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Introducing Advanced I2V and Sustainable Vision grants

Over the past month, the NCIIA has introduced two exciting new programs, both of which aim to move educational and innovative ideas to realization. The first is Advanced Invention to Venture, an expansion of the NCIIA's acclaimed workshop series (www.invention2venture.org) targeted toward E-Teams who have taken their ventures and turned them into emerging companies. The second is the new Sustainable Vision grants program. Consistent with NCIIA's expanded interest in projects with a sustainability focus, this new grant category supports programs that apply technology entrepreneurship to address domestic and international problems in poverty and environmental degradation.

Advanced Invention to Venture

Building on the success of the Invention to Venture workshop series, in August 2006 the NCIIA successfully piloted an Advanced Invention to Venture (AI2V) workshop. The idea behind the intense, three-day workshop is to provide extended support for I2V participants, promising E-Teams, and teams involved with regional partner Massachusetts Technology Transfer Center (MTTC), a statewide organization that helps stimulate commercialization from within academia. "The basic I2V is a great introductory crash course in how to develop a technology venture," said I2V Program Manager Humera Fasihuddin. "But it's too basic for some teams. The AI2V workshop provides teams with tools for more intensive and strategic thinking, hand-in-hand with intense coaching and

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From the Executive Director:

New Programs for a New Year

As NCIIA moves beyond its first ten years and into the next ten, we continue to grow, expanding existing programs, introducing new ones, and making connections, all in an effort to further the incorporation of invention, innovation, and entrepreneurship in US higher education. In that vein, this edition of *NCIIA News* highlights several new and exciting initiatives introduced since the last newsletter: Sustainable Vision grants, a new grant category, and Advanced Invention to Venture, an expansion of the standard I2V workshop. See the article on the left for more details on those initiatives.

A program sure to be a force in the next 10 years, the BMEidea competition, had its second annual run this April. We are pleased to announce the winners: NanoGraft Technologies from the University of California, Berkeley; Ultramed Ultrasound Breast Cancer Detection from Pennsylvania State University; AnemiCAM from Brown University; and Robopsy from MIT. We are proud to support these teams and look forward to their progress as they move their products toward commercialization. See page 2 for an in-depth look at the AnemiCAM E-Team, developers of a promising low-cost, non-invasive anemia diagnostic aimed at the developing world.

Another new project receiving support from the NCIIA is the *International Journal for Service Learning in Engineering* (IJSLE). IJSLE, which debuted in April, is a free, peer-reviewed, semi-annual electronic compilation of articles on engineering projects, ventures and pedagogy related to service learning. See page 5 for a brief interview with IJSLE founder and Penn State professor Tom Colledge.

Finally, be sure to mark your calendars and join us for the NCIIA 11th annual meeting in Tampa, FL, March 22-24, 2007, entitled "Building In, Building Out: Fostering a culture of innovation on campus and beyond." Contribute and learn how educational programs supporting technology entrepreneurship reach beyond the walls of academia and help build creative local, state, national, and global networks. Register beginning in early October at www.nciia.org/login.

Sincerely,



Phil Weilerstein,
Executive Director

AnemiCAM focuses on developing world

Brown University E-Team develops low-cost, non-invasive anemia diagnostic

Anemia, a pathological deficiency in hemoglobin, the oxygen-carrying component of the blood, can cause fatigue, organ dysfunction, poor pregnancy outcomes and, in children, can impair growth and motor and mental development. While the disease affects an estimated 3.5 million Americans, it is an epidemic in the developing world, affecting 50% of the population in some countries. Although easily diagnosable with a simple blood test and highly treatable thereafter, screening for anemia is a significant challenge in the developing world because physicians often lack the necessary laboratory infrastructure for blood testing—and even in areas with the right facilities, needle reuse is a serious problem.



and non-invasively assess hemoglobin levels in the blood. No more needles, no more risk. And the device is priced around \$30US.

AnemiCAM is based on simple principles. To do a quick anemia check, doctors typically pull down a patient's lower eyelid and check the conjunctiva, the tissue that covers the front of the eye and lines the inside of the lid. If the tissue is pale, hemoglobin levels in red blood cells may be low, resulting in anemia.¹

But this check isn't definitive; accurate diagnosis still requires a blood test. Using a white LED, proprietary liquid crystal cell, photodetector, battery pack and simple processing microchip, AnemiCAM examines the conjunctiva spectroscopically, allowing diagnosis to be made in less than ten seconds and with 95% accuracy.

