**Entrepreneurial Leadership Academy**

**Fellows and Project Areas**

**2012-2013**

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*Andy Tao, taow@purdue.edu - Scholar*

**Biochemistry, Associate Professor**

I am interested in developing technologies as powerful research and clinical tools for cancer and other diseases research. In particular, I am involved in the commercialization of a platform technology developed primarily in my research lab for the analysis of protein phosphorylation that relates to many human diseases. During the process, I am interested in understanding business practices, including putting together a good business plan, fundraise, market analysis and financial strategy. In addition, I plan to assemble a strong interdisciplinary research team which could eventually lead to a center grant for disease subclassication using system biology tools.

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*Steven Wereley, wereley@purdue.edu - Scholar*

**Mechanical Engineering, Associate Professor**

I have two potential ELA projects that I’m considering. The first is derived from my current small business, a business designing and making programmable Lab-on-Chip devices. This started as a previous Burton Morgan business plan competition winner and grew into its own small business—with a couple SBIRs helping to get things going. The second idea derives from my work with the oil spill in the summer of 2010. I came up with a way to estimate the size of an oil spill based on images of the flowing oil. I have some ideas for products to commercialize related to that process.

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*Dino Franco Felluga, Felluga@purdue.edu*

**English, Associate Professor**

I have undertaken a number of initiatives that have had an impact on my field of British nineteenth-century studies and beyond; to date, I have completed these initiatives without the guidance of colleagues who have the entrepreneurship skills I need to expand on these initiatives in the most effective ways. Since the initiatives are connected and feed each other in significant ways, I will provide a quick list: in 1996, I created Romanticism on the Net, which was later expanded to become Romanticism and Victorianism on the Net (RaVoN: ravonjournal.org); in 2003, I created the North American Victorian Studies Association (NAVSA), which is now the largest scholarly group in the world devoted to the study of Victorian literature (www.purdue.edu/NAVSA); also in 2003, I helped to found NINES: Networked Infrastructure for Nineteenth-century Electronic Scholarship (nines.org), a model for the vetting and publication of online scholarship, supported by the U of Virginia and over two million dollars from the Andrew W. Mellon Foundation; in 2011, I created BRANCH: Britain, Representation and Nineteenth-Century History (branchcollective.org), a timeline and anthology of the period 1775-1925 (branchcollective.org). BRANCH helped lead to a contract with Wiley-Blackwell for a four-volume Encyclopedia of Victorian Literature, which will exist also online. I would like now to explore the creation of an iPod/iPad/Droid app that could fully integrate the Encyclopedia and BRANCH for a non-academic audience.

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*Mark Morgan, mmorgan@purdue.edu*

**Food Sciences**
As a participant in the Entrepreneurial Leadership Academy, I hope to learn more about the commercialization process and business development strategies for bringing new technologies to market. The information learned will be critical for pursuing the commercialization of technologies developed in my laboratory at Purdue and in helping Indiana entrepreneurs build new businesses in the food industry as part of my outreach efforts. Recently, I have been involved with several projects related to active packaging technology and detection or control of foodborne pathogens. Both of these technologies have potential for commercialization and improvement of food safety.

Joseph Irudayaraj, josephi@purdue.edu
Agricultural and Biological Engineering, Professor

My research efforts focus on developing single cell technologies for exploring intracellular mechanisms (cell signaling and posttranslational modifications) to understand the etiology of diseases and more critically to find a cure for cancer. Specifically, in relation to the EAL opportunity at hand, my goals are two-fold, first, I would like to learn about entrepreneurship and second is to apply the concepts to advance one of the more recent technologies constituting the development of ultrafast super-resolution imaging for mRNA, microRNA and epigenetic screening at single cell resolution, in tissues. I expect the technology developed to be used for routine cancer screening in a clinical setting.

