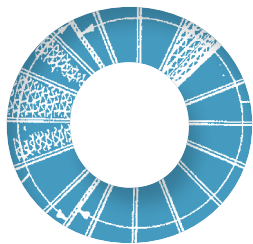


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*Fig. 1*

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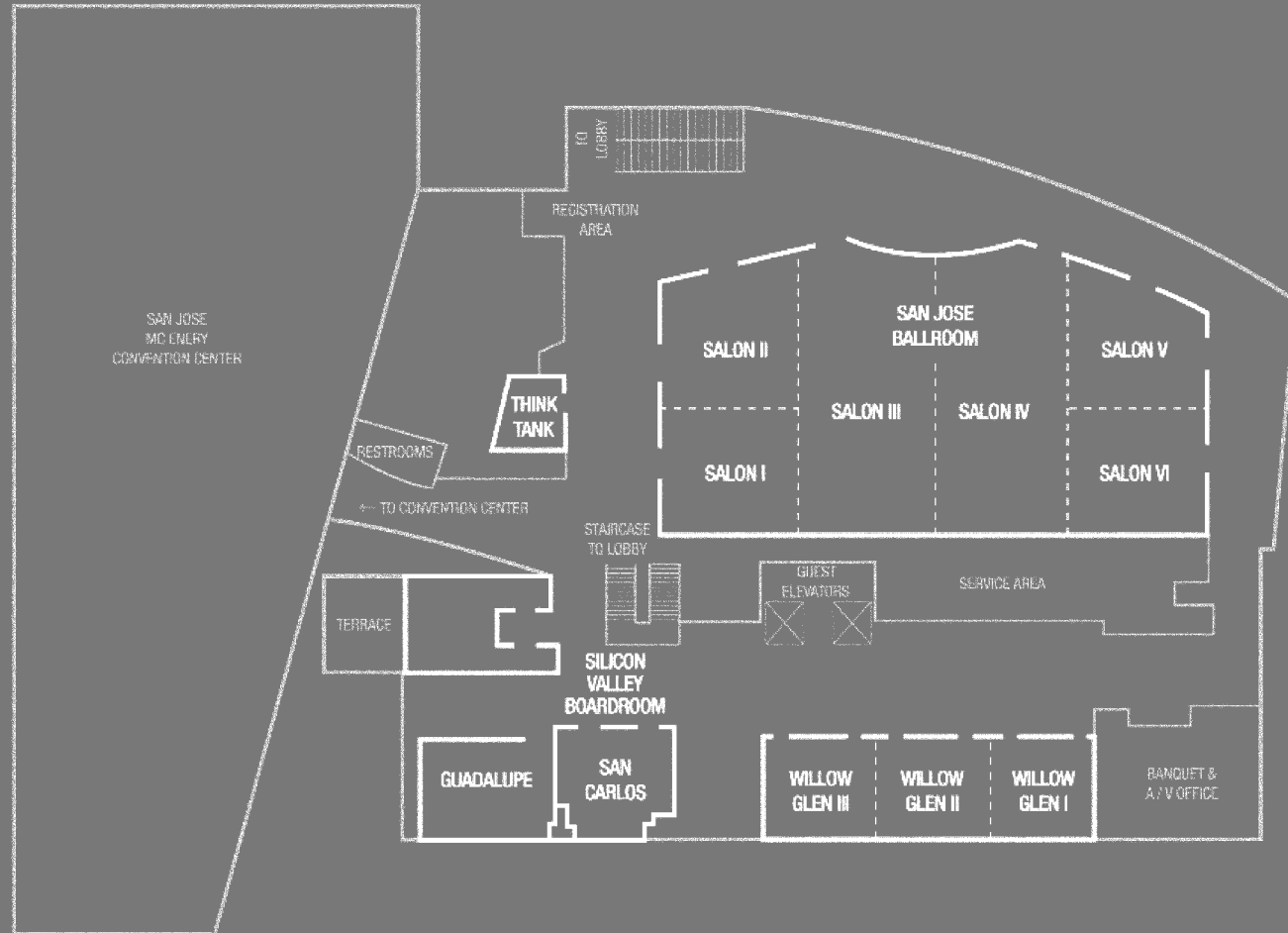
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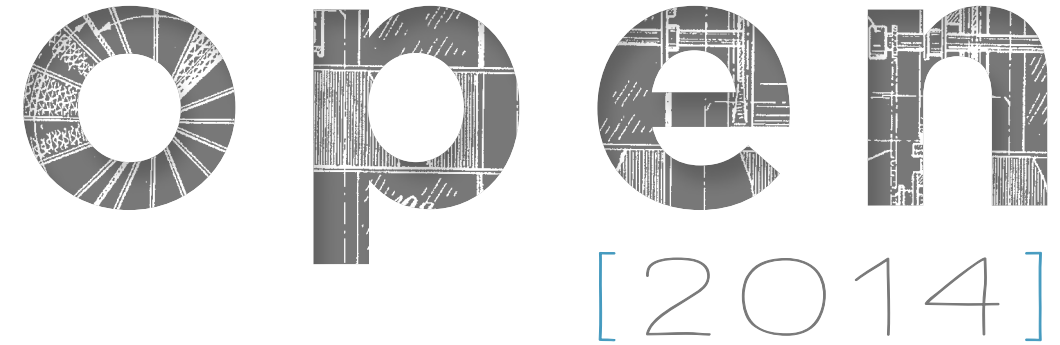
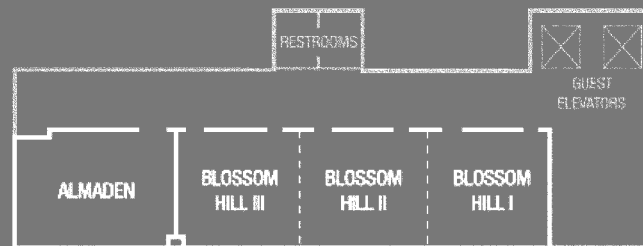
MARCH 21-22, 2014 // SAN JOSE, CALIFORNIA

hotel map

SECOND LEVEL



THIRD LEVEL



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Grand Challenges  
EXPLORATIONS

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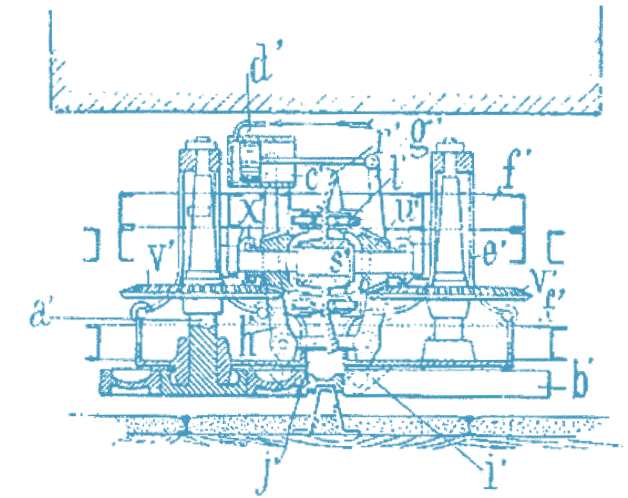
### Phil Weilerstein

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## WELCOME TO open 2014



### Dear Colleagues,

Welcome to San Jose, California and Open 2014, the NCIIA 18th annual conference, brought to you by NCIIA in partnership with the Engineering Pathways Center or Epicenter. We are deeply appreciative to our primary sponsor, The Lemelson Foundation, whose generous ongoing support makes this conference possible. We're thrilled to be here with you! You have a range of inspiring sessions, events and networking opportunities ahead.