Although the AnemiCAM team has come onto the scene only recently, winning a \$20,000 Advanced E-Team grant in this cycle and grabbing second place (and \$2,500) in the 2006 BMEidea competition, the idea for AnemiCAM has been around since 2002. It started as part of an informal collaboration at Brown in which doctors present a challenge and students execute it. Greg Jay, director of emergency medicine research at Rhode Island Hospital, visited an engineering course taught by Greg Crawford, dean of engineering. Jay had the idea to use a digital camera to take a picture of the conjunctiva, but Crawford suggested using spectroscopy instead. They found John McMurdy, a doctoral candidate in biomedical engineering and

an optics expert with experience in the spectrometer industry, and the team was begun. "John was a perfect fit," said Crawford. "Once we brought him in, work really got started."

And work has continued. McMurdy, after giving poster presentations at two separate Brown Forum for Enterprise events, recruited Alan Kivnik, a serial entrepreneur, and Samuel Abiade, a consultant on African trade and sales who will help the team get a foothold in its initial target market of Nigeria. Crawford, Jay, and fellow physician Selim Suner signed on as advisors, and two undergraduates, Zara Mathews and Kristen Kelly, came aboard to work on clinical testing and commercialization strategies.

Now the fully formed team is close to completing an intellectual property agreement with Brown, and is actively pursuing investors. "It's absolutely our hope to spin this out quickly," said Crawford. "We've already started talking with venture capitalists, local investors, state-run groups—basically everyone we possibly we can—to find out the best way to move forward and get our first big infusion of cash. There's a lot going on: a lot of discussions, a lot of enthusiasm for the idea."

For his part, McMurdy has a good idea of what the team's immediate next steps will be. "We're going to use some of our E-Team money to do preliminary marketing work in Nigeria, talking with



Photograph by Lauren Brennan

physicians, getting feedback, getting the idea out there," he said. "As far as the technology itself is concerned, our prototype is coming along. We finished our first wave of clinical testing and published the results in the *Journal of Biomedical Optics*. We're now in the midst of our second wave, using a less expensive and more compact prototype."

The final goal for AnemiCAM is to get the device into the hands of those who need it. "This product has the potential to make an immediate impact in developing countries," said McMurdy. "We can make this device very inexpensively and get it into use in places where anemia is prevalent. Our device addresses an immediate clinical need in those areas."

Crawford also hopes AnemiCAM will have an effect on how Brown commercializes research. "This is one of the earliest projects we started with the physicians," he said. "We're hoping this project becomes a model for translational research at Brown, used down the road to help people commercialize devices that will really help people."

1. From "Doctors and Engineers Pool Their Knowledge to Advance Medicine"

by Wendy Lawton, *Inside Brown*, 2006.

NCIIA Grants Recommended for Funding: May 2006

Advanced E-Team Grants

GlobaMED Devices: Global Anemia Detection & Treatment
Brown University, \$20,000
Gregory Crawford

KlarAqua
Illinois Institute of Technology, \$13,500
Thomas Jacobius

StrideKick
Babson College, \$11,500
Todd Peavey

A Video Game-Based Guitar Learning System—Guitar Evolution
Case Western Reserve University, \$13,500
Cyrus Taylor

Malawi Treadle Pump
Washington State University, \$12,500
Denny Davis

Starlight Stoves for India
Colorado State University, \$15,000
Paul Hudnut

Pull-Out Resistant Pedicle Screw for Osteoporotic Patients
Johns Hopkins University, \$18,500
A. Jay Khanna

Novel 3D Cell Culture Device for Drug Discovery and Biopharmaceutical Production
Brown University, \$15,236
Jeffrey Morgan

Pratt Design Incubator—SMIT
Pratt Institute, \$14,700
Debera Johnson

A Cell Phone-Based Personal Computer for Developing Communities
University of Massachusetts Amherst, \$13,500
Chris Pal

