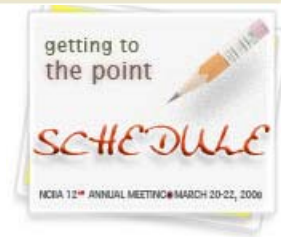


Getting to the point: *ideas, process, products*



2008



THURSDAY

- 7:00-5:00 CONFERENCE REGISTRATION: REGENCY BALLROOM
- 7:00-8:00 BREAKFAST: REGENCY BALLROOM
- 8:00-9:00 OPENING PLENARY: REGENCY BALLROOM

Hold That Thought: New Twist on the Classic Wooden Blocks Encourages the Development of Great Thinkers from Preschoolers to Global Corporate Executives

Can you imagine a second grader and a scientist using the same toy to help them think better? Derek Cabrera and Laura Colosi are research scientists who took reams of research on the essential patterns of human thinking and boiled it down into the simplest of educational tools--the toy block. The result is a revolutionary new toy that teaches thinking skills to children and adults, from preschooler to PhD. ThinkBlocks are used with elementary grade students in school classrooms, in graduate classrooms in the Ivy League, and in corporate boardrooms. ThinkBlocks have no gender, age, cultural, language, skill-level, or subject barrier. They can be used by anyone, anywhere to tackle virtually any topic or discipline. In this active and engaging opening plenary, Drs. Cabrera and Colosi offer an entertaining peek into their accidental sojourn from academia to entrepreneurialism and show us the four simple patterns that underlie all human thought and this remarkable thinking toy. Join us and learn how getting your ideas out of your head and into your hands can expand your ability to problem solve, invent, innovate and thrive.

View the ThinkWorks video by [clicking here!](#)

9-10:30 Creativity Track: Papers (CONTINENTAL); Moderator: J-D Yoder, Ohio Northern University

Thurs 1A1 Jorge Vanegas and Rodney Hill, Texas A&M University

An Advanced Learning Environment and Experience on Creativity, Innovation, and Entrepreneurship

This paper advances the field of invention, innovation, and entrepreneurship education by sharing the content, structure, pedagogical approach, and tools used for a unique multidisciplinary undergraduate course on the design process, creativity, innovation, and entrepreneurship, and by presenting outcomes, lessons learned, and insights gained from teaching over 5,000 students over a decade. The course, currently taught for Honors students from diverse majors (from engineering, business, biotech, and life sciences to veterinary medicine, liberal arts, agriculture, and design), addresses fundamental concepts of creativity and problem solving, creative thinking, humor, convergent and divergent thinking, and future studies, all within a dual individual/team learning environment centered around design thinking, problem-based learning, and knowledge creation. It provides an advanced learning environment and experience that prepares students to be the active creators of the future, encouraging them to think holistically as inventors, cultivate an entrepreneurial spirit and develop leadership skills, and reach their potential creative talent.

Thurs 1A2 Jason Morris, Western Washington University

Facilitating Creativity by Making Function Follow Form

Creative solutions are rarely found using conventional problem solving methods. Students must be encouraged to try alternative processes for attacking a problem. Professional design projects begin with a design brief, but because of preconceived notions, the brief itself inhibits the designer's creativity. This alternative process removes hindrances to creativity by restating the design problem in abstract, non-objective language. It begins with abstract form creation without knowledge of the design's purpose. The form creation is done with guidelines made by the instructor, who creates the rules to correspond with the design's objectives. Only after these abstract sculptures are complete is the design's purpose revealed. A selected form study is then evaluated for ideas and inspiration, which is refined applying the realities of the design functions. This process has consistently resulted in highly creative and beautiful designs that delight and surprise the students.

Thurs Andy F. Loewy, University of Louisiana at Lafayette

1A3

Methods for Promoting Innovation in the University Industrial Design Studio

Flexible and original thinking is key to outstanding design. In order to teach design effectively we must therefore offer students a framework that doesn't restrict their thought process, allowing students room to develop their own individual design process. This doesn't mean that we can't offer our students technical advice or offer suggestions that might influence their process. Creativity blossoms and a student's creative process is discovered when the individual is immersed in an environment conducive to innovative thinking. This paper cites methods and techniques that have proven to be helpful to my students as a catalyst for furthering the development of their design process without the restrictions that we encounter so often in prescriptive teaching. My methods for promoting mentally active drawing and encouraging discovery through hands-on model-making are a few of the areas will be elaborated upon in this paper.

Entrepreneurship Education Research Track: Papers; Moderator: Steve Nichols, University of Texas at Austin (STATE)

Thurs Jon Pratt, Dave N. Norris Jr. and Laura Marler, Louisiana Tech
1B2 University

Nurturing the Creative Class from Art to Nano

Richard Florida's book, *The Rise of the Creative Class*, focused national attention on the importance of attracting and retaining highly skilled individuals that work in creative occupations. Recent research from USDA indicates that a combination of the creative class, entrepreneurship, and natural amenities can improve development in small metro and non-metropolitan areas. The creative/entrepreneurial class spans fields from fine arts to nanotech. How can this group be nurtured through active local policies and programs for attracting/retaining them and maximizing the economic impact of their innovations? What programs have proven to be supportive of creative individuals and the creative enterprises they populate? How can universities create an environment where creative types from all disciplines—arts to nanotechnology and at all levels—collaborate and interact to form a new problem solving idea generation?

Thurs Phil Weilerstein and Angela Shartrand, NCIIA
1B1

Education for Innovation: A Decade of NCIIA Program Outcomes

For over a decade, the NCIIA has supported faculty and students in the area of technology entrepreneurship through our grants programs, events, competitions, and educational resources. What have we learned about the long-term impact of our programs? This session will highlight NCIIA's assessment and evaluation strategy, and will share the key outcomes of our Advanced E-Team and Course and Program grants. We will also discuss some of the challenges we have faced in assessing long-term outcomes of entrepreneurship education and technology commercialization.

Tools Track: Workshop (FAR EAST)

Thurs 1C Steven Overholt, Gannon University

Blogs—Tips and Strategies for the Tech Entrepreneur

Many students are aware of blogs and how they may be used socially. However, blogs are also a powerful tool for the tech entrepreneur. They are invaluable for collaboration, product development, technology research, market research, marketing, customer relations, and more. Large corporations have discovered the interactive power of blogs and their effectiveness in introducing new products to market. This session will demonstrate how student inventors can also use this medium to help drive their innovation process and effectively engage current and potential customers to build their markets. This program will put another powerful tool in the toolbox of tech entrepreneurs.