Some key program highlights are:

- Inventor and entrepreneur Saul Griffith's keynote speech during the Sustainable Practice Impact Award luncheon on Friday.
- The luncheon plenary on Saturday featuring NPR science correspondent Joe Palca with a panel of successful NCIIA alumni entrepreneurs.
- A series of high-energy Ignite-style presentations during breakfast on Saturday featuring University Innovation Fellows describing student-initiated high-impact programs from around the country.
- Open Meetups, a series of dynamic, interactive conversations on compelling topics. Come stir the pot! Check the schedule on Saturday for the list of Meetups.

- Open Minds at the Tech Museum on Saturday night—a showcase of our best student E-Teams and their new technologies. This year we bring the conference to a close with this perennial favorite!

Throughout the conference you'll have access to a wealth of excellent papers, panels and workshops offering original thinking on compelling topics in learning and leading invention, innovation and entrepreneurship in higher education. The sessions are designed to provide actionable information and valuable connections to take home with you so plan your path with care and take time to meet the many new participants at this year's conference.

Please don't hesitate to call upon any of the NCIIA staff throughout the conference for help, to learn more about NCIIA, or to do anything else we can to make this conference a success for you.

### Phil Weilerstein

*President and CEO*  
National Collegiate Inventors and Innovators Alliance—NCIIA

# CONFERENCE AT A GLANCE

Full schedule is available  
on your mobile device at  
[nciia.org/open/schedule](http://nciia.org/open/schedule).

## FRIDAY, MARCH 21

7:30 am - 5:00 pm: Conference Registration

7:30 am - 8:30 am: Breakfast

8:30 am - 9:30 am: Conference Kickoff

9:30 am - 10:30 am: Breakout Session 1

**Global Impact**  
Papers  
Guadalupe

**Online Education**  
Workshop  
Blossom Hill

**Program Models**  
Papers  
San Carlos

**Biomedical Engineering**  
Papers  
Almaden

**Teaching Tools**  
Workshop  
Willow Glen

**BREAK 10:30 am - 11:00 am**

11:00 am - 12:00 pm: Breakout Session 2

**Resources**  
Panel  
Willow Glen

**Teaching Tools**  
Papers  
Guadalupe

**Competitions**  
Papers  
Almaden

**Online Education**  
Workshop  
Blossom Hill

**Best Practices**  
Panel  
San Carlos

12:00 pm - 2:00 pm: Award Luncheon with Keynote Speaker Saul Griffith

2:00 pm - 3:00 pm: Breakout Session 3

**Program Models**  
Papers  
Guadalupe

**Students as Leaders**  
Panel  
Willow Glen

**Small Colleges**  
Panel  
Blossom Hill

**Online Education**  
Papers  
San Carlos

**Biomedical Engineering**  
Papers  
Almaden

**BREAK 3:00 pm - 3:30 pm**

3:30 pm - 4:30 pm: Breakout Session 4

**Spaces of Invention**  
Papers  
Guadalupe

**Teaching Tools**  
Panel  
Blossom Hill

**Lean Startup**  
Workshop  
Willow Glen

**Extracurricular Activities**  
Papers  
Almaden

**Best Practices**  
Workshop  
San Carlos

4:30 pm - 7:00 pm: Poster Session

7:00 pm - 10:00 pm: Dinner on your own

## SATURDAY, MARCH 22

8 am - 5:00 pm: Conference Registration

8:30 am - 9:30 am: Breakfast with Ignite-style Presentations

9:30 am - 10:30 am: Breakout Session 1

**Lean Startup**  
Papers  
Almaden

**Global Impact**  
Papers  
Guadalupe

**Open Meetup**  
Group  
Discussion  
S.J. Ballroom

**Intellectual Property**  
Panel  
Blossom Hill

**Spaces of Invention**  
Workshop  
San Carlos

**Students as Leaders**  
Panel  
Willow Glen

**BREAK 10:30 am - 11:00 am**

11:00 am - 12:00 pm: Breakout Session 2

**Students as Leaders**  
Panel  
Blossom Hill

**Teaching Tools**  
Papers  
Guadalupe

**Program Models**  
Papers  
Almaden

**Program Models**  
Panel  
Willow Glen

**Open Meetup**  
Group  
Discussion  
S.J. Ballroom

**Research**  
Papers  
San Carlos

12:00 pm - 2:00 pm: Luncheon with NCIIA Alumni Panel and Joe Palca

2:00 pm - 3:00 pm: Breakout Session 3

**Teaching Tools**  
Papers  
Guadalupe

**Biomedical Engineering**  
Papers  
Almaden

**Research**  
Workshop  
Willow Glen

**Students as Leaders**  
Panel  
San Jose Ballroom

**Program Models**  
Workshop  
Blossom Hill

**BREAK 3:00 pm - 3:30 pm**

3:30 pm - 4:30 pm: Breakout Session 4

**Best Practices**  
Workshop  
Willow Glen

**Assessment**  
Panel  
Almaden

**Open Meetup**  
Group  
Discussion  
S.J. Ballroom

**Students as Leaders**  
Papers  
San Carlos

**Lean Startup**  
Workshop  
Blossom Hill

**Program Models**  
Papers  
Guadalupe

6:30 pm - 9:30 pm: Open Minds at the Tech Museum

Full schedule is available on your mobile device at [nciia.org/open/schedule](http://nciia.org/open/schedule).