Chemical-free Artisanal Mining Solution
Rensselaer Polytechnic Institute, \$17,500
Burt Swersey

Orion Security LSP LLC
Lehigh University, \$16,500
Todd Watkins

Soy-Based Plasticizer
Ohio State University, \$14,000
Michael Camp

Development and Commercialization of Innovative Wall-climbing Robots
City College of New York, \$16,000
Jizhong Xiao

Automatic TB Diagnostic
Franklin W. Olin College of Engineering, \$17,250
Mark Somerville

Electrotactile Braille Display
Rose-Hulman Institute of Technology, \$1,500
David Voltmer

Course and Program Grants

From Science to Prototype: Out-of-the-Box Thinking for Medical Technology
University of Colorado at Denver \$34,400
Randall Tagg

A Collaborative Effort to Integrate Engineering Design and Industrial Design Curricula for Entrepreneurial Technological Product Development
Northeastern University, \$5,000
Francis DiBella

From Research Lab to Product: Lab Automation Course to Enable Rapid Product Development
Pennsylvania State University, \$25,000
Khanjan Mehta

Launching the Venture 2007
University of North Carolina at Chapel Hill, \$12,100
Ted Zoller

Global Health by Design
Stanford University, \$37,500
John Linehan

Incubating the Next Generation of Global Software Development Entrepreneurs
Pace University, \$35,200
Orlena Gotel

Towards Multiple E-Team Platforms
California Polytechnic State University, \$6,000
Eric Olsen

Development of a Cross-Disciplinary Program of Study: Entrepreneurial Leadership in Pharmacy
Drake University, \$29,000
Brad Tice

Expansion of Our Technical Entrepreneurship Program
University of Miami, \$6,500
Peter Tarjan

Entrepreneurship at Faith-Based Institutions: Reading Group as Stepping Stone
Calvin College, \$4,550
Steve VanderLeest

University of Central Florida Pathways to Commercialization Course
University of Central Florida, \$29,000
Thomas O'Neal

Transforming Engineering Capstone to a Radiant Entrepreneurial Program
University of Idaho, \$18,000
Donald Elger

mentoring. The new program also gives the NCIIA the ability to provide greater support to E-Team grantees.”

The pilot took place from August 2-4 in the Massachusetts Biomedical Initiatives (MBI) Incubator Center in Worcester. Five teams were selected for the August pilot, representing Northwestern, Harvard, MIT, Brandeis, and Rensselaer Polytechnic Institute.

Participating teams reported exciting program outcomes. “Our invention didn’t crystallize into a product and business until I sat through this program and focused on developing the strategy,” said Jeff Agar, Assistant Professor of Chemistry and Neuroscience at Brandeis.

Edward Paramadilok, from the Northwestern team developing a specialized rehabilitation treadmill, found AI2V to be “an enlightening experience. The facilitators provided us with several ‘golden nuggets’ to take back with us. It was definitely time well spent!”

Jessica Dawson, from Developmental Testing Service, LLC, agreed. “AI2V supplied us with a comfortable environment where we could analyze our venture. In three short days we walked out with a more focused concept and much more confidence in our ability to bring our product to market. I highly recommend this program to any new venture—we feel much better about the road ahead.”

The next AI2V takes place September 14-16 and 27-28 in Worcester, MA. Visit invention2venture.org/advanced for more information.

Sustainable Vision grants

NCIIA’s new Sustainable Vision grants category is the product both of a growing interest in sustainability across US higher education and expanded program priorities. The deadline for the pilot cycle is **October 27, 2006**. The Sustainable Vision grants program builds on information gathered during several seminars and roundtables the NCIIA has hosted over the past several years. With input from The Lemelson Foundation and other groups with experience in sustainable innovation and international partnerships for education, the NCIIA has developed a set of criteria, which we will refine following our experience with the pilot round.

Executive Director Phil Weilerstein remarked, “Our hope is that this pilot program will help faculty and students working on innovative projects and programs advance their work on many levels. These grants have the potential to help strengthen existing partnerships and move forward initiatives that will make a real difference. We very much look forward to seeing the creative direction our participants take through the Sustainable Vision grants program.”