Product Development Track: Workshop (OAK)

Thurs 1D Randall Tagg, University of Colorado at Denver and Health Sciences

Prototyping for Everyone: Rapid Assimilation of Skills & Tools for the Creation of Physical Prototypes

Product development requires the successful fusion of concept, physical prototyping, market assessment, and business planning. The prototyping phase is critical, since a viable, well-designed, and tested realization of a proposed product is the foundation for all the other activities that bring the product to market. Prototyping requires a wide range of technical knowledge drawing from many fields of science and engineering. Through workshop activities, we aim to explore how much of this broad range of knowledge can be assimilated and applied by individuals, regardless of prior training or specialization. Indeed, students working in experimental scientific research must quite often quickly assimilate and apply knowledge of mechanics, electronics, optics, and other areas into the successful completion of a project. Workshop participants will explore how this mode of learning can support the entrepreneurial development of new products and what resources would create the ultimate "inventor's garage."

10:30-11 Break and soapbox sessions

11-12:30 BREAKOUT 2

Creativity Track: Workshop (OAK)

Thurs 2A Denise K. DeLuca, The Biomimicry Institute

Biomimicry: Innovation Inspired by Nature

Biomimicry is a method for studying and then emulating nature's best materials, forms, processes, and systems and using them to develop sustainable design solutions. The core idea is that animals, plants, and microbes have already solved many of the design challenges that engineers and architects are grappling with today. After 3.8 billion years of research and development, design failures in nature are fossils, and what surrounds us is the secret to sustainability. Biomimicry is a path to a sustainable future, a survival strategy for the human race. The more the human world looks and functions like the natural world, the more likely we are to endure on this home that is ours, but not ours alone. During this 90-minute workshop, participants will get a brief introduction to biomimicry and then break into design teams that will tackle a design challenge using the biomimicry design spiral and Life's Principles.

NCIIA Grants and Resources Track: Panel (EXECUTIVE)

Thurs 2B Phil Weilerstein, Jennifer Keller Jackson, and Humera Fasihuddin, NCIIA.

NCIIA Grants and Resources

This session will update participants on NCIIA grant programs and future initiatives. NCIIA's program offerings continue to grow and now include grants for faculty and students, one-day and four-day workshops on entrepreneurship and innovation, student-led competitions and more. Twice each year, the NCIIA calls for proposals for Course & Program and E-Team grants to support invention, innovation, and entrepreneurship education at member colleges and universities. The Sustainable Vision program supports economically sustainable models of technology innovation for those living in poverty and focuses on basic human needs such as clean air, water, energy, shelter and nutrition. The Invention to Venture workshops introduce the basics of technology entrepreneurship and are targeted to students, faculty and members of the local community. The Advanced Invention to Venture workshops provide in-depth training for ventures on the brink of commercializing their activities. The BMEidea competition recognizes and rewards students for their biomedical inventions. Finally, the I-Show competition, in partnership with ASME, invites students to submit a product/service plan and winners participate in a public pitch competition at the ASME annual conference.

Tools Track: Papers (FAR EAST); Moderator: Courtney Price, VentureQuest

Thurs 2C1 Malu Roldan, San Jose State University

Innovation Conversations via Social Media

In their book *Innovation*, Lester and Piore (2004) discuss how innovations emerge from interpretive conversations among customers, designers, marketers, and others. Companies have joined industry consortia and set up company-owned stores (even an entire resort in one case) to encourage these conversations. On the online front, social media is emerging as a significant platform for generating such conversations. For example, blogs, podcasts, and forum conversations are shaping the direction of TV shows and other products of mainstream media organizations. Furthermore, sites like Incuby.com and Second Life are emerging as virtual platforms for testing and promoting innovation ideas. This paper will discuss how social media sites are serving as platforms for these conversations, present findings from a pilot application of these tools in an information technology innovation course, and tips for bringing these tools into the classroom.

Thurs 2C2 Clifton Kussmaul, Muhlenberg College

Supporting Teams with Open Source Software Tools

Student teams and projects present many challenges. For example, students need to know what to do, and benefit from seeing "real world" tools and processes. Teachers need to assess progress and identify potential problems. Some of these challenges can be addressed using open source software tools. These tools are free and have often been adapted to a variety of settings, and faculty and students with software development skills can examine and enhance the tools. In this session, we describe the experiences we and others have had in academia and industry using such tools, including task trackers, version control systems, wikis, and integrated systems such as Trac and Moodle. We describe challenges, lessons learned, and recommendations for selecting and introducing such tools effectively. We emphasize the benefits of choosing a small number of flexible tools, introducing them incrementally, and focusing on people and processes.

Thurs 2C3 Terri Barreiro, College of St. Benedict and St John's University
EduCases: An Innovative Method for Teaching Entrepreneurship to the Millennial Student

This session will present EduCases, an innovative tool for entrepreneurship educators. EduCases are designed to appeal to millennial students who have grown up in a multi-media world. Millennials tend to learn best in team situations, and they are comfortable with multi-tasking. EduCases are designed to integrate video and written material in a way that appeals to the millennial student. EduCases are ideally used as a tool to introduce the basic concepts of entrepreneurship (opportunity recognition, feasibility analysis, marketing, operations, finance), and are appropriate for students with little or no management background.

Product Development Track: Papers (STATE); Moderator: Lisa Getzler-Linn, Lehigh University

Thurs 2D1 Derek Ruth and Jim Wolff, Wichita State University
The Influence of Individual, Group and Disclosure Characteristics in Assessing the Commercial Patent

A main challenge facing technology transfer programs is to assess the commercial potential of a technology disclosure before significant resources are invested. Using twelve real technology disclosures from a variety of disciplines and twenty-one raters, this paper develops and refines an instrument to assess a technology's commercial potential. The technologies were first evaluated on an individual basis (two per rater) and then again on a group basis (five per group). The instrument assesses five dimensions of each technology: market, technology, competitive, value creation, and venture attributes. Using factor analysis and other techniques, we evaluate and refine the dimensions and individual items of the instrument. Using the refined instrument, we explore how the characteristics of the raters and the technology disclosures affect the ultimate ratings of the technologies. In particular, we focus on inter-rater agreement as well as how preliminary, individual ratings affect the final group ratings.

Thurs 2D2 John M. Wilkes and Jose Gomez-Marquez, Worcester Polytechnic University
Evolution of an NCIIA-sponsored Course into a Health and Space R&D Unit

This is the story of how a course at WPI, established with an NCIIA grant, resulted in a patent for AEROVAX, and the multiple student team effort to develop a system to harvest liquid oxygen in low Earth orbit. Key to the LOX story is a 1976 WPI graduate and inventor who came to WPI to speak in the class about the space idea. He has now applied for a patent. Aerovax is a health care delivery device for mass immunizations devised by a past member of the class. All WPI students have to complete a (three-course equivalent) Society-Technology project as juniors. The paper describes how this required project was linked to the Aerovax and LOX innovations and has resulted in experiments at WPI on the ideal way to form teams in an R and D environment.

