National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

Summary Descriptions: Poster Session Attendees

Anchovi: Sorting Images by Topic

Award Abstract #1216839: http://go.usa.gov/wBx
Entrepreneurial Lead: Boris Babenko, boris@anchovi.com
Team Video: http://bit.ly/RVKT5B

This team at the California Institute of Technology developed a computer vision system to annotate large bodies of images very quickly. The computer could identify and count images in a variety of situations, from medicine to traffic to geo-spatial information. The computer can do this by using algorithms that take in images and make measurements based on the pixel content of the images. Originally, the team thought that they would develop this technology to create image analysis and annotation software for science and industry. Through I-Corps, they established a customer contact plan that put them in touch with leaders in the geo-information systems markets. What they learned was very surprising: there weren't any customers who were very excited about the team's potential product.

Instead, the team changed the focus of their plan from industry to consumers. What if they could help consumers organize their photos by topic or content? The technology could be easily adapted to fit the needs of consumers organizing their personal photo collection, helping them file images by topic, or by identifying duplicate images quickly and easily.

Arborlight: **Building a Better Light Bulb**

Award Abstract #1236998: http://go.usa.gov/wZS
Mentor: Norm Rapino, nrapino@umich.edu
Team Video: http://bit.ly/NGh8TM

Using technology from display lighting, this team from the University of Michigan Ann Arbor developed an LED-based product to replace traditional fluorescent industrial lighting. Currently, the brightest LED-based light bulb on the market generates less than 2,500 lumens, while the widely used linear fluorescent T8 light bulb produces more than 3,300 lumens. To address marked demand for an LED-based bulb that can emit the same amount of light, the team developed a lighting architecture based on mercury-free, low-cost components. They also devised a production method that allows the supply stream to be completely independent from the availability and price fluctuations of the necessary rare earth elements.

The I-Corps program helped the team to realize the value of customer discovery. In theory, the team thought they could simply bring a product to the market, and then the customers would come to them. In practice, the team learned that they must seek out their potential customers, learn what their needs are, and present the customer with a solution to their problems. Creating a successful business is not done simply by making a product and then hoping people will buy it.

Barter: Using Knowledge Markets to Increase Worker Productivity

Award Abstract #1217250: http://go.usa.gov/wBb
Principle Investigator: Marshall Van Alstyne, marshall@mit.edu

What do social networks, Q&A websites, and intranets have in common? They are knowledge markets intended for sharing information. Enterprises have sought gains from knowledge sharing through suggestion boxes, share drives, and social wikis, but have had difficulty maintaining participation and measuring return-on-investment. This team, from the Massachusetts Institute of Technology (MIT), focused on how a knowledge economy inside an organization could impact worker productivity. Their results from an empirical study of a Japanese bank suggested there could be large positive effects.

The team initially created an academic prototype of a knowledge market called Barter, which was used in university classrooms to enhance student learning. Through the I-Corps program, the team moved beyond the classroom to the business world with the aims to validate the company business model and complete a prototype of a commercial product based on the successful academic one. They established a prototype customer relationship with a leading international bank, and another world-wide financial institution requested to use the team's tools.

Big Data: Efficient Analysis of Real-Time Data

Award Abstract #1158737: http://go.usa.gov/wBC
Mentor: Jim Chung, jimchung@gwu.edu
Team Video: http://bit.ly/OVPBR2

This team from The George Washington University entered the I-Corps program with a business model based on providing location based privacy services, but exited with a product to provide real time data analysis to the intelligence community and hedge funds. The initial project was location based privacy services, but meeting with location based service providers revealed that they weren't interested in privacy services; consumer advocacy groups did not believe that a consumer market would become available for these privacy services until Congress passed a law.

With this information, the team pivoted to another technology they had already developed, one based on real time data analysis of a large number of data services. Again, the customer contact showed the team where their potential customer base really was. The team thought that large forensic analysis firms would be interested in a new technology to analyze the vast quantities of data they handle. However the firms were not sure that the judicial system would not yet be ready to accept the cutting edge technology as admissible evidence in court. Instead, through this contact they learned that the intelligence community and hedge fund analysts relied heavily upon real time data analysis. It was with these customers that the team found a very enthusiastic audience with a problem that they could readily solve. The I-Corps program was a very valuable experience for this team, as it allowed them the freedom to experiment with business models and customer targets, with the freedom to change direction as the market dictated.

