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## Sneak Peek at March Madness for the Mind 2006

As always, this year's March Madness for the Mind event (Friday, March 24th from 6:30-9:30 at the Oregon Museum of Science and Industry) features a variety of student teams developing innovative technologies for applications in a number of industries. Eighteen E-Teams from across the US will present, as well as two high school InvenTeams from the Lemelson-MIT program and several successful former E-Teams, such as Keen Mobility and Deflexion. Here we give you a sneak peek at a handful of the promising teams, along with insights from the team members themselves: Wireless Crop Protection from the University of California, Berkeley; Early Detection of Acute Renal Failure from Johns Hopkins University; Low-cost Water Purification System for Developing Countries from the Illinois Institute of Technology; and the Expandable Wheelchair team from Pennsylvania State University. These teams all show strong potential to have a positive impact on local communities and beyond.

### Wireless Crop Protection (Aglinx) University of California, Berkeley

The Aglinx team is developing a wireless frost protection system for California vineyards. The system consists of temperature-monitoring Wireless Sensor Networks (WSN) deployed in the field, a computer interface showing the field manager a map of the vineyard and the temperature at each WSN, and ultra-bright LEDs in the field acting as beacons that communicate

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*NCIIA News* is the semi-annual newsletter of the National Collegiate Inventors and Innovators Alliance (NCIIA)  
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## From the Executive Director:

### A Time for Celebration

Welcome to a special edition of *NCIIA News*, dedicated to the NCIIA's 10<sup>th</sup> annual meeting, celebrating ten years of innovative education at US colleges and universities. This newsletter spotlights three of the many events taking place during the conference: the March Madness for the Mind Reception and E-Team Exhibition at the Oregon Museum of Science and Industry, the announcement of the Olympus Innovation Award winners, and the confluence of educators from primarily undergraduate institutions (PUIs) who are working to promote entrepreneurship education on their campuses.

Please see the article on March Madness for the Mind for a preview of four of the eighteen E-Teams that will be presenting at the event. These teams run the gamut from wireless sensor technology for California vineyards to water filtration technology for the developing world to assistive technology for wheelchair users. Conference participants will get a first-hand look at these and other exciting technologies, and meet the passionate people behind the projects.

I'm also pleased to announce the winners of the new, expanded Olympus Innovation Award: John Ochs, John Kleppe, and Michael Lovell. Flip to page two of the newsletter to read an article detailing the careers of these innovative educational leaders.

Page five contains a brief look at the work done so far by a collection of faculty from PUIs to further support entrepreneurship education on their campuses. One of the central purposes of the annual meeting is to provide a space where people can meet, network, and foster such collaborations, resulting in new initiatives and opportunities. We applaud the PUI faculty for their efforts and eagerly anticipate the results of their work.

Lastly, be sure to attend the gala NCIIA 10<sup>th</sup> anniversary celebration! Held at the end of the meeting on Saturday, it will be an elegant evening of great food, music, and conversation as we look back on ten exciting and transformative years.

Sincerely,



Phil Weilerstein,  
Executive Director

# And the Olympus Innovation Award Winners Are...

## Three outstanding educators recognized for their work

The opening reception and dinner of this year's conference features the Olympus Innovation Awards Ceremony. Now in its second year, the award recognizes individuals who have fostered or demonstrated innovative thinking in higher education. The award was expanded this year to include the Olympus Lifetime of Educational Innovation Award and the Olympus Emerging Educational Leader Award, in addition to the Olympus Innovation Award.

This year's winners are supremely qualified educators whose innovative practices have had a significant impact on both students and faculty at their respective institutions. We'll take a brief look at each educator's career.

### Olympus Innovation Award:

#### John Ochs, Lehigh University

Peter Likins, a former President of Lehigh, once said that John Ochs has had "perhaps the most profound impact on Lehigh's curriculum in history." Ochs' efforts have had broad and deep impact across a variety of disciplines, fostering a campus-wide culture of entrepreneurial thinking and interdisciplinary cooperation.

Among Ochs' major achievements at Lehigh is the creation of the Integrated Product Development (IPD) program, which focuses on technical entrepreneurship through experiential learning. Each year IPD offers two courses that are co-listed under engineering, mechanical engineering, business, and design. Teams of engineering, business, and design students and faculty produce technical and business feasibility studies, mock-ups of design ideas, and working prototypes and business plans. Beyond the E-Teams generated each year, many projects are undertaken in collaboration with entrepreneurial businesses or non-profits in the Pennsylvania region.

This is a formula that works. Now in its ninth year, IPD has produced over 150 academic-sponsored projects and has had over 1,200 student participants. The program has given birth to a number of student-run startups, including NCIIA-funded EcoTech Marine and state-funded H-field Technologies.