Creativity and Product Development Track: Workshop (CONTINENTAL)

Thurs 2E John-David Yoder and Robert Kleine, Ohio Northern University; Jonathan Weaver, University of Detroit Mercy; and Susan Kleine, Bowling Green State University, *Creativity Across the Product Development Process*

Creativity Across the Product Development Process

Certainly creativity is not a new concept at NCIIA. Recent annual meetings have included excellent workshops in this area. The goal of this workshop will be to focus on the complete product development process and give examples, tools, and experiences in employing creativity tools through this process. The session will be lead by a team of two engineer faculty with industry experience in product development and two marketing faculty with expertise in consumer marketing. This should provide a significant contrast to previous workshops in which the emphasis tended to be creativity in engineering concept generation, or in problem finding, etc (that is, in one stage of the product development process rather than across it).

12:30-2:30 Luncheon session with featured speaker Sir Ken Robinson (REGENCY BALLROOM)

National education systems worldwide are being reformed to meet the challenges of the 21st Century. As a respected adviser to governments in Europe, Asia and the United States, Sir Ken Robinson argues that many countries are pushing reforms in the wrong direction. Drawing from his groundbreaking book, *Out of Our Minds: Learning to Be Creative*, he explains why too many are locked into a model of education shaped by the Industrial Revolution and a narrow idea of academic ability. Urging schools and colleges everywhere to urgently rethink basic assumptions about intelligence and achievement, Sir Ken focuses on the vital questions: Why is it essential to promote creativity? What's the problem? Why do so many adults think they're not creative? Most children are buzzing with ideas. What happens to them as they grow up? What should be done? Is everyone creative or just a select few? Can creativity be developed? If so, how? In exploring these questions, Sir Ken argues for radical changes in how we educate all

students to meet the extraordinary challenges of living and working in the 21st century.

2:30-
3:30

Social Entrepreneurship Curriculum Track: Papers (CONTINENTAL); Moderator:
Susannah Howe, Smith College

Thurs
3A1 Burt Swersey, Rensselaer Polytechnic University

Affordable Design

Students have successfully designed products for "the other 90%" in three design courses. They have been enthusiastic about working on projects that have the potential to improve the lives of those who are most in need. Several of their designs have potential to become real products.

Thurs
3A2 Nassif Rayess, Jonathan Weaver and Leo Hanifin, University of Detroit Mercy

Interdisciplinary Design, Entrepreneurship and Service (IDEAS) Course

The Interdisciplinary Design, Entrepreneurship and Service (IDEAS) course brings together students and faculty from the colleges of Architecture, Business, Engineering and Liberal Arts to work on socially beneficial projects. The structure of the course, the successes and difficulties, the type of projects, and the feedback from the students and faculty involved and external reviewers will be discussed. The development of this course is sponsored by the NCIIA.

Policy and Ethics in Entrepreneurship Education Track: Papers (STATE);
Moderator: Liz Kisenwether, The Pennsylvania State University

Thurs
3B1 Richard Popp and Paul G. Yock, Stanford University School of Medicine

Ethical Issues in Invention, Innovation, and Entrepreneurship

Ethics and Policy is one of three major teaching divisions within the Stanford University Biodesign Program, along with Invention/Research and Technology Transfer. We have addressed our obligation to educate our students about the ethical implications of developing technologies by course work and by creating case studies with defined scenarios that encourage students to consider real-life situations and respond to challenging ethical dilemmas. Personal ethics surrounding working in interdisciplinary teams in new environments are many and varied. Ethical issues in medical innovation have special legal implications. Conflict of interest is much discussed in the media and is a topic that students need to understand in the educational context, but they also need to develop sensitivity to conflict of interest for their future careers. This talk will describe the ways in which Biodesign approaches ethics within the biomedical technology innovation setting.

Thurs
3B2 George P. Jones, Rice University

A Model for Teaching Business Ethics to Graduate-Level Science Students

Graduate-level science students entering occupations in industry and government will become involved in business and policy decisions, often with ethical implications. A graduate-level course at Rice University, "Science, Policy, and Ethics," combines the teaching of ethical issues with science- and technology-based case examples to build awareness of business ethics issues and their impact. The course emphasizes fact-based decision-making and examines how organizational culture can impede ethical behavior and decisions in business. The presenter will share the model used to teach business ethics issues and one of the cases used in the course. The model and case will illustrate many key points used to build awareness of the ethical implications of science-related decisions and policies in business.

Innovative Educational Models Track: Panel (OAK)

Thurs 3C Joyce Ward, National Inventors Hall of Fame Foundation; Marcian (Ted) Hoff, National Inventors Hall of Fame inductee; Corey Centen and Nilesch Patel, Atreo Medical, Inc.; John Calvert, Inventor Assistance Program

Inventing Today. Changing Tomorrow.

The director of the Collegiate Innovators Competition (CIC), along with a panel of guests, will discuss the role of the program in encouraging and enabling students to cultivate original ideas through invention and the act of inventing. "Where Are They Now?" success stories of competition participants will be used as case studies to encourage, motivate, and inspire conference participants in their quest to move from the drawing board to production to the market place. The Collegiate Inventors competition is an annual program of the National Inventors Hall of Fame Foundation and is designed to recognize and encourage graduate and undergraduate students in their quest to invent and develop new technologies and scientific breakthroughs. Entries are judged on originality, inventiveness, and potential value to society (social, environmental, and economic).

Thurs
3D1

Derek Cabrera and Laura Colosi, ThinkWorks

Thinking Skills Unplugged: New Twist on the Classic Wooden Blocks Encourages the Development of Great Thinkers from Preschoolers to Global Corporate Executives

Can you imagine a second grader and a scientist using the same toy to help them think better? Building off of their plenary talk and activities, Drs. Cabrera and Colosi offer a workshop on the four essential thinking patterns that underlie human thinking and the design of ThinkBlocks—the toy that teaches thinking skills to preschoolers and PhDs. This session will engage participants in a deeper review of the four patterns of thinking that can be used to develop analytical and critical thinking, creativity, prosocial or teamwork thinking, and emotional intelligence. ThinkBlocks are for business leaders, scientists, inventors, parents, teachers, and students, and can be used in any setting.

3:30-
4:30

Poster session

4:30

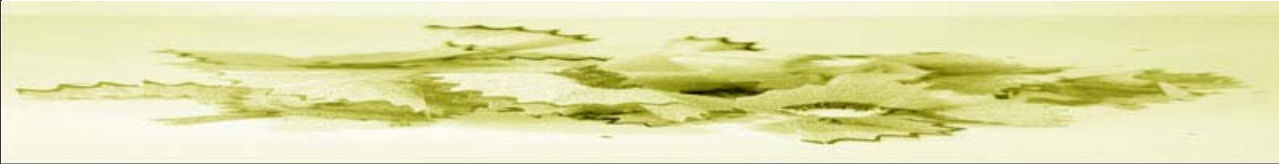
GROUP EXCURSIONS IN DALLAS

6:30

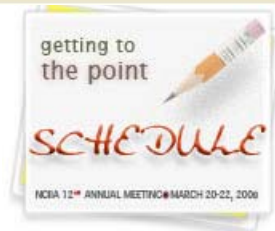
DINNER IN SMALL GROUPS

Thursday night is scheduled as a night out on town with fellow attendees and should provide an excellent networking opportunity away from the conference spotlight!