Ji Soo Yi, yij@purdue.edu
Industrial Engineering, Assistant Professor

All of us make decisions every day, but such decisions never get easier despite of explosive amount of information we have. Often, the abundance of information overwhelms us, rather than comforts us. Thus, I am trying to solve this problem by using intuitive and interactive visualization techniques. I have developed various visual decision support systems (e.g., Dust & Magnet, Food for the Heart, SimulSort, and caniask.net) and theories explaining how such visualization techniques can help decisions. My current goal is to help decision makers make sense thousands of online reviews using visualization techniques.

Jenna Rickus, jlrickus@mac.com
Agricultural and Biological Engineering, Biomedical Engineering, Associate Professor

I am interested in the design of new materials to measure, control, and mimic living cells. Materials are designed in the context of specific biological problems. I believe in a deep integration of cell biology with the materials, sensors, and actuators that we design. Currently I am working on the micro-encapsulation of human islets for transplantation to treat type 1 diabetes. The research focuses on the development and optimization of porous inorganic and organically/biologically modified, cell-templated shells to achieve immunoisolation and long-term stability and function of transplanted islets. The goal is to enable successful islet transplantation so that individuals with type 1 diabetes can shed their dependence on exogenous insulin injections and reduce their risk of hyper/hypoglycemic events and complications, such as vascular disease.

John Lumkes Jr., Lumkes@purdue.edu
Agricultural & Biological Engineering, Associate Professor

I am interested in two commercialization efforts, which although very different in terms of technology, location, and barriers, will hopefully have process similarities that can be explored during this program. The first project is the development of several digital hydraulic patents focused on improving the efficiency and effectiveness of fluid power systems. Several laboratory prototypes have been tested. The second project is the development of micro-business
opportunities in developing countries focused on sustainable technologies related to energy, transportation, and agriculture. Example technologies include low cost transportation and agricultural vehicles and technology education/dissemination through cellular based apps.

**John Turek, turekj@purdue.edu**

**College of Veterinary Medicine, Department of Basic Medical Sciences**

I, along with Professor David Nolte in Physics founded a company (Animated Dynamics (AniDyn) LLC, www.anidyn.com) to commercialize applications for holographic tissue dynamics imaging (TDI) and spectroscopy (TDS). TDI/TDS is a method for motion-based functional imaging of living tissue. We are seeking partners/investors to further develop applications for drug discovery, toxicology testing, assisted reproductive technology, and personalized medicine.

**David Thompson, davethom@purdue.edu**

**College of Science, Departments of Chemistry and Biomedical Engineering (courtesy)**

Professor Thompson’s seeks to develop a self-sustaining, multi-disciplinary delivery technology resource at Purdue that optimizes the promising new drug leads discovered at Purdue and third parties by matching them with the best delivery technology for clinical translation. This resource will greatly enhance the value of Purdue intellectual property by positioning it more effectively in the developmental pipeline. It is envisioned that the resource will be supported initially as a Core Resource within an NIH Program Project grant that will focus on linking the medicinal chemists and delivery scientists on campus with other campus resources to deliver both small molecule inhibitors as well as high molecular weight biological therapeutic agents using molecularly engineered materials that have been purpose-designed for these tasks.

**Justin Seipel, jseipel@purdue.edu**

**School of Mechanical Engineering, Assistant Professor**

I’m interested in applying scientific principles of how our bodies work to make better products, environments, and new robotic technology motivated by biology. In particular, I am focusing on new devices to help reduce the stresses of lifting and carrying heavy loads. This load-carrying and lifting work is in collaboration with PhD student and PREPP fellow Jeff Ackerman. A secondary project is a multi-modal robot inspired by bats. In all these projects, the fundamentals of animal locomotion play a key role.

**Shirley Rietdyk, srietdyk@purdue.edu**

Falls often result in long-standing pain, functional impairment, disability, and nursing home admission. I am interested in developing technologies to that will reduce the number and severity of falls in populations that have greater fall risk, including normally aging adults, people with Parkinson's Disease, cancer survivors, and others. These technologies include (1) a device to improve diagnosis and to customize balance training and (2) wearable devices that will determine each individual’s risk of falling so that resources can be targeted to those most in need of intervention.