Ochs remarked, "Our vision is to create a sustainable and scalable educational environment that supports imagination, creativity, innovation, invention and entrepreneurship for all students, faculty, staff and alumni of Lehigh University. It is my opinion that these five characteristics are stages of personal development that build on each other and involve increasing knowledge, skills, and risk taking. The goal of the Lehigh programs is to give anyone with guts and passion the opportunity to take this journey of development."

In 2005, Ochs was a runner-up for the inaugural Olympus Innovation Award.

### Olympus Lifetime of Educational Innovation Award:

#### John Kleppe, University of Nevada Reno

John Kleppe was forming E-Teams long before they were called that. In 1974, five years after Kleppe joined the faculty of the Department of Electrical Engineering at UNR, he developed an innovative capstone class in which students worked in teams that represented companies. Each team designed and developed an original product, and the course culminated in the teams presenting their products to the technical community in Reno. The class is still being taught by Kleppe, and over the years has evolved into a nationally recognized interdisciplinary product development experience.

"My goal as an educator," said Kleppe, "has always been to teach a *true* college capstone experience on 'how America works' with regards to invention, innovation, and entrepreneurship."

In the early 90s Kleppe formed a friendship with Jerome Lemelson, then living in Lake Tahoe. Kleppe's class was, to Lemelson, one example of a way to imbue in students the entrepreneurial spirit of invention and innovation he believed was key to America's future economic success. In that sense, Kleppe's work was part of the inspiration for the NCIIA itself. This and all his other achievements over the last thirty years make Kleppe the ideal recipient of the inaugural Olympus Lifetime of Educational Innovation Award.


### Olympus Emerging Educational Leader Award:

#### Michael Lovell, University of Pittsburgh

Michael Lovell has had a profound impact on entrepreneurship education at the University of Pittsburgh in a short amount of time. Since joining the mechanical engineering department in January of 2000, Lovell has founded the Swanson Center for Product Development, a \$5 million facility with design and prototyping equipment to allow students, faculty, and staff to take products from the idea stage through prototype and into production.

Said Lovell, "We created the Swanson Center because we realized that in order to remain competitive, students needed to be more innovative. We needed a way to match students with technologies and get products to market."

The center has done just that, with seven companies reaching commercialization thus far.

Working in collaboration with the NCIIA, Lovell also helped establish RAPID, a network of rapid prototyping service providers who offer their services to NCIIA E-Teams at reduced prices through an online portal. Look for more good things from Lovell and the Swanson Center in the future. 

# NCIIA Grant Awards: December 2005

## Advanced E-Team Grants

### **A Method to Prevent Airway Obstruction in Patients with Obstructive Sleep Apnea**

Stanford University, \$20,000  
Thomas Krummel

### **i-conserve Energy Management System**

Pennsylvania State University, \$15,750  
Elizabeth Kisenwether

### **Seguro: Pesticide Protection and Warning System**

University of California, Berkeley, \$20,000  
Alice Agogino

### **The Expedition Walker**

Portland State University, \$9,050  
Faryar Etesami

### **Off Nicotine Smoking Cessation Program for Primary Care Settings**

Case Western Reserve University, \$17,800  
Scott Frank

### **A Novel System to Improve the Efficacy of Percutaneous Catheter Ablation of Atrial Fibrillation**

Stanford University, \$7,250  
Paul Wang

### **A Novel Aortic Endograft with Adhesive-mediated Fixation and Seal for Endovascular Treatment of Abdominal Aortic Aneurysms**