On to Friday >>



Getting to the point: *ideas, process, products*



FRIDAY

7:00-5:00	CONFERENCE REGISTRATION
8:00-9:00	BREAKFAST PLENARY (REGENCY BALLROOM)
9:00-4:00	STUDENT TRACK
9:00-10:30	BREAKOUT 1

Intellectual Property Track: Papers (CONTINENTAL); Moderator: Abi Barrow, Massachusetts Technology Transfer Center

- Fri 1A1 Martin High, Oklahoma State University
Joint Inventorship and Ownership in Student Team Projects
During the last several NCIIA meetings, there has been much discussion concerning the rights of students in their inventions that result from a team effort. This paper will attempt to provide a tutorial for both faculty and students in the legal aspects of joint inventorship and ownership of patentable intellectual property. Unfortunately, this area of patent law is one of the "muddiest," but there are some basic rules that can be applied to help head off larger problems.
- Fri 1A2 Jon Down, University of Portland, and John Turner, Oregon State University
University Technology Spin-Offs: Do Entrepreneurship Academic Programs and Centers Impact Success?
The relationship between university Technology Transfer Offices and other university stakeholders has been problematic. The behavior of TTO directors is often constrained by the monitoring and governance mechanisms put in place to ensure actions conform to the risk-averse profile of most university institutions and the need to secure short-term funding for operations via royalty payments from established technology companies (rather than trading technology for a piece of a high risk start-up). Our research examines the link between spin-off success and the presence of entrepreneurship programs (or center) on campus. In the paper we will report the significance of this correlation using AUTM data for spin-off success and NCEC and Entrepreneur Magazine data to operationalize entrepreneurship presence. We will also report on two approaches for driving this partnership in order to bring significant benefits to the university community.
- Fri 1A3 Jim Wolff and Derek Ruth, Wichita State University
Technology Commercialization as a Classroom Laboratory Exercise – Structuring the Unstructured
Challenges arise when structuring the unstructured process of evaluating intellectual property (IP) for commercial potential. This paper describes and discusses an effort to create venture start-ups around university technology. The initiative encompasses three phases, the first two of which are the primary focus of this paper. Phase one is a managing emerging technologies course in which student teams are tasked with evaluating the commercializability of multiple technologies from university IP. The teams narrow the technologies significantly to those with greatest potential. The surviving technologies and documentation are inputs for phase two. In phase two, student interns are tasked with an in-depth analysis of commercial potential and to build a thorough business case for the surviving technologies. In phase three, Executive MBA consulting teams are tasked with developing a venture plan and strategy.

Biomedical Innovation Track: Papers (STATE); Moderator: Maria Oden, Rice University

- Fri 1B1 Evan T. Edwards, | Solutions |, and Larry G. Richards, University of Virginia
Utilizing Human Factors Engineering to Develop Biomedical Innovation
The utilization of Human Factors Engineering is critical for biomedical device design in order to create safe and effective products for patients, physicians, caregivers and the like. Designing for the end user can also identify and potentially eliminate use-related hazards early in the design process. This will not only create a safer product, but also save the manufacturer considerable time and money that may

have been needed in the future to correct flaws or errors identified once the product is on the market. As the need for patient-focused technologies increases, so does the need for guidance as to how to develop systems and devices utilizing HFE. This paper will highlight the key aspects of incorporating Human Factors Engineering into the design of biomedical devices including key concepts, methods and techniques used according to industry and FDA standards.

Fri 1B2 Bryan Laffitte, North Carolina State University

Visual Thinking as a Tool for Innovative Product Development in Biomedical Research

This interactive workshop results from methods developed in a recent NIH-sponsored project, involving colleagues from several academic disciplines, to develop innovative tools for minimally invasive heart surgery. The experience of working with a large group of diverse experts on complex problems taught us the limitations of verbal communication in regard to problem-solving, and its tendency to allow meetings to devolve into extended bouts of arm-waving. By employing whiteboard brain-storming with an industrial designer acting as a visual facilitator by sketching perspective views of concepts as they are discussed, the collective knowledge of the team becomes much more easily leveraged, allowing all of the members to clarify, challenge, and present alternatives concepts on the spot. Workshop participants will experience ninety minutes of interactive instruction in concept sketching, tailored for any experience level, and emerge with both immediately applicable skills and the confidence to expand them.

Fri 1B3 Mary Besterfield-Sacre, University of Pittsburgh; Angela Shartrand and Phil Weilerstein, NCIIA

Stimulating Innovative Design in Biomedical Engineering: The BMEidea Competition

Innovative design is a critical aspect of translating emerging research in the biomedical field into real-life applications (e.g., medical devices and products used in patient care). To stimulate greater innovation in this emerging field, NCIIA helped launch an initiative that led to the creation of the BMEidea Competition. This session will describe the primary goals of the competition, its structure, and key outcomes (e.g., winners, commercial outcomes, challenges faced). We will also describe our efforts to assess team-based design processes and create tools to better identify the elements of high quality innovative design.

Partnerships Track: Papers (OAK)

Fri 1C1 Christine Kurihara, John H. Linehan, and Paul G. Yock, Stanford University

International Initiatives of Stanford University Biodesign Program

The President of Stanford recently challenged the university community to explore global partnerships in order to help meet the world's problems. In response, Stanford Biodesign has two initiatives to train biomedical technology innovation leaders. The partnerships have recently been finalized, both with potentially powerful outcomes. In Mexico we are partnering with faculty at ITESM, training them in the Biodesign process so that they may start a similar program there as a gateway to Latin America. Already, through a pilot, we have brought one faculty member and one medical student to Biodesign for six months. In India, working with the government, we are establishing an international fellowship that will bring four fellows to Stanford for half of a two-year fellowship. In both instances the goal is to train young engineers and physicians to identify major health needs and develop solutions that are cost-effective and widely deployable across a broad socio-economic spectrum.

Fri 1C2 Diane Austin, University of Arizona; Arturo Frayre and Irma Fragoso, Instituto Tecnológico de Nogales

Exploring Interdisciplinary Bi-national Partnerships for Innovation and Implementation

This paper/presentation describes an interdisciplinary, bi-national partnership between graduate and undergraduate students from the University of Arizona and the Instituto Tecnológico de Nogales (Sonora, Mexico) that can serve as a model for other educational institutions. UA social science students join with ITN engineering and business students in unique learning spaces within courses, internships, and social service. The paper illustrates the model through a project to design and introduce alternative technologies in Nogales. The project has included assessment, demonstration, education, and training activities to assess approaches for reducing emissions generated by the use of wood and other combustible materials as fuel for household-level heating and cooking. The team has focused on: (1) reducing the impact of household-level heating and cooking by promoting the use of less-polluting technologies, and (2) reducing the need for household heating by promoting more thermally efficient home construction technologies.