## FRIDAY 7:30 am – 5:00 pm

**Registration**

Registration desk, Ballroom level

## FRIDAY 7:30 am – 8:30 am

**Breakfast**

San Jose Ballroom

## FRIDAY 8:30 am – 9:30 am

**Conference kickoff**

San Jose Ballroom

**Icebreaker**

## FRIDAY 9:30 am – 10:30 am

**Global Impact**

Guadalupe

9:30 am – 10:30 am

**Papers****USAID and Universities: Catalyzing novel solutions to development challenges**

**Ticora Jones, USAID**

The Development Impact Lab (DIL), headquartered at UC Berkeley, is a USAID-funded academic network leveraging breakthroughs in science, engineering, and economics to improve global development outcomes. DIL is establishing a new discipline of “development engineering” that integrates the design of pro-poor technologies with insights and tools from development economics and other quantitative social sciences. The Lab is partnering with USAID to design and implement activities that focus student innovation on carefully identified social and economic development needs. Examples include: 1) student “capstone” projects addressing development challenges identified by government experts, 2) graduate courses on design for sustainable communities, with practice guided by outside experts, 3) student contests, with private sector mentoring to help students translate ideas into action, and 4) research demonstration projects that engage doctoral students in applied innovation and rigorous impact evaluation, which ensures that new ideas actually generate positive impacts for the poor.

**Can Short-stay International Field Immersion Programs have Real Impact? Fusing Sustainable Development and Entrepreneurship Curricula**

**Todd Watkins, Mark Orrs and Christopher Kauzmann, Lehigh University**

This presentation will focus on the five-year evolution of a short-stay field immersion program in International Social Entrepreneurship, which for the first time integrated with a similar program in sustainable development this year. The program combines a one-semester capstone multidisciplinary team-project course on campus in the US with a ten-day field research component abroad. Short-stay international field study programs, while attractive for flexibility and convenience relative to semester or year long study-abroad options, are notoriously challenging vehicles for generating real social impact. This year’s program was in Kenya, with several projects, a subset of which focused on expanding implementation of (partially NCIIA-funded) water filtration technology. The depth of experience, learning, and outcomes for both students and our Kenyan partners were notably superior this year. The three authors will explore, from faculty and student perspectives, the evolution of the program and substantive structural differences this year that may have improved results.

...continued

**Global Impact**

Guadalupe

9:30 am – 10:30 am

**Papers****Career Pathways for STEM Professionals Interested in Social Value Creation**

**Khanjan Mehta, Pennsylvania State University**

Academic programs, student clubs and professional organizations focused on social innovation and international development are rapidly growing across the United States. While the number of American students and early-stage professionals starting social ventures in the developing world is increasing, there are many others who are interested in sustainable development but just cannot, or do not want to, move overseas and start a new entrepreneurial venture. So what are the career options for these passionate engineers and scientists? Few students and seemingly fewer parents, faculty and career counselors are familiar with non-traditional career paths for STEM professionals that focus on social value creation in the US and abroad. This talk will present findings from an effort to curate career profiles and trajectories of about 50 individuals pursuing careers in diverse organizations including large companies, government, nonprofits, foundations, religious organizations, military, consulting agencies, think tanks and UN agencies.

**Online Education**

Blossom Hill

9:30 am – 10:30 am

**Workshop****Online Learning Workshop: Landscape of opportunities**

**Kurt Thoroughman, Washington University in St. Louis**

**Laurie Moore, Stanford University**

The world of online learning has exploded over the past few years. From MOOCs to Just-in-time Online Learning Tools (JOLTS) to flipped classrooms, everyone seems to be talking about how these new tools and approaches can and should be leveraged within colleges and universities. In this workshop, we will explore the range of offerings and discuss how participants are using them to teach engineering, innovation, and entrepreneurship.

**Program Models**

San Carlos

9:30 am – 10:30 am

**Papers****Establishment of the NYC Regional Innovation Network**

**John Blaho, City College of New York**

We have created a highly interactive innovation and entrepreneurship consortium of over 25 leading universities in the New York, New Jersey, Connecticut, and Pennsylvania area that we term the NYC Regional Innovation network. Our goal is to leverage our seasoned expertise in mentoring and training startups and small businesses (or larger businesses interested in creating new divisions) in the customer discovery process. We emphasize an experiential learning process combined with an inverted classroom approach which aligns the companies’ value propositions with each of their customer segments. Our process enables companies to scale their commercialization model into a sustainable and repeatable business. In the long term, we hope to provide innovators throughout the U.S. with a structured portal for access to the unique NYC-regional combination of world-class universities, venture capital investment resources, and the nation’s fastest growing technology startup ecosystem.

**Entrepreneurship in Southeastern North Carolina: The partnership that works**

**Len Holmes, Floyd Inman and Michael Menefee,**

**University of North Carolina at Pembroke**

The Thomas Family Center for Entrepreneurship of the University of North Carolina at Pembroke with funding from the NCIIA has created a flexible entrepreneurship program available to all undergraduate and MBA students. The new program focuses on transforming ideas into businesses, as well as protection of intellectual property. To bring real-world experience into the program, there is collaboration with the UNCP Biotechnology Center in the development of a new biological control product. Additionally, NCIIA seed funding has supplied inertia for the fall 2013 appointment of a graduate student from the School of Business to complete a marketing study aimed at sales and distribution of the developed product. The product, Brave-Guard™ Beneficial Microworms, eliminates agricultural insect pests in an environmentally friendly way without the use of chemical insecticides. At present, Brave-Guard™ is being used in several regional field tests.



**Biomedical Engineering****Almaden**

9:30 am - 10:30 am

**Papers****Transitioning Projects Between Student Teams****Cameron Jones, Johns Hopkins University**

The Center for Bioengineering, Innovation and Design (CBID) program at Johns Hopkins University is directing undergraduate and Master's level students in core principles of the needs-based innovation model. In a brief one-year period, students develop highly innovative products that have traditionally attracted much interest and various levels of follow-on funding. Oftentimes these projects are passed along from previous teams as students graduate and leave the university. While a transition between project managers is not uncommon in business, such a shift at the nascent stage of innovation invites new challenges. These projects, often just a year or two old, are very much still evolutionary: prototypes, intellectual property, and business models are continually adapting with new data and fresh ideas. In this paper we discuss many of the issues that may arise as projects undergo team turnover, offer some recommendations to mitigate these challenges, and present an illustrative case study.

**Teaching Innovation and Entrepreneurship: A multidisciplinary approach****John Langell, University of Utah**

Impactful innovation programs require a diverse skillset beyond the capabilities of traditional academic departmental teaching models. Teaching successful medical technology innovation to students is optimized through an immersive experience in the relevant clinical, engineering, business and legal disciplines. This interdisciplinary model is conceptually sound but difficult to implement. At the University of Utah we have created a benchmark graduate program in medical technology innovation and entrepreneurship. Faculty from bioengineering and medicine created a Master of Bioengineering Graduate track called Bioinnovate, co-designed and co-taught by engineering faculty and physicians with the assistance of Business and Law faculty who provide core content and track electives in entrepreneurship and intellectual property. Our program is composed of medical students, surgical residents, engineering students and MBA students. Based on standardized survey data, our collaborative teaching program offers superior entrepreneurship education than traditional programs.