Latest from the BMEidea competition

Along with announcing the winners of the 2006 BMEidea Competition—a national competition celebrating student biomedical innovation—we are also pleased to announce the securing of National Science Foundation (NSF) funding. Working with Mary Besterfield-Sacre from the University of Pittsburgh as well as researchers from other organizations, NSF funding will allow for a study of the design process of current BMEidea winners. This year brought an exciting array of submissions from schools across the US, and we are thrilled to support the winners as they move forward.

First prize (\$10,000): Nanograft Technologies

University of California Berkeley

A tissue engineering approach to construct “smart” vascular grafts from bone marrow stem cells for use in coronary artery bypass graft procedures.

Second prize (\$2,500): Ultramed Ultrasound

Pennsylvania State University

A breakthrough in ultrasound technology using multi-element, high frequency transducers with scalable frequency ranges to allow real-time tissue biopsies and non-destructive imaging for breast cancer detection.

Second prize (tie, \$2,500): AnemiCAM

Brown University

A device that allows doctors to quickly and accurately detect anemia (low hemoglobin) in patients by reflecting light in the conjunctiva, within the lower eyelid.

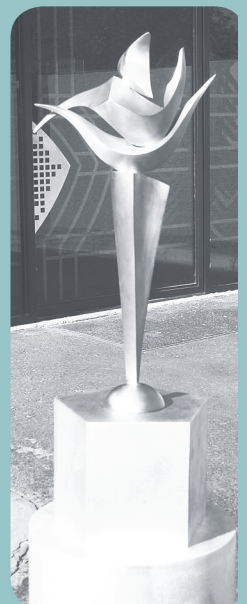
Third prize (\$1,000): Robopsy

Massachusetts Institute of Technology

A telerobotic biopsy system that uses a small, disposable actuator device to grip, orient, and insert a biopsy needle from within a Computed Topography (CT) gantry.

The deadline for submissions for the next competition is April 6, 2007. Visit nciia.org/r_bmeidea.html for more information.

The BMEidea trophy spends a year on display in the department of each first prize-winning school.



International Journal for Service Learning in Engineering Gets Its Start

April 2006 saw the start of something new for the widespread and growing service learning community in academia: the first issue of the *International Journal for Service Learning in Engineering* (IJSLE), a free, peer-reviewed, electronic journal offered semi-annually over the Internet. Led by Tom Colledge, Assistant Professor of Engineering Design at Penn State University, and supported by PSU and NCIIA, the journal publishes articles with a specific focus on service learning in engineering, engineering entrepreneurship, and pedagogy. Recently we sat down with Colledge to discuss what motivated him to launch IJSLE, and what the journal hopes to accomplish.

NCIIA: *Where did the idea for IJSLE come from?*

Colledge: The idea was sparked by simple demand. I recognized that there were numerous engineering service learning projects going on at Penn State and elsewhere with no means of recognizing students' efforts beyond the classroom, or a means of communicating that work to others. There were several essential needs not being met: a way to foster inquiry into rigorous engineering design, research and entrepreneurship topics, direct those efforts

to service-related projects, and transmit the results and best practices. The time had come to create a scholarly journal for these purposes.

NCIIA: *What does the journal hope to accomplish?*

Colledge: The journal hopes to provide readers with articles that offer timely information related to service-based projects in engineering design, engineering research, engineering-related entrepreneurial ventures, and engineering-related pedagogy. Future plans for the journal include the development of a web portal to facilitate collaborative engineering design, research and entrepreneurial efforts in service through the creation of repositories of best-available technologies, case studies, cultural resources, and networking capabilities. The journal will be accessible through this same portal.

Interested in the IJSLE? Visit www.engr.psu.edu/IJSLE where you can access it online. **The next call for papers is August 30, 2006.** Contribute your knowledge and experience to this worthy new project!

Building In, Building Out:

Fostering a culture of
innovation on campus
and beyond

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March 22-24, 2007

Tampa, FL



Registration opens in early October
Visit www.nciia.org/news_events.html for more information



NCIIA NEWSLETTER



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Next NCIIA grant deadlines

Course and Program and Advanced E-Team grants:

December 1, 2006

Sustainable Vision grants:

October 26, 2006

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 or e-mail info@nciia.org.

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