Stanford University, \$15,898  
David P. Lee

### **Internet Security Company**

University of Georgia, \$20,000  
Charles Hofer

### **Time-Temperature Integrator**

University of Florida, \$15,700  
R. Keith Stanfill

### **Specialized Head and Neck Protection for High Impact Football and Hockey Collisions**

University of Miami, \$10,500  
Peter Tarjan

### **Micro/Meso Scale Machine Tool Development for the Manufacture of Small Precision Parts**

University of Illinois at Urbana-Champaign, \$18,590  
Richard DeVor

### **Nandex**

Georgia Institute of Technology, \$19,750  
Pat Dickson

### **Solar Water Purification Bottles for Developing Countries**

University of Massachusetts, Lowell, \$12,500  
John Duffy

### **Wheelchair Mounted Pelvic Restraint**

University of Pittsburgh, \$15,250  
Linda van Roosmalen

### **Ultra Low Cost Portable Electronic Notebook For School Children in Underdeveloped Countries**

Brown University, \$19,000  
Gregory Crawford

## Course and Program Grants

### **Program to Support Computer Applications for Medicine**

University of Virginia, \$25,410  
Alfred Weaver

### **Development of the Interdisciplinary Design, Entrepreneurship and Service (IDEAS) Course**

University of Detroit Mercy, \$23,500  
Nassif Rayess

### **International Social Entrepreneurship through Multidisciplinary Student E-Team Projects**

Lehigh University, \$36,500  
Todd Watkins

### **Product Realization for Global Opportunities**

University of Pittsburgh, \$36,300  
Matthew Mehalik

### **Entrepreneurship in the Digital Arenas**

Rochester Institute of Technology, \$15,000  
Richard Demartino

### **From Discovery to Commercialization: Development of the Greater Phoenix Nanotechnology Innovation Pathway and Pipeline**

Arizona State University, \$39,500  
B.L. Ramakrishna

### **Design and Construction of a Hybrid Energy System in Kenya: The Precursor to a Manufacturing Capability**

Pennsylvania State University, \$12,000  
Thomas Colledge

### **Integrating Master of Engineering Management Students into Multidisciplinary Senior Design Project Teams**

Valparaiso University, \$5,000  
Michael Hagenberger

### **Entrepreneurship Beyond Literacy and Resource Barriers: A Proposal for Cross-Functional Course Development and Delivery**

University of Illinois at Urbana-Champaign, \$5,000  
Ali Yassine

### **Global Resolve: Social Entrepreneurship Through Innovation**

Arizona State University, \$5,000  
Mark Henderson

### **Teaching Structural Design, Construction Practices, and Sustainable Technologies for Mitigation of Natural Disaster Damages in Coastal and Fault Areas of Developing Regions**

Catholic University of America, \$42,450  
Gunnar Lucko

system operation and temperature zones, allowing a field manager to gauge vineyard condition from remote locations.

The team has developed a looks-like, works-like proof-of-concept of the beacon (called the VinePod) and written a business plan that made it to the semifinal round of the 2005 UC Berkeley Business Plan Competition. Team member Brian Sosnowchik is hoping to use the conference to “discuss our ideas with a larger forum of entrepreneurs. Feedback and helpful suggestions are always well-received, and I think that’s something we’ll garner by attending. We are definitely excited about the potential impact of our project, and we’re looking to impart that excitement on others.”

Since receiving NCIIA funding the team has broadened its scope from specializing purely in frost protection to developing an information infrastructure that will enable what they call “precision agriculture.” Frost protection will become a subset of the team’s services, in addition to monitoring spatial water use distribution, crop and harvest planning, and a variety of other techniques. Visit [aglinxsolutions.com](http://aglinxsolutions.com) to find out more.

## **Early Detection of Acute Renal Failure Johns Hopkins University**

This team is developing a medical device that can detect and diagnose acute renal failure (ARF) earlier than is currently possible. ARF is a common medical condition that affects approximately 300,000 patients hospitalized in intensive care units (ICUs) annually in the United States, leading to \$6-8 billion in clinical costs and 30,000 deaths each year. The team is developing a device that uses laser technology and Raman spectroscopy to provide data on metabolite excretion rates, which are indicative of ARF, in near real-time. The device enables the detection of ARF in hospitalized patients up to forty-eight hours earlier than current detection methods—and early detection is essential to successful treatment.

The team has made significant strides toward commercialization, officially incorporating as Renal Diagnostics, Inc., and hiring a veteran life sciences entrepreneur to serve as interim CEO. They have secured their IP, and eventually plan to merge with or be acquired by an established medical device company with distribution networks in hospital ICUs. They are currently in the process of looking for seed funding and are recruiting additional team members with both business and technical expertise.

## **Expandable Wheelchair Pennsylvania State University**

This team is developing an adjustable manual wheelchair that addresses the problems of larger people in long-term care situations. The growing girth of Americans means standard chairs are too small for a meaningful percentage of patients, so

the team has designed a wheelchair that can expand from the usual 18” wide and 16” deep seating surface to 22” wide and 18” deep, and comes with an adjustable headrest.

The team, which has partnered with former E-Team and successful assistive technology company Keen Mobility, plans to use a direct-to-customer distribution model along with a low-cost promotion method of giving demonstrations at area nursing facilities to create demand. The team has filed a provisional patent and is currently in the process of redesigning a prototype for mass production.


Team member Joshua Hatch believes in the social benefit of the project. “Our project has the potential to improve the lives of many people in nursing homes and other health care institutions,” Hatch said. “As my student team, university, and sponsoring company are all Portland locals, we are excited about the opportunity to showcase our project on the home field.”