**Incorporating Entrepreneurship into Science and Engineering Graduate Training through Bioinnovation****Donald Gaver, Tulane University**

Science and engineering graduate education rarely offers the necessary training to fully prepare graduates for careers in non-academic research and leadership positions. Tulane University's IGERT Bioinnovation PhD Program challenges this paradigm through an educational approach that partners science and engineering research with training in entrepreneurship and regulation. Bioinnovation Fellows benefit from an interdisciplinary environment that spans Tulane's Schools of Science & Engineering and of Medicine while they participate in cutting-edge translational doctoral research projects. Fellows also must complete a cadre of advanced science and engineering courses along with several core business and law classes that culminate in the International Business Model Competition. In addition, they participate in a summer-long internship at the FDA to learn the regulatory requirements for bringing a biomedical technology to market. Tulane's Bioinnovation PhD Program strives to prepare the next generation of students to lead the creation of innovative, cost-effective solutions to complex biomedical problems.

**Teaching Tools****Willow Glen**

9:30 am - 10:30 am

**Workshop****Moving Analogies****Joseph Tranquillo, Bucknell University**

Visual, auditory and kinesthetic experiences are the primary ways we can reach our students. With the exception of a small handful of disciplines, however, kinesthetic learning is rarely seen in college classrooms. Moving Analogies bring kinesthetic learning back into the classroom and are designed to open up discussion of an abstract or complex topic. This interactive workshop will introduce moving analogies that target business and entrepreneurial concepts and mindsets. Example exercises will include:

- Organizational alignment using principles of Aikido
- Dynamic nature of markets using a theater improv warmup
- Resource identification using a jazz improv exercise
- Vision statements using a modern dance exercise

Each active exercise has a physical component that is paired with a lesson and further thoughts to consider. Ample time will be reserved for questions and for participants to work on creating their own moving analogies.

**BREAK 10:30 am - 11:00 am****FRIDAY 11:00 am - 12:00 pm****Resources****Willow Glen**

11 am - 12 pm

**Panel****NCIIA Grants and Resources****Joseph Steig, NCIIA**

Learn how to fully leverage NCIIA grants, training and other resources for success on your campus and beyond. This session will provide an update on current and future NCIIA programs, including funding and training for student teams as well as support for faculty educators to create or expand courses and extracurricular programs. We will discuss how NCIIA supports technology invention, innovation, entrepreneurship and helps produce social impact. We will give you an overview of the competitions we run and talk about our venture development services for later-stage student teams.

**Teaching Tools****Guadalupe**

11 am - 12 pm

**Papers****Project-based Learning Kickstart Tips****John Duhring and Kenji Kato, Cogswell Polytechnical College**

Hackathons and meetups have proliferated as useful methods for kick-starting technology projects, so why not embrace them in academic settings? This presentation will examine the benefits derived from these activities and illuminate methods to incorporate them as course kick-off activities. In particular, methods for online brainstorming, project identification and team creation will be examined. Properly managed, these activities can create a healthy environment for students and deserve further experimentation.

**Crowdfunding: Motivations and deterrents for participation in higher education****Elizabeth Gerber, Northwestern University**

Crowdfunding is changing how students get the resources to bring their ideas into existence. With the increasing number of undergraduate students crowdfunding, it is important to understand what motivates and deters participation. To shed light on this new phenomenon, we present a grounded theory of motivation informed by a qualitative study of crowdfunding among young entrepreneurs. We uncover creator motivations, which include raising funds and receiving validation. We also explore deterrents to crowdfunding participation, including follow-through and exposure of intellectual property. Based on these findings, we provide three emergent design principles to inform the design of effective use of crowdfunding in higher education.

...continued

**Teaching Tools****Guadalupe**

11 am - 12 pm

**Papers****Are Business Plans So Bad?****Nathalie Duval-Couetil and Jake Wheadon, Purdue University**

Although the content and methods of teaching entrepreneurship vary among practitioners and institutions, business plan development has historically been among the most commonly used experiential activities in entrepreneurship education. Recently, however, business plans have fallen out of favor in the startup community in favor of lean startup methodologies. These methods emphasize early testing of minimal offerings in order to validate assumptions without creating well-developed business plans. While these methodologies greatly increase the speed of development and reduce risk in many startups, should they be a reason to reject the development of business plans altogether? Despite their weaknesses, business plans may be an effective way for students to learn about many aspects of entrepreneurship. This presentation will discuss the business plan as a pedagogical tool in an effort to persuade educators not to throw the baby out with the bathwater.

**Competitions****Almaden**

11 am - 12 pm

**Papers****Liberal Arts College Venture Competitions—They're Contagious!****Trexler Proffitt, Muhlenberg College**

This paper extends budding research on the spread of venture competitions among liberal arts college campuses. While venture competitions are common at large institutions with specialized business or engineering schools, the liberal arts college campus is a unique and somewhat recent site in which to elicit the entrepreneurial mindset. Quite often one finds: 1) suspicion towards anything related to business or engineering among colleagues in other areas or administrators; 2) limited resources, and 3) little tradition or culture of entrepreneurship as part of the college script among LAC undergraduates. Despite this adverse environment, many faculty at LACs are excited about the co-curricular potential of venture competitions for their high-achieving students. With an expanded dataset and new insights from additional informants, this paper compares and contrasts findings from three liberal arts college innovation challenge competitions. The three Centennial Conference case studies are: Muhlenberg College, Franklin & Marshall College, and Ursinus College.

**Measuring the Quality of Innovative Ideas to Strengthen the Scientific Base for Entrepreneurship Teaching and Research****Richard Price, University of Michigan, Ann Arbor**

This paper describes the results of collaborative research between the 1000 Pitches student competition and a research team at the Institute for Social Research at the University of Michigan to improve the measurement of entrepreneurial ideas. The collaboration has analyzed a database of 4,537 ideas that tracks the growing entrepreneurial interest among Michigan students, improves the psychometric qualities of a measurement instrument to assess the quality of entrepreneurial ideas and holds promise for developing a teaching tool to improve the quality of ideas. The paper reports: 1) patterns of student participation in the competition, 2) results of factor analyses based on sixteen measured dimensions of the entrepreneurial ideas, 3) results of regression analyses using experts' judgments to identify dimensions most important in producing winning ideas, and finally, 4) offers a proposal for the development of a teaching tool to improve the quality of entrepreneurial ideas.