Fri 1C3 Khanjan Mehta, The Pennsylvania State University

Lessons from the Field: Setting Up a Windmill-based Business in Rural Kenya

Students from various disciplines at Penn State University, University of Nairobi and Kochia Development Group (a community-based organization in Kenya) are working together to develop a robust and sustainable windmill-based power system for rural communities in

western Kenya. The objective is to build the system in Kenya using Kenyan resources and set up a profit-driven business around it. The model developed for this project emphasizes building strong relationships between all the involved parties and incorporates engineering design, community development, entrepreneurship and business development, public policy studies, curricular development, etc. to make the project truly sustainable. The first windmill was installed in June 2007 and efforts are underway to scale up the operation. One of the major challenges on this project has been inculcating "business sense" in the communities we have been working with.

Innovative Educational Models Track: Papers (FAR EAST); Moderator: Rodney Hill, Texas A & M University

Fri 1D1 Scott Shim, Purdue University

Creativity Under Pressure

48:2 design is an intensive weekend workshop held at Purdue University every year with a support from diverse corporations and manufacturers. As a part of the senior seminar class, the workshop emphasized a couple of real world circumstances: working under pressure and managing design projects. Multiple teams are made up of eight industrial design students, seniors as project managers and undergrads (juniors and sophomores) as designers. All students are assigned to one of the teams through a random draw. Each team is given forty-eight hours to provide creative concepts and solutions to a design project assigned by the sponsor. The workshop begins on Friday evening at 6:00 and is completed by 6:00 PM on Sunday. Once a brief overview of the project is presented to the students, project managers are in full control.

Fri 1D2 Benjamin Castaneda and Fanny Lys Casado, University of Rochester; Jesus Carpio and Eduardo Ismodes Cascon, Pontificia Universidad Católica del Perú

Generating knowledge in Developing Countries

Innovation through Research and Development (R&D) is critical for the growth of nations. Some countries have recognized the critical role universities play in this process and have developed mechanisms to encourage it. However, in a country like Peru, universities are concerned with knowledge transfer rather than creation. To change this inertia, we have created a system called e-Quipu to support generation of innovative ideas by diverse interest groups formed in the Pontificia Universidad Católica del Perú. E-Quipu provides a framework to pursue interests while developing skills and capabilities such as teamwork, oral and written communications and project development. In addition, the system has contributed to form international teams that collaborate in a virtual environment. E-Quipu provides adequate conditions to contribute to society through publications, national projects, businesses, patents and specialists.

Fri 1D3 Terri Barreiro, College of St. Benedict and St. John's University

Entrepreneurship Scholars at CSB/SJU: Four years, Four Trips to China, Six New Ventures Launched

This paper will describe the development and implementation of an Entrepreneurship Scholars (E-Scholars) program at the College of St. Benedict and St. John's University (CSB/SJU). E-Scholars is a two-year, interdisciplinary, hands-on program. One important focus of the program is its emphasis on opportunity recognition and the launching of new ventures to seize opportunities. To date, six student-run ventures have been launched by E-Scholars. The program also focuses on building tolerance for ambiguity and gaining awareness of global issues. Both of these areas are addressed by having E-scholars participate in a business trip to China.

10:30-11 Break and soapbox sessions

11-12:30 **BREAKOUT 2**

Intellectual Property Track: Panel (FAR EAST)

Fri 2A Lisa Getzler-Linn, Lehigh University; McRae Banks, Worcester Polytechnic Institute; Liz Kisenwether, Pennsylvania State University; Keith Stanfill, University of Florida; Richard Schultz, University of North Dakota; Jim Baker, Michigan Technological University; Paul Hudnut and Gregory Graff, Colorado State University

Intellectual Property Policies for Corporate-sponsored and Entrepreneurial Students

Many institutions of higher learning have Intellectual Property (IP) policies that apply to faculty and graduate students as well as established norms for contractual agreements in corporate-sponsored projects. However, the widespread popularity of entrepreneurship programs has added to the complicated issues surrounding IP on college campuses. Some institutions have no policies in place for undergraduates. Existing policies can be problematic when undergraduate project teams develop valuable IP, either for student driven entrepreneurial projects or those sponsored by external companies. The difference between inventorship and ownership, student beliefs about what they own, the perceived value of faculty input and how financial support can affect IP ownership will be some of the topics discussed, along with best practices. Many institutions

continue to struggle in clarifying and developing IP policies and strategies suitable for these increasingly popular project courses.

Biomedical Innovation Track: Panel (CONTINENTAL)

Fri 2B Benjamin S. Kelley, Baylor University; Jay Goldberg and Lars Olson, Marquette University; Robert Malkin, Duke University; and Roger Gonzalez, Steve Ayers and David Dittenber, LeTourneau University

Teaching, Service, and Innovation-Oriented Biomedical Engineering Design

Collegiate undergraduate biomedical engineering continues to emerge and mature as a discipline that provides a sound grounding in engineering fundamentals and with the promise of advancing health solutions around the world. As volunteerism and service learning within engineering programs has grown, so has the diversity of approaches for undergraduate biomedical engineering design projects to be associated with underserved populations. A project that works toward meeting the needs of developing countries is the LeTourneau Engineering Global Solutions (LEGS). National student design competitions such as the Biomedical Engineering Innovation, Design, and Entrepreneurship Award (BME-idea), and the Engineering World Health (EWH) Projects That Matter Program, provide students with a showcase for the results of service learning and social entrepreneurship projects. Another vehicle is in-class paper designs projects, containing simplified versions of real-world hands-on scenarios

Partnerships Track: Workshop (OAK)

Fri 2C Joshua Pearce, Clarion University; Ryan Legg, Cornell University; Lonny Grafman, Humboldt State University; and Thomas Colledge, Pennsylvania State University

Leveraging Information Technology, Social Entrepreneurship and Global Collaboration for Sustainable

Currently, those working for a sustainable development all over the world, in a vast array of contexts, are often duplicating efforts. In an era where a rapid transition towards sustainability is needed, such wasted effort is no longer tolerable. This panel will discuss current efforts to overcome this challenge by creating an Open Sustainability Network (OSN) that links relevant individuals, programs, courses, projects, and organizations aimed at sustainable development. The panel discussion will build an understanding of, and collaboration between, relevant online tools. The panel is meant to bridge disciplines to connect and learn from relevant social entrepreneurship, business and product development, service learning, and appropriate technology initiatives to help scale up for more effective impact in teaching, research and practice.

Innovative Educational Models Track: Panel (STATE)

Fri 2D Nancy Clement, Purdue University; Edward J. Coyle, Georgia Institute of Technology; Malu Roldan, San Jose State University, and Khanjan Mehta, Pennsylvania State University

Creating Social Entrepreneurship Networks

To better meet the increasing needs of society at home and abroad, universities across the country have established innovative outreach programs that provide students with basic entrepreneurial concepts and hands-on experiences. These programs create career pathways in many disciplines and offer entrepreneurial approaches to major issues associated with health, environment, poverty, education, and literacy. Whether addressing local or global problems, university programs are providing assistance to non-profit organizations by fostering and participating in social entrepreneurship activities.