**PREPP Fellows**

**Somesh Khandelwal, somesh.khandelwal@gmail.com**

**PREPP Doctoral Fellow**
My research is focused on creating smart hybrid materials with high impact and damage resistance, ability to change mechanical properties actively and with capability to sense the extent and location of damage if any. These capabilities have already been demonstrated in both physical and numerical experiments. Ongoing research is focused on creating a commercializable product that embodies these capabilities.

Two primary industries where this product is immediately applicable are: (1) Vehicle and Body Armor, and, (2) Protective packaging. Other related industries are: (3) Impact attenuating footwear and helmets, and, (4) Damage resistant floors, wall and highway crash barriers. Such a diversified portfolio of products would also hedge against variability in any one industry, be it from reduction in military spending or downturn in construction.

The USP for our product comes from the fact that while other products offer only single function at a time, e.g. damage resistance or damage detection, our product is multifunctional.

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**Steve Ouellette, souellet@purdue.edu**  
**PREPP Doctoral Fellow**

Protein kinases represent an important class of enzymes responsible for regulating cellular signals that control critical functions such as cell growth and death. Kinase enzymatic activity is tightly regulated under normal circumstances, but is often the driver of disease when it becomes dysregulated. Therefore many kinases are pursued in the pharmaceutical industry as druggable targets, most notably for cancer indications. The process of discovering a valid kinase drug target, developing agents to inhibit its activity, and verification that the kinase is inhibited in patients requires sensitive and specific methods to measure kinase activity. In Dr. Laurie Parker’s lab, we aim to develop these technologies using peptide-based probes to measure kinase activity *in vitro* and *in vivo*. My goals as a PREPP fellow include demonstrating feasibility of our technologies as products, developing communication devices for securing funding to support our efforts, and becoming more familiar with different aspects of technology commercialization and entrepreneurship.

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**Mert Efe, mefe@purdue.edu**  
**PREPP Post-doctoral Fellow**

The goal of my fellowship is to commercialize the large strain extrusion machining (LSEM) technology that was invented in the Center for Materials Processing and Technology (Profs. S. Chandrasekar and K. Trumble). Together with my colleagues, we have formed a company, Convolutus, specializing in machinery that produces metal foils and sheets by LSEM. Traditional methods for the production of metal strips (sheets of limited width) are complicated in nature, requiring multiple processing steps, which are capital intensive for dedicated equipment and building facilities as well as energy expensive. In contrast, LSEM is capable of producing metal strips of industry standard thicknesses and lengths in a single step that reduces initial capital investments by up to 60% and reduces production costs by 20% over current technologies. This disruptive process also produces these indirect benefits: shorter lead times by as much as 40%; lowers inventory carrying costs by up to 50% and reduces energy consumption by up to 60%. During the fellowship, I will raise funds, finalize the business plan and secure IP. Once the necessary funding level is achieved, the scaling-up and commercialization project will take 3 years and the process will start creating manufacturing jobs, saving energy and costs in the US metals, machinery, and manufacturing industries.

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**Andrew Otte, aotte@purdue.edu**  
**PREPP Post-doctoral Fellow**

My postdoctoral work in Dr. Pinal’s lab focuses on the development of novel technologies for the manufacture and improved performance of pharmaceuticals. Most notably, my work deals with particle engineering and prefabricated dosage forms. These two technologies help address the drive towards personalized medicine, the need for pediatric
formulations (see Best Pharmaceuticals for Children Act and Pediatric Research Equity Act), as well as the Quality by Design (QbD) initiative. My postdoctoral research directly addresses a strongly recognized technological need by bringing novel ways of exploiting pharmaceutical expertise. The technology has great commercialization potential and the PREPP program will help me in establishing the most effective program of activities aimed at acquiring critical data, demonstrating the functionality and versatility of the prefabricated dosage forms, ultimately bringing this technology one step closer to commercialization. Specifically, I believe this program will assist me in developing a formal understanding of the commercialization process, aiding in targeting funding opportunities, defining potential clients and market spaces, and finally, formulating a strategic business plan for further development and capitalization of this technology.