics the three-dimensional in vivo respiratory tract. Our multicellular dynamic platform allows for the measurement of cellular responses to drug treatment over time, generating robust data on drug candidates and reducing the time for and cost of preclinical testing.

Innovation Team: Nadia Boutaoui, Juan Carlos Celedon, Lawrence Vernetti, and Albert Gough

18: Impulse

For sports coaches, athletes, and physical therapists who desire practical measurement of muscular force and strength, Impulse offers a portable, interactive, personalized, user-friendly force sensor linked to a software platform for assessing muscular fitness and performance. Unlike conventional methods for measuring muscular strength, Impulse's waterproof sensor and software track and display muscular fitness data in an easy-to-use interface that provides instant feedback and monitoring for fitness, athletic, and rehabilitation purposes.

Innovation Team: Elizabeth Nagle and Matthew Darnell

19: AxoMax

For surgeons, the repair of a severed nerve with large gaps remains clinically challenging. The standard of care is the transplantation of a nerve from another part of the body to repair the gap; this is known as autografting. The use of an autograft requires a second surgical site, resulting in longer operating times, and typically a sensory nerve is transplanted which leaves an area of the body with permanent numbness. This patented technology uses a biodegradable tube with controlled drug delivery that supplies the cues necessary to promote the growth of nerves over large gaps.

Innovation Team: Kacey Marra and Lauren Kokai

20: BRiTE

For independent older adults with mild cognitive impairment who are looking for ways to stop or slow the progression of short-term memory loss, BRiTE is a brain training and exercise program that uses research-based activities targeting mental, physical, social, and artistic stimulation to enhance overall health and wellness. Unlike drugs and traditional approaches to dementia, BRiTE is a program enabling affected individuals to extend their highest quality of life by maintaining optimal brain health through integrated activities in a stimulating social environment.

Innovation Team: Oscar Lopez, James Becker, and Elizabeth Skidmore

21: Circadian Activity Profiling System (CAPS)

For aging adults and clinicians who wish to understand and control the modifiable factors that increase the risk of dementia, CAPS provides the first and only medically validated use of wearable technology to follow an individual's circadian rhythms and inform users if they are at heightened risk for dementia and what they can do about it. CAPS assesses circadian rhythms in real time and compares the values to medically validated profiles. Not only does CAPS empower users to modify dementia risk, it also creates an interface among users, research, and clinical practice.

Innovation Team: Stephen Smagula

22: imHealthy

For nongovernmental organizations, free health clinics, and others whose mission is to improve the health and well-being of the medically underserved, imHealthy is a software/app solution that provides personalized, actionable health interventions. Unlike the standard of physically performing individual well-being assessments to develop interventions, imHealthy uses a mobile app and data integration program for data collection and analysis to customize an open-source electronic health record that quickly leads to recommendations for personalized interventions for caregivers serving the medically underserved.

Innovation Team: Leming Zhou and Valerie Watzlaf

23: OneValve

For patients affected by heart valve diseases who require a full valve replacement, OneValve provides a novel heart valve prosthesis that, unlike the commercially available mechanical and bioprosthetic heart valves, is nonthrombogenic, durable, and capable of reducing the risk of calcification and endocarditis. OneValve functions in all four valve positions, providing flexibility to address market needs.

Innovation Team: Antonio D'Amore, Vinay Badhwar, William Wagner, and Garrett Coyan

24: SmartCAT

SmartCAT is a mobile health platform designed to improve the effectiveness and efficiency of cognitive behavioral therapy (CBT) for childhood anxiety disorders, leading to faster and more complete recovery. SmartCAT includes a smartphone app for youths and a portal that integrates care with the treating clinician. The app is designed to get kids practicing CBT skills (e.g., coping, relaxation, problem solving) in their day-to-day lives, in a way that is more fun and engaging than existing solutions, using interactive games, multimedia activities, and a skills coach for real-time help with tackling their anxiety. Unlike existing anxiety apps, the activities on the app are coordinated with clinical care. SmartCAT is evidence based and results suggest that by adding SmartCAT, treatment can be reduced from 16 to eight sessions while boosting recovery rates by 38 percent compared to previously published data of a CBT trial for youth anxiety.