Boston Mountain Biotech: Pharmaceutical Purification Using Genetically Optimized Cells

Award Abstract #1237252: http://go.usa.gov/wB1
Entrepreneurial Lead: Ellen Brune, ebrune3@uark.edu
Team Video: http://bit.ly/NdgzmC

The pharmaceutical industry spends $8 billion every year to purify their products. This team from the University of Arkansas made it their mission to simplify pharmaceutical protein production, a critical step the in pharmaceutical manufacturing process. Currently, the target proteins must be separated from extensive background contamination. The team's innovation is a specially designed set of cells that minimize contamination through genetic optimization. This simplifies the purification process, saving time and money, which can then be applied to new drug and vaccine development, diagnostics, and medical devices.

Before the I-Corps program, the team had limited knowledge of the commercial market and the depth of application of their technology. The goals of their customer contacts were to refine customer segments, define value, and to establish long-term relationships with potential partners and customers. Their contacts led them to heads of business development and vaccine development at several leading pharmaceutical manufacturers, who described how they are in desperate need of technology of the kind that the Arkansas team can provide. These important exchanges allowed the team to validate their pricing model and fine tune not only the business plan, but also key technical aspects of the technology to ensure that it could meet customers' needs.

Composite Nanocoatings: Improved Coatings for Surgical Devices

Award Abstract #1217196: http://go.usa.gov/wBq
Principal Investigator: Eric Loth, el9r@virginia.edu
Team Video: http://bit.ly/NipTV1

Over the last decade, there has been a rapid expansion of new minimally invasive treatments in medicine. The University of Virginia (UVA) team investigated a way to enhance the lubricity and blood compatibility of bionanocomposite coatings, allowing the surgical tools that they coat to perform better in bio-medical conditions, in turn reducing side effects and accelerating natural healing processes. For example, a more lubricant coating could improve endovascular delivery catheters, while a more blood compatible coating could improve stents. Using fundamental lab research to reduce 50-90% of liquid friction, the team was able to address the market needs of improving access, deliverability, and predictable deployment of surgical devices.

Through the I-Corps program, the team paved the way for transferring innovations high in demand out of the lab and into the bio-medical field. They also worked to grow the small entrepreneurship program at UVA by expanding the facilities and involving undergraduate students.

Gluco Sentient: Realizing the Potential of Personal Medicine

Award Abstract #1158781: http://go.usa.gov/wBW
Mentor: Neil Kane, neil@illinoispartners.com
Team Video: http://bit.ly/NZo10t

Based at the University of Illinois at Urbana-Champaign, this team leveraged an inexpensive and widely available technology, the personal glucose meter (PGM), to expand the potential of personal medicine. A modified PGM strip was produced that enables the detection of a variety of targets, including viruses, bacteria, disease markers, and even recreational drugs. The team concentrated its initial innovation on the detection of HbA1c, the glycated hemoglobin found in diabetic patients, previously tested for mostly in central labs. Glycated hemoglobin is an important measure of a patient's average glucose levels over the long term. At home detection of HbA1c could provide a significant boost to a diabetes patient's quality of life by helping them avoid the potentially life threatening complications due to poor control of blood glucose levels.

Through the I-Corps program the team learned to appreciate the value of getting out of the building to meet customers and to thoroughly understand their needs. With this knowledge, they can adapt their business strategy. The team also hopes to avoid costly mistakes in future production development, mistakes which could arise from misjudging their customers and market. However, I-Corps provided a framework and methodology for discovering customers, partners, and opinion leaders, the important first steps in bringing innovation out of the laboratory.

Graphene Frontiers: Pilot Production of Graphene Films

Award Abstract #1158721: http://go.usa.gov/wB4
Mentor: Mike Patterson, mikep@alumni.princeton.edu
Team Video: http://bit.ly/Ne0udC

The I-Corps program facilitated this team's aspiration to journey outside the engineering lab and into the marketplace. Based at the University of Pennsylvania, the team explored the commercial feasibility of producing a high quality, uniform, and large-area graphene film for next-generation displays. Graphene is a transparent conductive film that can be placed on thin plastic or solid glass. As an emerging "super material," its proposed applications include touch screen displays, advanced sensors for medical diagnostics, and analysis of food and water purity.

The team submitted a patent for a low cost, large-scale graphene synthesis technology that they developed. Because their procedure had no need for a vacuum or high temperature, it was flexible in economical design and operation. In addition, it was a continuous production method that could easily be modified to an industrial scale. To demonstrate the utility of their method, they undertook the production of an ultra-compact, low power vapor sensor device that detects ethanol in a person's breath using graphene.