**An Experiential Competition to Increase Startup Survival Rates****Robert Culbertson, Carnegie Mellon University**

Most entrepreneurship competitions today focus on presentation skills, the catchy idea, the unique business model or the rigorous business plan. Record numbers of students are participating. But instead of just creating more startups, what about increasing the survival rate of startups? We propose a new approach, evolved over eleven years of teaching entrepreneurship, which rewards students that show increased skill in decision-making, team building and leadership and a deep understanding of the cash flow numbers. It is not one competition, but bi-weekly competitions that hone each skill. Winners are rewarded and analyzed. Failures are analyzed and encouraged. Teams are reorganized, similar to what startups face in their first two years.

**Online Education****Blossom Hill**

11 am - 12 pm

**Workshop****Online Learning Workshop: Inventing the future****Tina Seelig, Stanford University**

In this interactive session, we will explore where we can and should go from here in developing and integrating online learning tools into college and university education. The sky's the limit as we brainstorm about innovative online tools that should be built and effective ways to use them in the classroom.

**Best Practices****San Carlos**

11 am - 12 pm

**Panel****The Three Rs of Supporting Student Startups That Have "Flipped the Switch": Reality, Relationship, Risk****Lisa Getzler-Linn, Lehigh University****Lada Rasochova, University of California, San Diego****Anita Leffel, University of Texas at San Antonio**

Entrepreneurship programs provide a wide range of resources and support to students starting new ventures, but what that means is varied. Some do it through stand-alone accelerators or the tech transfer office, but many are supporting the invention/commercialization process without an appropriate mechanism. The REALITY is that without a mechanism that clarifies the student entrepreneur's RELATIONSHIP with the university, there is inherent RISK for the student, individual faculty and the university as a whole. However, not many institutions have resolved these issues and often entrepreneurship programs must find procedural back doors and policy work-arounds to accomplish their mission. As a member of the Global Consortium of Entrepreneurship Centers, I interviewed other entrepreneurship center directors on this topic in October; the results will provide the starting point for this discussion. The panel includes entrepreneurship program directors from several NCIIA member institutions.

## FRIDAY 12:00 pm - 2:00 pm

**Luncheon****San Jose Ballroom****Sustainable Practice Impact Award luncheon with keynote speaker Saul Griffith****Saul Griffith, Otherlab**

This luncheon will include the presentation of the Sustainable Practice Impact Award, which recognizes companies or individuals who have demonstrated outstanding achievement in developing clean technologies, implementing sustainable practices in their businesses or providing exceptional educational opportunities to university students. The award reflects The Lemelson Foundation and NCIIA's strong commitment to supporting technological innovation that improves the world.

**Saul Griffith is the Founder / Principal Scientist at Otherlab**, where he focuses his work on engineering solutions for energy production and energy efficiency. He has multiple degrees in materials science and mechanical engineering and completed his PhD in Programmable Assembly and Self Replicating machines at MIT. He is founder or co-founder of numerous companies, including Optiopia, Squid Labs, Potenco, Instructables.com, Howtoons and Makani Power. Saul has been awarded numerous awards for invention and was named a MacArthur Fellow in 2007. In 2011 Saul was named a World Economic Forum 'Young Global Leader'. Saul holds multiple patents and patents pending in textiles, optics, nanotechnology, robotics, energy production, manufacturing and smart geometry. Saul co-authors 'Howtoons' with Nick and Ingrid Dragotta - a children's comic book series about building your own science and engineering gadgets. Saul is a technical advisor to *Make* magazine and *Popular Mechanics*, and sits on various advisory boards including Duke Energy and the San Francisco 100% Renewable Energy Taskforce. He rarely wears shoes, is typically found knee-deep in machinery with fists full of tools, and has holes in most of his pockets.

## FRIDAY 2:00 pm – 3:00 pm

**Program Models****Guadalupe**

2 pm – 3 pm

**Papers****Driving a New Campus Culture of Innovation****Lindsay Emery, West Virginia University**

What is an army's strategic plan without its infantry to implement it? It's an idea on a piece of paper with no tangible results, no achievements. Infiltration and reconnaissance efforts contribute to a greater purpose: advancement and long-term success. The Linking Innovation, Industry and Commercialization (LIINC) program executes WVU's 2020 Strategic Plan in the trenches, actively serving as the facilitator for increased and improved collaboration between WVU's research efforts and the private sector marketplace. LIINC has promoted campus-wide dialogue among university members, established corporate relationships, brokered new support for researchers, and elevated the awareness and involvement on campus related to innovation and commercialization. LIINC is a single route in the economic development road map of the State of West Virginia. This presentation will demonstrate the program's transformative efforts to change the community and campus culture for greater prosperity and development.

**Interdisciplinary Engineering Design Course****John Callister, Cornell University**

A new interdisciplinary design course has been developed at Cornell University for senior undergraduates and master's degree students in engineering. This initiative emphasizes entrepreneurial-driven technology designs and the understanding of early stage product development complexities. These complexities include staging invention and innovation via the critical selection of materials and processes for final product function, performance, reliability, cost and technical marketability. Students from material science, chemical engineering, and mechanical engineering participate, and MBA students are also involved as mentors. This pedagogical strategy provides students with the opportunity to present and launch an original product startup. Although the ideation phase took longer than a similar, mono-disciplinary class, the outcomes exceeded expectations.

**NU100 Entrepreneurship Initiative****Heba Labib and Nezar Sami, Nile University**

This presentation reports on Nilepreneur, an initiative for young entrepreneurs who have technical innovations with a developmental impact. The participants, a broad spectrum of young people, spread geographically and from very diverse economic and educational backgrounds, go through a competition titled NU100, in which they receive training and compete for seed funding. In this paper, authors present efforts to empower Egyptian youth to believe in entrepreneurship as a mindset that enables them to shape their own future. Rather than following the natural route of courses in a specific university, authors chose to offer a national training program. Participants successfully completing training tracks will receive their Entrepreneurship Driver's License® (EDL®) for which they receive detailed assessment before and after. Material developed for this training will be available for open access in very simple Arabic, allowing independent learning and clear hands-on practice, forming the base of developing more rigorous academic-level material.

**Students as Leaders****Willow Glen**

2 pm – 3 pm

**Panel****Student Leaders are Shaping Campus Priorities at Michigan and Beyond****Aileen Huang-Saad, University of Michigan, Ann Arbor****Humera Fasihuddin, NCIIA**

Entrepreneurship is a contact sport—if institutions are to scale their efforts in entrepreneurship they must find innovative ways to change their ecosystems outside of the traditional classroom model. The panel presents two key examples. First, University of Michigan students have created a competition called 1000 Pitches, the largest student-run pitch competition in the U.S. Last year, they collected over 4,000 pitches ranging from economic development needs to medical devices to clean energy and are sharing the model with Pennsylvania State University. Second, The Epicenter Student Engagement Strategy, an NSF-funded STEP Center, supports student changemakers to enhance engineering education on their campuses, encouraging entrepreneurially inclined engineering students to address the gaps crucial to their experience. Examples of student-led impact will be described where University Innovation Fellows address gaps in their innovation ecosystems. The University Innovation Fellows will each describe how they addressed a missing link in their innovation ecosystems.