12:30- 2:30 OLYMPUS INNOVATION AWARDS LUNCHEON (REGENCY BALLROOM)

2:30- 4:00 Mini-plenaries

Fri 3A *Entrepreneurship Is an Extreme Sport* (CONTINENTAL)
Tina Seelig, Stanford University

How do you teach creativity and entrepreneurship? It certainly isn't by lining students up in rows and columns and giving lectures about innovation. Creativity is taught by giving students the opportunity to stretch their imaginations by asking them to solve problems without a one right answer - problems that seem impossible until you turn them upside down and inside out. In this session I will show examples of projects that were given to students and the amazing and unexpected results they deliver. The students surprise me and themselves every time, leaving them knowing that they can creatively turn any problem into an opportunity.

Fri 3B *Design for the Other 90%* (FAR EAST)

Paul Polak, D-Rev
Polak's focus is on "design for the other 90%"—building technologies that help half of the world's population, the three billion people who live on less than two dollars a day. He points out that "90% of designers work for the richest 10% of the world's customers." This is a "silly ratio," and one that Polak has dedicated his life to changing. He's been working for more than twenty years on International

Development Enterprises, looking to assist the world's small farmers, people who farm an acre or less, living on two dollars or less a day.

4-4:30 Break and soapbox sessions

4:30-6:00 BREAKOUT 4

Social Entrepreneurship Track: Papers (FAR EAST); Moderator: Edward Coyle, Georgia Institute of Technology

Fri 4A1 Lisa Reed and Thomas Ngo, University of Portland

Productive Uses of Renewable Energy in Rural Nicaragua: How E-Scholars Learn and Teach Entrepreneurs

The University of Portland's award-winning E-Scholars Program has always included an international entrepreneurship component. However, with more students requesting social/sustainable entrepreneurship experiences, an additional program option was designed with Green Empowerment, an international NGO based in Portland. In spring 2007, four E-Scholars were selected to begin a specially designed NGO training program with Green Empowerment staff to learn how innovation and entrepreneurship can impact a community. Specifically, the students evaluated the most productive uses for a new micro-hydro system being installed in Malacatoya, Nicaragua. During extensive interviews with the community, NGOs and others, the E-Scholars are responding to the village's interest in increasing its coffee output for export by helping to improve its coffee de-pulping process. Our panel will share the process for developing similar projects. If we can coordinate two other schools with social entrepreneurship projects, they will join us.

Fri 4A2 Nancy Clement, Purdue University, and Edward J. Coyle, Georgia Institute of Technology

The Social Entrepreneurship Initiative

This paper describes the Social Entrepreneurship Initiative (SEI) at Purdue University. It is an expansion of the EPICS Entrepreneurship Initiative (EEI) that has taught students in the Engineering Projects in Community Service (EPICS) program about social entrepreneurship via their engineering design projects for local non-profit organizations. Other socially focused design projects have expressed interest in participating in these product-focused activities. The SEI has thus been designed to support all programs that emphasize and mentor students who are involved in the design and development of products that address the needs of local communities or global society. Important functions of the Social Entrepreneurship Initiative include the creation and support of a network of students, faculty, and programs focused on social entrepreneurship. This is accomplished by providing a venue for students to come together and present ideas for socially beneficial products ideas.

Fri 4A3 Dan Buckenmeyer, James Davis, and Melissa Paulsen, University of Notre Dame

Building an Impactful MicroEntrepreneurship Program

In order to realize the potential of microenterprise and social entrepreneurship as a viable means of poverty reduction in the United States, the University of Notre Dame commenced a two-seminar course through the Gigot Center for Entrepreneurial Studies in the Mendoza College of Business entitled "Microenterprise: The Road to Equality." This course is available to undergraduate and graduate students alike and spans all colleges at the University of Notre Dame. The mission of this coursework is to promote the creation of sustainable communities by equipping college students with adequate training to make lasting contributions to the creation or expansion of select small businesses. By expanding this program across schools nationwide we believe the impact of this program can be amplified to a world-changing scale.

Institutionalization of Entrepreneurship Education Track: Workshop (CONTINENTAL)

Fri 4B Michael Lehman, Juniata College

Space + Capital + Support + Community = An Entrepreneur Program

Space. Capital. Support. Community. These words represent the four pillars upon which an effective entrepreneurship program can be built. The Juniata College Center for Entrepreneurial Leadership (JCEL) focused on developing offerings in each of these four distinct yet interrelated, areas, creating an innovative program for a college of 1,400 students and 100 faculty members situated in a rural community of 8,000 residents. This interactive workshop will allow participants to identify existing, untapped assets in each of these areas, map out ways of integrating initiatives across these areas and lay the framework for more effectively integrating the business of new venture creation into their institutions. The language, experiences and opportunities rooted in entrepreneurship have practical application and exciting potential when applied across disciplines, developing a program based on these four tenets can be an effective approach.

Innovative Teaching Tools Track: Workshop (OAK)

Fri 4C Khanjan Mehta, Pennsylvania State University

The Sensor and Controller System Integration course exploits the power of virtual instrumentation to promote lab automation and accelerate the idea evaluation and product development processes. This is an intensive laboratory-based course that covers interfacing computers of various form factors to a wide array of sensors, actuators, instruments and sub-systems. Essential principles of engineering and computer science are covered in the course and it is open to undergraduate, graduate and professional students from all disciplines across campus. Hands-on technical sessions are accompanied by workshops on entrepreneurship, intrapreneurship, innovative thinking, IP and patenting, venture funding, etc. The course enables students to rapidly metamorphose their ideas to proof-of-concept systems for high-tech and low-tech applications using commercial-off-the-shelf (COTS) components. Students are strongly encouraged to develop high-tech high-impact products for people at the bottom of the pyramid for their course project.
Course website: www.cedcc.psu.edu/scsi

Entrepreneurship in Computer Science: Panel (STATE)

Fri 4D Richard DeMartino, Rochester Institute of Technology, and Clifton Kussmaul, Muhlenberg College

Innovation and Entrepreneurship Programs in Computer, Information Science, and Digital-Related Disciplines

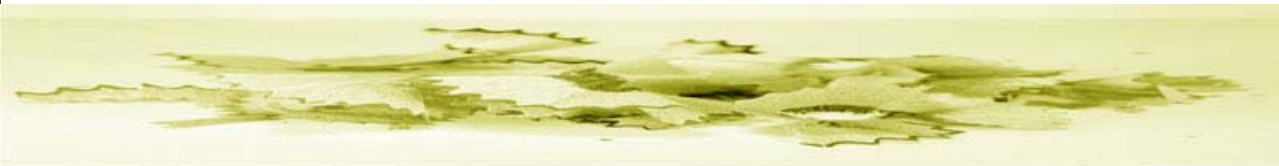
Technology-related innovation and entrepreneurship educational programs have increased in popularity and variety over the past decade. While tech programs have emerged in association with a number of disciplines, the most advanced programs often are associated with colleges of engineering. This proposed panel session explores technology-related innovation and entrepreneurship programs associated with the computer science/software/digital technology discipline. While a number of programs have been developed in this area, such programs are neither as mature nor numerous as those in the engineering domain. This session will include panelists who discuss 1) the challenges associated with the innovation and entrepreneurship programs in the computer science and other digital technology areas and 2) case studies of existing programs. One of those presentations will include a final report of the NCIIA-supported Entrepreneurship in Digital Domains initiative.