Ground Fluor Pharmaceuticals: Efficient Production of Radio-Pharmaceuticals

Team abstract #1157916: http://go.usa.gov/wBj
Principle Investigator: Stephen DiMagno, sdimagno1@unl.edu

Video URL: http://bit.ly/MXCv5X

This team from the University of Nebraska-Lincoln has developed a unique technology to rapidly and efficiently synthesize the radiotracers necessary for positron emission tomography (PET). For most PET applications, the preference is for [18F] fluorinated radiotracers; however, this molecule has half life of less than two hours, necessitating the preparation and distribution of complex compounds under significant time constraints. Through the I-Corps Curriculum, the team pushed themselves to get out of the laboratory to arrange in-person talks with representatives of the radio-pharmaceutical industry over the course of 12 weeks.

For this team, I-Corps wasn't just about the grant money. It was about gaining an invaluable experience that provided them the skills and impetus to take their technology forward. They learned the necessity of having a product that's of value to the customers and meets their needs. Although their final business plan was not what they envisioned at the start of the program, they instead have built a solid foundation that takes them forward to the next stages of product development.

Ion Express: Simplifying Pharmaceutical Screening

Award Abstract #1158726: http://go.usa.gov/wBY
Principle Investigator: Jacob Schmidt, schmidt@seas.ucla.edu
Team Video: http://bit.ly/MepQ9o

This team from the University of California-Los Angeles developed a low cost, easy to use technology to increase the efficiency of electrophysiological measurement of cellular ion channels. Ion channels regulate vital cardiac and neural activity and are critical targets for the pharmaceutical industry, with a $15 billion market value for the top 15 ion channel modulators. However, the necessary electrophysiological measurement of ion channels in the laboratory is difficult due to the ion channel's need to reside in a lipid bilayer membrane. Current technology for the electrophysiological measurement of ion channels has limited compatibility with different cell types; suffers from low throughput; and is difficult to use out of the box.

The innovation the team brought to customers during the I-Corps program was a prototype with much lower consumable cost and offered more compatibility with cell types and the ability to measure ion channels independently of cells. The team would provide an instrument to measure ion channel electrophysiology and the inexpensive, consumable plates. Based on the positive feedback received during a period of intense customer contact with the pharmaceutical industry, the team has headed back to the laboratory to scale the technology from the 8 channel prototype to a 32 channel product. Enthusiastic customers also volunteered to be pilot test sites.

Micro-LAM Technologies: Innovation in Laser Assisted Machining

Award Abstract # 1237113: http://go.usa.gov/wBi
Principle Investigator: John Patten, john.patten@wmich.edu
Team Video: http://bit.ly/RVMbgZ

This team from Western Michigan University patented a machining process with a diamond cutting tool, augmented by a laser to heat and soften hard and brittle materials to make them more pliable for machining. During the ten weeks of the I-Corps program, the team was excited to get out of the lab to meet customers to hear their thoughts on the technology and what the customers' needs were. The team met with more than 120 customers, learning that what they suffered from was low productivity, high tool wear, and inabilities to make certain products out of certain materials like silicon, silicon carbide, and sapphire.

The team's innovation solves all three of those problems, and would allow companies to make products faster, better, cheaper, and of higher quality. The major change that the team experienced during the I-Corps program was realizing the value of customer contact and how being responsive to customers' needs could improve the business plan and the value proposition. The team likened it to going out with an open mind to hear everything customers said, and absorbing all that information like a sponge.

Neon Labs: Predicting Successful Consumer Products

Award Abstract #1216835: http://go.usa.gov/dSv
Entrepreneurial Lead: Sophie Lebrecht, sophielebrecht@cmu.edu
Team Video: http://bit.ly/Ndh00b

What if companies could make better use of their resources by only creating products that are likely to be enjoyed by consumers? This team from Carnegie Mellon University used consumer products currently under development to study how the brain's affective (feelings and emotions) processing and decision-making systems react to visual perception of objects. With a combination of functional magnetic resonance imaging (fMRI) and behavioral psychophysics, they have begun the process of developing analytic tools that better predict which products are most preferred by consumers.

The I-Corps program encouraged the team to thoroughly understand the needs of all potential customer segments. It was during the initial customer discovery process that the team realized their technology could apply to more than just physical objects. After a meeting with an Internet video service, they realized they can provide a value-added service to Internet-based industries that rely on video thumbnails, advertising, and other imagery to appeal to consumers and generate revenue. The team has now gone back to the lab to begin the process of adapting their technology from predicting just the best physical objects to a tool that can predict thousands of the best thumbnail images per minute.