**Small Colleges****Blossom Hill**

2 pm – 3 pm

**Panel****Why Size Doesn't Matter: Enabling entrepreneurship, innovation and invention in small private design and liberal arts colleges****Lee Davis and Vincent Purcell, Maryland Institute College of Art (MICA)****Andrea Wollensak, Connecticut College****Penny Herscovitch, Art Center College of Design****Kunal Parikh, Johns Hopkins University**

The rapidly evolving fields of design, entrepreneurship, innovation and technology invention present a unique challenge to the limited budgets and capacities of small, private design and liberal arts colleges. While their larger university peers benefit from having diverse disciplines and departments all represented under one roof, small design and liberal arts colleges face real, practical constraints. But small colleges are responding with innovative solutions to integrate design, entrepreneurship, innovation, and technology invention into both graduate and undergraduate education. Through the development of interdisciplinary centers, student-led initiatives, partnerships with larger universities, nonprofits and companies, small colleges are reinventing design education, challenging the limits of traditional disciplines, and demonstrating the power of design and liberal arts education to enable the next generation of innovators and inventors.

**Online Education****San Carlos**

2 pm – 3 pm

**Papers****The Benefits of the Anti-MOOC: Big goals achieved in small online classes****Cindy Gilbert, Minneapolis College of Art and Design**

The past year was instrumental for online learning. The New York Times dubbed 2012 "The Year of the MOOC" and MOOCs (Massive Open Online Courses) have since become one of the hottest topics in education. It has become clear as most institutions are now developing online curricula that e-learning is not an educational fad but instead holds great promise for the future and democratization of education. MOOCs are clearly one means to these ends; however, other successful models of online education hold equal, if not more, promise to advance higher education as well as innovation and entrepreneurship. This paper considers the benefits of the "anti-MOOC" by providing concrete examples from MCAD's MA in Sustainable Design program that is built on a foundation of small classes (<18 students per class) that cultivate tight-knit networks and attain the previously untapped potential for transnational projects, innovation, and collaboration conducted completely online.



...continued

**Online Education****San Carlos**

2 pm – 3 pm

**Papers****200,000 Served: Experiences from a MOOC on entrepreneurship and innovation****James Green, University of Maryland**

With the proliferation of massive open online courses (MOOCs) in recent years, many universities worldwide are trying to better understand the how and why of MOOCs. This presentation is an ongoing exploration of the development, delivery, and evaluation of an online entrepreneurship course on one of the fastest growing MOOC sites, Coursera. The session will focus on the university-based implementation of an entrepreneurship and innovation MOOC, who the students are, and how to maximize effectiveness. Using real survey results, demographic information, and interactive course content, participants will get an inside view of this MOOC. The integration of the MOOC know-how and content into the university's for-credit courses will also be discussed, as will the potential for MOOCs to improve the accessibility and affordability of higher education.

**Development of an Online Entrepreneurial Training Course for Sustainable Technology****Jacob Cook and Cindy Gilbert, Minneapolis College of Art and Design**

Knowledge about how to start a successful business is a critical barrier to success, according to 84% of entrepreneurs surveyed by the Kauffman Foundation. While many of today's business leaders have MBAs, tomorrow's challenge is to make entrepreneurship approachable for non-business audiences, including designers. Innovation is critical to successful enterprises and designers are particularly well-suited for innovation and entrepreneurship endeavors given their creative leanings. Yet many opt-out based on preconceived notions of what it means to a "businessperson," or worse, plunge ahead without a framework for building a successful enterprise. With the support of NCIIA, the Minneapolis College of Art and Design (MCAD) is developing a new entrepreneurial training course to provide the principles and practices of Lean Startup methodologies to the graduate students of MCAD's Sustainable Design program. The paper covers the challenges faced and methods employed to teach entrepreneurship to a design audience in an online environment.

**Biomedical Engineering****Almaden**

2 pm – 3 pm

**Papers****Biodesigning with European Undergraduates: Adaptation, trade-offs and outcomes****Catarina Maia and Joao Claro, INESC TEC and Faculdade de Engenharia, Universidade do Porto**

Biomedical engineering innovation and entrepreneurship education poses challenges that are not addressed in general entrepreneurship education courses or even in technology-based entrepreneurship education programs. We have adapted the Stanford Biodesign Program to be included in the Bioengineering Master's program running at the Faculty of Engineering of the University of Porto (FEUP). As part of its curriculum, the Master offers a one-semester, medical-device-specific innovation and entrepreneurship course in which students work with technologies under development at the university. Our work shows how it is possible to adapt an American postgraduate course to a European undergraduate setting, involving both researchers and students. We present the course evolution, from our original proposal to an elective and then a core course in the Master's curriculum. We also address the process of directly sourcing technologies from researchers, challenges faced in the course design and administration, and the students' view of the course.

**Medical Device Design and Assessment: Unearthing business decisions****Joseph Tranquillo, Bucknell University**

Product Archeology is a pedagogical technique for reconstructing the decision-making processes of the designer. For the past eight years we have offered a course in which students must unearth the business decisions in bringing a medical device to market. In the first half of the class, teams put themselves in the shoes of the company five years before the product launch. The challenge is to excavate information on topics such as

...continued

**Biomedical Engineering****Almaden**

2 pm – 3 pm

**Papers**

FDA, consumer trends, supply chains, intellectual property, market dynamics, packaging and distribution. Just as in real archeology they must piece together the decisions based upon what is publicly available. In the second half of the class teams produce a business strategy document that projects the product forward five years. Their proposal is based upon consideration of all the topics above, but also on the value added given the costs of changes in business practices, manufacturing and distribution.

**NCIIA-funded Technology Innovation with People with Disabilities Program Results and Best Practices****Jon Pearlman and Mary Goldberg, University of Pittsburgh**

We developed a summer internship program that paired undergraduate business students with NSF-funded Research Experience for Undergraduate engineering students to evaluate the commercial potential of devices we are developing in our laboratories. We have run three cohorts (run in the summer programs) of ten projects, with twenty students, mentored by ten graduate students/post-doctoral fellows. We have assessed the impact of the internship with the students and mentors, and also have tracked commercialization success, which has included design awards and startup companies that have received SBIR funding. In this talk we will discuss our successes and challenges and propose what we believe is the best format for future years.