## **Low-cost Water Purification System for Developing Countries Illinois Institute of Technology**

This team is developing a clay-based water purification system for household use in developing countries. The unique system, which utilizes three different clay-based disks treated with colloidal silver to remove bacteria and other pollutants from contaminated water at the point of use, has the potential to positively impact the 1 billion people across the globe without access to clean drinking water.

After reviewing their commercialization options, the team has decided to pursue the development of micro-enterprises in rural villages of Mexico for the manufacturing and testing of the filter, and hope to partner with Monterrey Tech for help with business development. The team has incorporated as KlarAqua, a company whose mission is to develop and implement sustainable clean water solutions in order to promote health and economic opportunity worldwide.

Like all the E-Teams, Eugenio Ramirez of the water purification team is looking forward to March Madness for the Mind. Said Ramirez, “This conference is a great opportunity for us to present our product. It will also be an excellent place for us to examine our strengths and weaknesses and see if we’re prepared to clearly demonstrate the product’s viability and its social benefits for third world countries.”

“Our goal is to contribute to efforts toward making this world a safer and healthier place, not just with good intentions but also by incorporating social, cultural, and economic factors in providing solutions to the common problems of our time. This event will encourage us in our efforts to make a difference.” 

## Encouraging Entrepreneurship at Primarily Undergraduate Institutions

The 2005 NCIIA conference in San Diego saw the start of a special initiative for entrepreneurship education at smaller, primarily undergraduate institutions (PUIs) across the US. At the conference, representatives from a wide range of PUIs had informal conversations about how to encourage and support entrepreneurship education at their schools. The discussions centered around the recognition that PUIs differ widely from research institutions: PUIs usually have fewer students, resources, and facilities; more limited faculty and staff expertise; higher teaching loads; less external funding; and smaller research programs. How, then, do you teach entrepreneurship in an effective manner? The faculty decided to collaborate further to find out.

Inspired to continue their discussions, ten faculty from seven different institutions applied for and received an NCIIA grant to fund a working meeting in August 2005. At this meeting and thereafter they have focused their efforts on three cross-cutting perspectives on entrepreneurship education: functional, temporal, and developmental. The functional model is focused on what students know and should be able to do, the temporal model is focused on how product or service concepts grow over time, and the

developmental model is focused on how students/teams, faculty, and programs develop. In addition to regularly documenting their work on a wiki (an easily editable and expandable website, see [www.pui-eship.org](http://www.pui-eship.org)), they have or will be presenting their work at a range of conferences, including USASBE, NCIIA, CCSCNE, and ASEE, and they are planning for continuation and further funding.

When asked how PUI has boosted capabilities at Smith and elsewhere, Susannah Howe, Engineering Design Clinic Director at Smith College and PUI participant, said, "This collaborative effort has been particularly energizing since it has provided us with a broader perspective than any single individual or institution. It has enabled us to share and build on our different areas of expertise, and it laid the foundation for a network of entrepreneurship educators at PUIs. We are eager to expand our collaboration as we develop this work in the years to come and welcome interested PUI faculty or staff to join us."

Want to get involved? Attend the NCIIA conference panel "Institutionalizing Entrepreneurship at Primarily Undergraduate Institutions" Friday afternoon from 2-3:30.

## Building In, Building Out: Fostering a culture of innovation on campus and beyond

*The NCIIA 11th Annual Meeting  
March 22-24, 2007*



Call for proposals deadline: **June 16, 2006**  
Login and submit your proposal at [www.nciia.org/login](http://www.nciia.org/login)





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## NCIIA NEWSLETTER

Next NCIIA grant deadline:

# May 12, 2006

Use our online  
grant application  
system!  
[www.nciia.org](http://www.nciia.org)

In 2006, the National Collegiate Inventors and Innovators Alliance (NCIIA) will award approximately \$1 million in Lemelson Foundation grants to colleges and universities to develop and support the creation of programs and projects in invention, innovation, and entrepreneurship education. We believe that invention, innovation, and entrepreneurship are essential components of the higher education curriculum and vital to the nation's economic future. We work with colleges and universities to build collaborative experiential learning programs that help nurture a new generation of innovators and entrepreneurs with strong technical and business skills.

The NCIIA is increasingly interested in and welcomes proposals for commercially viable projects that are technologically innovative and show promise to improve the environment and the human condition. Such projects should follow a sustainable entrepreneurial model. We are also particularly interested in supporting E-Teams whose demographic makeup reflects the balance and diversity of the teams' home institutions.

To obtain the full RFP and apply on-line, visit [www.nciia.org](http://www.nciia.org) or e-mail [info@nciia.org](mailto:info@nciia.org).

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