Innovation Team: Jennifer Silk and Bambang Parmanto

25: Pathfinder

Digital pathology has advanced significantly over the past several years but has experienced slow adoption rates among pathologists. One of the most important reasons for the slow rate of adoption is that navigating a virtual image with a computer mouse or other generic user interface device is less efficient and less ergonomic than the user interface of a physical microscope. Pathfinder is a hardware and software system that mimics the experience of navigating a physical slide with a microscope, enabling pathologists to easily transition to digital pathology and improving the marketability of digital pathology systems. Unlike existing systems, Pathfinder feels like a microscope, and offers visual-spatial feedback and pinch-to-zoom capability.

Innovation Team: Thomas Pearce and Michael Landau

26: SPADE

For academic researchers who collect a rich data set and need to obtain insights by visualizing and analyzing their data, SPADE is a cloud-based platform for making interactive charts, providing an easy and effective way to explore a complex, multidimensional data set. Unlike SPSS and GraphPad, SPADE can provide charts with interactivity and a dashboard layout for presenting the results in a clean and organized fashion. Also, unlike existing business intelligence software such as Tableau, SPADE has the flexibility to integrate advanced statistical and machine learning analysis in the dashboard.

Innovation Team: Qi Mi and Jon Rutkauskas

SPECIAL THANKS

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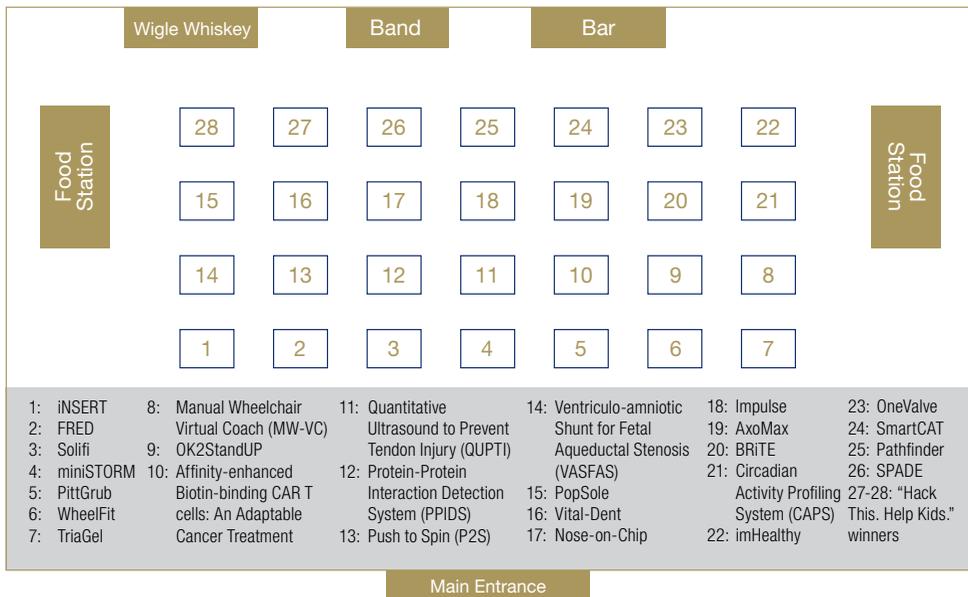
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Main Entrance



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Innovation Institute

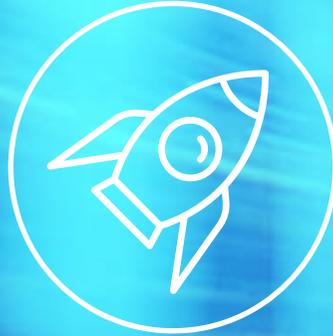
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