6:00 - MARCH MADNESS FOR THE MIND RECEPTION AND E-TEAM EXHIBITION
9:30

Don't miss this much-anticipated annual conference highlight! A select group of some of the nation's finest E-Teams will display their state-of-the-art innovations in a private exhibition for NCIIA conference registrants and guests. Meet these entrepreneurial inventors, see their prototypes, and learn about their ideas and further plans for development and commercialization.

The venue is the Nasher Sculpture Center, which is an easy walk from the conference hotel—just two city blocks—and, if the weather cooperates, the event will be hosted outdoors. As an added bonus, the entire museum will be open for attendees to browse!

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Getting to the point: *ideas, process, products*



2008

SATURDAY

7:00-11:30 CONFERENCE REGISTRATION

8:00-9:00 BREAKFAST (REGENCY BALLROOM)

9:00-10:30 BREAKOUT 1

Product Development Track: Papers (STATE); Moderator: Larry Richards, University of Virginia

Sat 1A1 Larry G. Richards, University of Virginia

Teaching New Product Development and Engineering Entrepreneurship to Virtual Teams via Distance Learning

Creativity and New Product Development has been taught at the University of Virginia since 1995. This course covers all aspects of the product development process: personal and interpersonal issues as well as technical and business concerns. Student teams develop new product ideas, carry them through to a physical prototype, plan for production, and formulate business plans, marketing strategies, and appeals for funding. Guest speakers address Intellectual Property issues, and several successful entrepreneurs visit to describe their experiences. We have previously taught this class in both traditional and distance learning formats, and will offer it in the distance learning mode this fall. In this paper, we discuss the challenges and rewards of teaching engineering entrepreneurship in this environment. The mixed audience (on-campus graduate students and off-site working engineers) brings opportunities for fruitful collaboration, but also special issues and concerns.

Sat 1A2 Frank Skinner, University of North Carolina at Charlotte

Engineering Innovation – Successful Products and Student Employment

Engineering Innovation is a successful, rewarding course when it is linked to your local industries. UNC Charlotte has developed and implemented the Mechanical Innovation course by linking this capstone program with industries seeking innovative products. Student innovators remove the corporate "risk of innovation" and provide low cost experimental designs. Student innovations give industry the opportunity to observe and generate creative abrasion at optimum times. Industry has subsequently hired our student innovators to complete the product development and manufacturing cycle. Thus, Innovation Links have proven themselves effective in conveying technology to industry and employment to the university students.

Global Entrepreneurship Education Track: Papers (CONTINENTAL); Moderator: Walter Bradley, Baylor University

Sat 1B1 Walter Bradley, William Jordan, Anne Grinols, Glenn Blalock, Greg Leman, Cynthia Fry, Baylor University

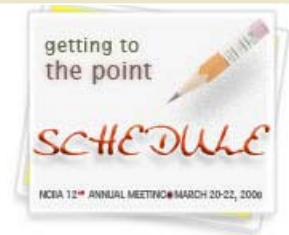
Incorporating Global Entrepreneurship Courses into an Engineering Curriculum

While it is generally acknowledged that engineering students need to know more about business practice, entrepreneurship, and the global economy, there is precious little space in the engineering curriculum for such classes due to engineering accreditation requirements and university core requirements. This presentation will highlight a two-course sequence we are developing at Baylor that will make space for students to be introduced to entrepreneurship and the global economy without adding hours to our current curriculum. In the proposed curriculum change, technical writing and engineering economics will be replaced by a Technical Communications class and a Global Entrepreneurship class. Engineering economics and written and verbal communications will be integrated into this two-course sequence where engineering and business students will develop technology-based business plans for industrial firms. Students can also elect to take these two classes in Shanghai, China in a six-week study abroad program.

Sat 1B2 Gary Palin and Jennifer Anderson, North Carolina State University

Global Social Entrepreneurship Education

The Entrepreneurship Education Initiative (entrepreneurship.ncsu.edu) of NC State University and the University of Aarhus in Denmark (www.au.dk/en) are establishing a strategic alliance for undergraduate



entrepreneurship education. A first step in this is the creation of an undergraduate course that stresses experiential learning via the assessment of technology to the development of business and product prototypes to address global social entrepreneurship. Students will form joint global E-Teams and learn and apply entrepreneurship skills and knowledge. Examples include market analysis, project management, intellectual property, etc. The final course deliverable is a business analysis and prototype application. Other hoped-for outcomes include a greater awareness of global and cultural issues in entrepreneurship, and long-term relationships between the students from the US and Denmark. Lastly, the course will include student and faculty exchanges and the use of experienced entrepreneurs from both countries as mentors.

Sat 1B3 David Gibson and Susan Hull Grasso, University of Vermont

Saving the Earth on Their Way to College

The 2004 special report of the National Academy of Engineering entitled "The Engineer of 2020" raises a question about how best to prepare young people for a rapidly changing, globally interconnected, diverse and multidisciplinary, complex, technologically driven engineering future. This presentation proposes that part of the answer can be found in "global challenges" as an integrative active learning theme for K12 pre-engineering learning experiences in science, technology, engineering and mathematics (STEM) placed within an informal, game-like, online learning platform. The presentation will report on the first two years of "The Global Challenge" at the University of Vermont College of Engineering and Mathematical Sciences, a National Science Foundation funded ITEST project. Observations of the program's first years indicate how a radical re-design of engineering and entrepreneurial education is possible operating independently from organizational change in K12 and higher education systems to attract and support young people into STEM majors and careers.

Opportunity Recognition Track: Workshop (FAR EAST)

Sat 1C Peter Hackbert, University of Illinois at Urbana-Champaign

Opportunity Recognition Scorecard: An Interactive Experiential Exercise

Opportunity recognition is a skill competency that cuts across disciplines and can be developed. New venture entrepreneurs can learn how to discern if an idea can be shaped and turned into a profitable new venture quickly and resourcefully. This workshop presentation demonstrates the time-tested experiential model developed at the Academy for Entrepreneurial Leadership, UIUC to help systematically assess new commercial, technical and social venture opportunities based upon eight dimensions and forty-five crucial success factors. After presenting one-page summaries and a three-minute student presentation innovators will know precisely where judges rank their ventures and how their ideas stack up against others. If the idea comes up short, creative entrepreneurs know exactly where it needs improvement and, if unable to improve it, the idea generator will know how to find a better idea. The exercise takes as little as ninety minutes.