**BREAK 3:00 pm – 3:30 pm****FRIDAY 3:30 pm – 4:30 pm****Spaces of Invention****Guadalupe**

3:30 pm – 4:30 pm

**Papers****The Invention Studio: A university maker space and culture****Craig Forest, Georgia Institute of Technology**

Creativity, invention, and innovation are values championed as central pillars of engineering education. However, university environments fostering the kinds of open-ended design-build projects that embody these values are uncommon and, to the extent that they do exist, are underutilized. The Invention Studio, a free-to-use, 3,000 square-foot maker space and culture at the Georgia Institute of Technology, is such an environment. There, 500 student users per month hang out, create things, meet, and mentor each other for at least 25 courses as well as independent projects. The Invention Studio is managed and maintained by an undergraduate student group with support from the university. Herein, we describe the motivation, organization, facilities, outreach, safety, funding, and challenges as well as its primary uses and impacts on student users. These facilities, infrastructure, and cultural transformation are demonstrating the value and sustainability of hands-on, design-build education to stimulate innovation, creativity, and entrepreneurship in engineering undergraduates.

**Innovating for People with Disabilities****John Pearlman and Mary Goldberg, University of Pittsburgh**

The Human Engineering Research Labs (HERL) are often referred to as an innovators' playground by developing trainees and seasoned professionals alike. HERL boasts a 40,000 square-foot space including 15,000 sq ft of open lab space and a 10,000 sq ft machine shop with state-of-the-art machining, welding, rapid prototyping and electronics design and fabrication facilities and equipment. What makes this space special is the inclusive environment that it creates—all spaces are communal, meaning no space is principal investigator-specific, and fully accessible for persons with disabilities. There are classroom spaces amidst the lab and machining equipment to optimize experiential learning opportunities. The lab is equal parts innovation- and training-driven, allowing everyone from high school interns to undergraduate researchers to graduate fellows to high school science teachers to military veterans to learn the fundamentals of user-centered rehabilitation engineering design.

*...continued***Spaces of Invention****Guadalupe**

3:30 pm – 4:30 pm

**Papers****Designing the Yale Center for Engineering Innovation and Design****Vincent Wilczynski, Yale University**

In 2009, the faculty of the Yale School of Engineering & Applied Science created a strategic plan for advancing the school, with one of the three goals of the plan being to advance the culture of engineering on the Yale campus. Central to this goal was the creation of the Yale Center for Engineering Innovation and Design, a new 8,500 square foot space for instruction, fabrication and assembly to support curricular and extracurricular design activities. This paper details the concept for the center, its design and outfitting, and the success of the first year of operation in 2012-13. The paper discusses the principles that guided the design of the center, the collaboration of colleagues at and beyond Yale to plan it, the creation of a community of design enthusiasts who actively use it, and the ways in which it advances the culture of engineering at Yale.

**Teaching Tools****Blossom Hill**

3:30 pm – 4:30 pm

**Panel****Nifty Assignments in Entrepreneurship Education IV****Michael Lehman, Lehigh University****Trexler Proffitt, Muhlenberg College**

NCIIA meetings are a great place to learn about assignments and activities that work well in teaching and could be adapted to other situations. However, many such nifty assignments (NAs) are not presented at conferences or in formal publications. This session is an opportunity to share our NAs. The NA sessions at NCIIA's 2011, 2012, and 2013 annual conferences were popular and lively; the activities are listed at <http://pui-eship.org>. A great NA is easy to adopt and adapt, broadly relevant, thought provoking, and fun for students and teachers.

**Lean Startup****Willow Glen**

3:30 pm – 4:30 pm

**Workshop****Teaching Lean IP Startups****Marc Sedam, University of New Hampshire**

Applying the lean startup principles on campus has been a challenge, but incorporating these principles into intellectual property-intensive startup opportunities is even more so. This workshop will discuss an approach to teaching startup formation in the classroom using lean principles and the business model canvas, including an innovative and simple grading system that actually rewards students for the results of their efforts and execution of a strategy without burdening the instructor with applying subjective grades based on the quality of the idea. The session will focus on the balance of applying the need for constant customer development while maintaining IP protection (especially in light of the America Invents Act) and openly discussing each team's business model canvas as a classroom exercise. Potential applications in technology transfer offices will also be discussed.

**Extracurricular Activities****Almaden**

3:30 pm – 4:30 pm

**Papers****Design for America: A program to support extracurricular civic entrepreneurship activity****Elizabeth Gerber, Northwestern University**

Poverty. Illiteracy. Pollution. These challenges will not solve themselves. We need civic entrepreneurs or people who actively seek, design, refine, and implement solutions to challenges, to improve and strengthen civil society. Yet higher education leaves little time to train these much-needed civic entrepreneurs. This paper addresses this challenge by presenting an overview of a model for extracurricular civic entrepreneurship activity and its implementation in an extracurricular network at eighteen universities. We present the Design for America program model, instructional tools, and assessment of the program over the past five years. We find that through self-directed, hands-on learning, students develop the skills and confidence critical for innovation. Based on these findings, we provide three emergent design principles to inform the design and scaling of effective extracurricular civic entrepreneurship activity and support tools.

*...continued***Extracurricular Activities****Almaden**

3:30 pm – 4:30 pm

**Papers****Development and Assessment of an Innovation and Entrepreneurship Boot Camp for Sophomore Engineering Students****Cheryl Bodnar, University of Pittsburgh**

One of the main critiques of innovation and entrepreneurship programs within engineering schools is that they reach students too late in their undergraduate careers to have a profound impact. In this study, we explored the engagement of sophomore engineers in innovation and entrepreneurship through a three-day, extracurricular boot camp. The camp focused on developing solutions to grand challenges, as outlined on the National Academy of Engineering website. Students received instruction in innovation and entrepreneurship and participated in activities to develop these skills. Teams also pitched newly developed ideas to a panel of industry and academic professionals with entrepreneurship experience. To assess the effectiveness of the camp, participants received pre and post surveys that measured their understanding of innovation and entrepreneurship concepts. Students also created maps of the product design process both before and after the camp to assess gains in their understanding of this process.

**Rigorous Three-day Startup Events in the Academic Setting Prepare Nascent Entrepreneurs****Anita Leffel and Cory Hallam, University of Texas at San Antonio****Cam Houser, 3 Day Startup****Luz Cristal Glangchai, VentureLab****Hesam Panahi, The University of Houston**

Technological innovation is the foundation for creating enterprises and the spirit of entrepreneurship is the catalyst for turning innovations into reality. Universities are committed to pursuing entrepreneurial education as a means to provide students with experiences to create new products for the betterment of society. Hack-a-thons, business plan and business model competitions are only some of the tools for nascent college entrepreneurs offered in the university curriculum. Entrepreneurship is a discipline requiring actual hands-on experience to help transition the entrepreneurs and their projects from classroom to marketplace.