Omega Chem: Replacing Petroleum Products with Renewable Bio-Based Chemicals

Award Abstract # 1237247: http://go.usa.gov/wBO
Entrepreneurial Lead: Shivani Garg, garg@iastate.edu
Team Video: http://bit.ly/NghCBK

This team at Iowa State University developed a novel way of synthesizing fatty acids from biomass, with the resulting molecules able to act as the precursors for making bio-based chemicals which could replace non-renewable petroleum products. Petroleum products include lubricants and even detergents. The team entered the I-Corps program believing that it was the technology that was the lynchpin of their business model. What they were surprised to learn was that their initial customer base, a critical element for starting up their enterprise, was not who they thought would be early adopters of their technology.

Although large corporations in the consumer goods industry were enthusiastic about the team's innovation, especially as the companies look to deliver more bio-based products, they would not be the initial customers. The team's initial customer base would be the first-line companies which manufacture the surfactants, for example, which the surfactant user buys to incorporate into its detergent manufacturing process. Learning this key element was critical to the team revising their business model.

Red Ox: Semi-Mobile Water Treatment Systems

Team Abstract #1237241: http://go.usa.gov/wBD
Principle Investigator: Andre Taylor, andre.taylor@yale.edu
Team Video: http://bit.ly/NghZvT

Desalination is a critical step in the disposal of waste water in many industries, such as oil and gas extraction. This team from Yale University developed an electrochemical desalination cell (EDC) which removes salts from the water, while also producing electricity and inorganic compounds which can be sold as commodities. After consulting with the natural gas industry, the team learned that the waste water must be transported to other locations in order to be disposed of. This transportation incurs a significant cost to the water treatment providers. By incorporating the desalination process into the transportation, they can provide a value added service to the primary treatment providers. With pilot sites identified, the Yale team has headed back into product development to begin the process of scaling up the technology and turning it into a semi-mobile treatment system.

Without the intense customer contact that I-Corps encourages, the team would not have had the opportunity to talk to industry leaders and regulators, learning that some industries have very long time lines along which they adopt new innovations. This contact helped them to revise their original business model into one that met the needs of an active, emerging company. The team realized they needed to find customers and partners with immediate problems that needed to be solved.

SmartMenu: Helping Restaurants Help Their Customers

Award Abstract #1158766: http://go.usa.gov/wB2
Entrepreneurial Lead: Jiten Chhabra, jiten@useablehealth.com
Team Video: http://bit.ly/NipSAq

The team from George Institute of Technology used proprietary algorithms to develop a self-service food ordering terminal, dubbed SmartMenus, that makes personalized healthy meal recommendations based on a diner's profile and past ordering behavior. The innovation was focused on helping restaurants increase their sales by providing contextually relevant suggestions to diners. SmartMenus has the potential to influence all the orders placed in a restaurant or cafeteria setting, including web and mobile interfaces. It could also provide anonymous diner data for commercial and academic research.

The I-Corps program taught the team language they needed to communicate with industry personnel and commercialize their innovation. They were able to ask their existing customers new, calculated questions. In return came explicit answers that helped the team better understand restaurant operators' goals and needs.

SupraSensor: Enabling Macronutrient Monitoring for Precision Agriculture

Award Abstract #1237240**:** http://go.usa.gov/wBg
Entrepreneurial Lead: Calden Carroll, calden.carroll@gmail.com
Team Video: http://bit.ly/L60dI5

The chemical sciences face the grand challenge of developing agricultural products that do not harm unintended targets. Nitrate is a key component of fertilizer and, when used in excess, a pollutant that is toxic to livestock and nearby bodies of water. The team from University of Oregon Eugene built remote sensors that monitored nitrate concentration in farmland. They demonstrated that proprietary compounds could be incorporated into a solid matrix, like a polymer thin film, to detect nitrate in the presence of other common interfering anions and natural organic matter. The goal was to provide the nitrate sensors to large-scale industrial farms to monitor and control fertilizer usage.

Funding from I-Corps enable this group of scientists and entrepreneurs to evaluate a potential product that could reduce cost, energy usage, and environmental damage in the multi-billion dollar per year agriculture business. Through pivotal interactions with customers, the team learned to revise their intention of selling a product to instead providing a service.