10:30-11 Break and soapbox sessions

11:00-12:30 BREAKOUT 2

International Collaborations Track: Papers (FAR EAST); Moderator: Mark Henderson, Arizona State University

Sat 2A1 Matthew Mehalik, University of Pittsburgh

Product Realization for Global Opportunities: Challenges to International Entrepreneurship and Design

This paper describes some of the unique skills and knowledge University of Pittsburgh and University of Campinas students learned from their collaborative design and entrepreneurship experiences associated with a new NCIIA program grant-supported course, Product Realization for Global Opportunities. The purpose of this effort is to infuse sustainability and product realization into the undergraduate engineering curriculum. We have done this by creating a unique product realization course sequence in which student E-Teams from the University of Pittsburgh and the University at Campinas (UNICAMP) in Brazil developed products for sustainable human development. This paper will report some of the unique learning situations associated with team collaboration, electronic planning and interaction, cultural challenges, and face-to-face interactions with end-users, in addition to how project information can be handed-off during semester transitions. The paper will share observational data as well as performance assessment information.

Sat 2A2 Jose Gomez-Marquez, Massachusetts Institute of Technology

Medical Devices for the Next Four Billion: The IIH Innovation Model for Accelerating High Impact Medical Technology for Global Health

The Innovations in International Health (IIH) program has created a model of innovation for accelerating the development of global health technologies across a wide array of disciplines. The resulting collaboration between researchers, users, and health practitioners has launched a growing portfolio of inventions that are at different stages

of deployment. These include an inhalable vaccine delivery technology, RFID-enhanced disease surveillance systems, and low-cost incubators for rapid tuberculosis detection. IIH enhances sustainability by bridging the gap between the invention, funding, and clinical trial stages of products aimed at the four billion patients not served by current medical technology. This workshop shares some of the products developed as part of IIH as well as new collaborative tools that enhance cross-border product development.

Sat 2A3 Christelle Scharff, Olly Gotel, Pace University; Vidya Kulkarni, University of Delhi, and Long Chrea Neak, Institute of Technology of Cambodia

Keeping Software Engineering Education Up-to-date with Globally Distributed Software Development

This presentation will describe three years of a teaching initiative between Pace University in New York City, the Institute of Technology of Cambodia in Phnom Penh and the University of Delhi in India. The partnership brought together undergraduate and graduate students of the three countries to work on globally distributed software development projects, while also exploring the entrepreneurial opportunities that can arise from such collaboration. Students worked together to engineer small software systems that were specific to the local Cambodian market. ITC students acted as customers. Pace undergraduate students acted as developers. Graduate students of the University of Delhi worked as database sub-contractors. The setup integrated strong mentoring aspects where Pace graduate students acted as mentors for the Pace undergraduate students and auditors on the project quality. This presentation will emphasize the three-year evolution of this innovative software engineering teaching initiative, the lessons learned and the resulting entrepreneurial opportunities.

Academic-Industry Partnerships Track: Workshop (OAK)

Sat 2B Douglas N. Arion, Carthage College, and Matthew Wagner, Center for Advanced Technology and Innovation

Leveraging Late Stage Industrial Intellectual Property for Economic Development and Entrepreneurship

Carthage College and the Center for Advanced Technologies and Innovation (CATI) have developed and implemented a successful model in which students use underutilized, late-stage intellectual property (IP) culled from industrial partners to develop the knowledge, attitudes, and skills of entrepreneurship, and develop products that result in regional economic development. The IP utilized is late-stage—more appropriate for commercialization than more traditional technology transfer activities based on early-stage research activities. The senior business plan projects in the Carthage ScienceWorks program are designed around leveraging CATI IP, and have resulted in several successful startups and new ventures. This workshop will describe a number of the success stories, and provide the background, methodologies, and databases that will allow other NCIIA members to utilize both this approach and the extensive intellectual property library of CATI in their own programs.

Innovation, Entrepreneurship, and Sustainability Track: Papers (CONTINENTAL); Moderator: Malu Roldan, San Jose State University

Sat 2C1 William Barnes and Andrew O'Keefe, Nick McCormick and Chris Lambert, University of Portland

Sustainable Fuels: Lessons from an Algal Biodiesel Student Project

Students and faculty from many disciplines are motivated by the idea of sustainability, but encouraging and creating concrete sustainability-themed projects on campus is challenging. This presentation and paper will focus on the experience of three undergraduate students as they attempt to start a functioning biodiesel production facility that derives from a potentially abundant source: algae. In assessing the economic and biological viability of algal biodiesel it is has become clear that an interdisciplinary approach is ideal. As the project evolves, it is becoming a campus model for projects involving sustainable innovation and environmentally responsible technology. It combines resources from many academic disciplines and draws on expertise from the local business community, including a local biodiesel fuel producer. The presentation and paper will include discussion of the specifics of the algae biodiesel project as well as a section on lessons that can be applied to future projects.

Sat 2C2 Anuradha Basu, Asbjorn Osland, and Michael Solt, San Jose State University

A New Course on Sustainable Entrepreneurship

Entrepreneurship typically focuses on opportunities for creating value for customers/users that will ultimately yield a profit for the founders/investors. Entrepreneurship courses and texts share this focus. Sustainable entrepreneurship takes a slightly different perspective by emphasizing the additional goal of promoting sustainable living and environmental improvement. An emphasis on sustainability and cleantech involves searching for opportunities for more efficient use of natural resources, and harnessing new resources that are more abundant, cheaper to produce, and less harmful to society. From an entrepreneurial perspective, such an emphasis presents opportunities in the form of innovative production processes, cost saving, lower risks, and the potential to tackle the world's critical problems. At present, there is no suitable text on the subject. This paper proposes a framework, learning objectives, course outline, and content for a

"Sustainable Entrepreneurship" course for graduate and undergraduate students.

Sat 2C3 Mariappan Jawaharlal, California State Polytechnic University

Developing and Implementing an Effective and Sustainable Engineering Service Learning Program

Service learning is an effective pedagogical approach that allows students to achieve their curriculum objectives while serving the needs of a community. Service learning provides a meaningful context to address real problems in complex settings rather than simplified problems in isolation. Service learning opportunities actively engage learners in developing new understanding and promoting deeper insight. Well planned service learning projects enhance the academic experience of students by relating academic content and course objectives to real issues in the community. The success of service learning entirely depends on building long-term and sustainable partnerships. Systematic implementation of engineering service learning initiatives began at Cal Poly Pomona four years ago. Since then a number of partnerships have been developed and several projects have been accomplished. This paper discusses all aspects of developing and implementing an effective service learning program at undergraduate institutions.

12:30-
2:00 CLOSING LUNCHEON (REGENCY BALLROOM)

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