3 day startup (3ds) is one tool offered in a number of university settings, with phenomenal success. Over one intense weekend, participants brainstorm ideas, conduct market validation, devise business models, build prototypes, and pitch to actual investors and successful entrepreneurs. The result is an experience that inspires innovation by requiring participants to actually build and launch companies.

**Best Practices****San Carlos**

3:30 pm – 4:30 pm

**Workshop****The Framework for Entrepreneurial Engineering****Daniel Ferguson, Purdue University****Kathryn Jablokow, Pennsylvania State University**

The goal of the Framework for Entrepreneurial Engineering Project (FEE) is to collaboratively develop with experts the descriptions of the knowledge, skills and attributes required of an entrepreneurial engineer. With this knowledge the education of engineers to be more entrepreneurial can be designed and assessed. The FEE Project deliverables include a consensus description of the knowledge, skills and attributes of entrepreneurial engineering activity needed for each stage of the entrepreneurial engineering process. Two conversations with entrepreneurship educators and entrepreneurial engineers will be used to accomplish our goal: 1) a conversation with informed engineering educators in a two-day retreat following the 2013 ASEE annual meeting that developed an initial draft of our deliverables, and 2) a Delphi Study conducted in 4th quarter 2013 and 1st quarter 2014 with up to 100 entrepreneurial engineers to confirm the results from the FEE 2013 retreat. The workshop will discuss our results.

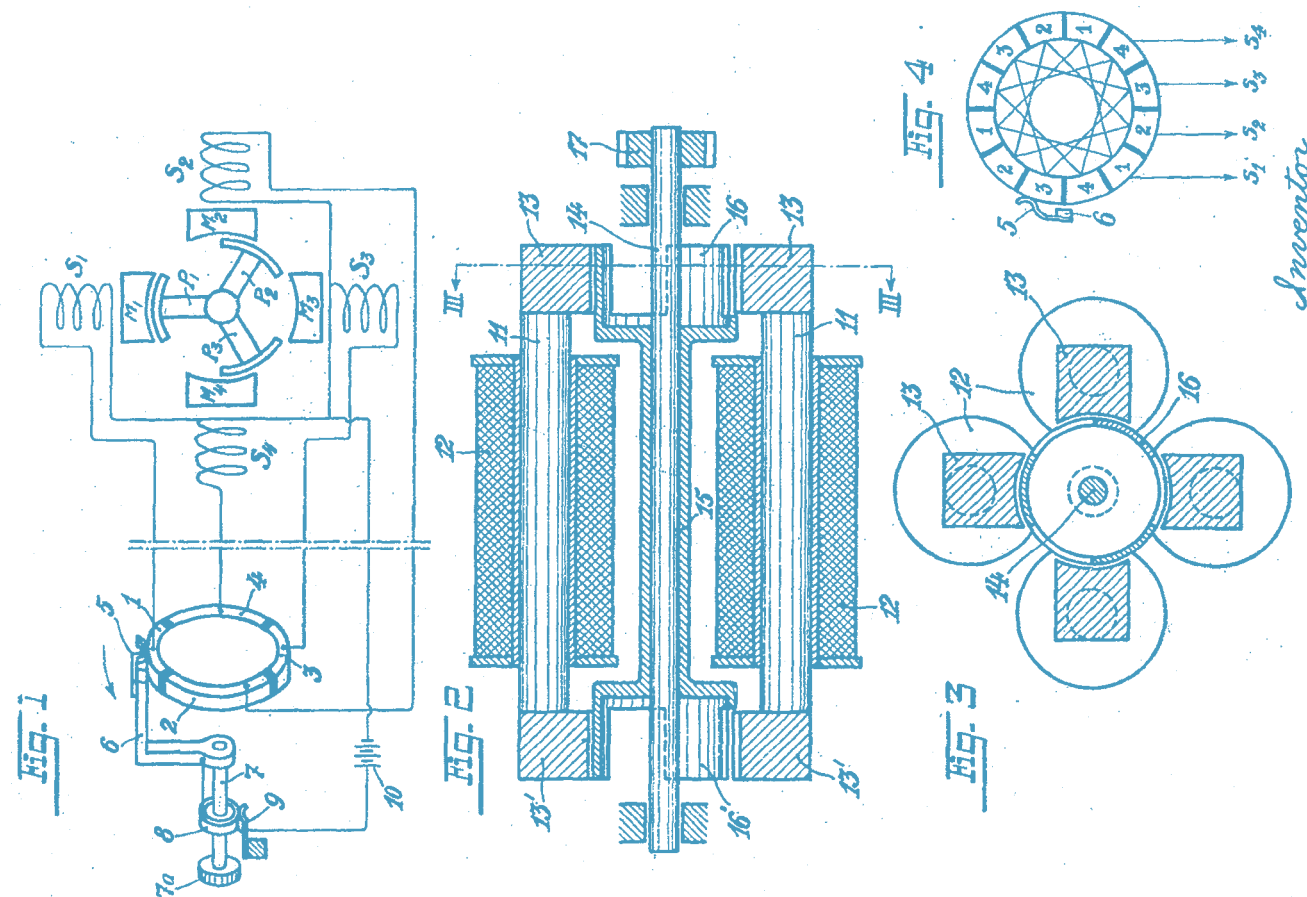
FRIDAY 4:30 pm - 7:00 pm

**Poster session**  
Outside the San Jose Ballroom

Featuring 40+ posters on a range of topics related to entrepreneurship. A great place to network and learn about new projects!

FRIDAY 7:00 pm - 10:00 pm

**Dinner on your own**



Full schedule is available on your mobile device at [nciia.org/open/schedule](http://nciia.org/open/schedule).

SATURDAY 8:00 am - 5:00 pm

**Registration**  
Registration desk, Ballroom level

SATURDAY 8:30 am - 9:30 am

**Breakfast**  
San Jose Ballroom

**Breakfast plenary: Secret Agents of Change**

**Jennifer Mayo, Oklahoma State University**  
**Jack Goodwin, University of California, San Diego**  
**Karuna Relwani, University of Pittsburgh**  
**Jared Karp, University of California, Berkeley**  
**Sharang Phadke, Cooper Union**

Five students. Thirty minutes. Thousands reached. Hear the story of five University Innovation Fellows, each of whom is leading a movement on their campus. This group of 'Ignite style' presentations will live up to Ignite's motto... "enlighten us, but make it quick."

SATURDAY 9:30 am - 10:30 am

**Lean Startup**  
Almaden  
9:30 am - 10:30 am

**Papers**

**Experimenting with the Lean Launchpad at UC Santa Barbara**

**Mike Panesis, University of California, Santa Barbara**

Santa Barbara, California typically does not come to mind as an entrepreneurship hub, yet in many ways it is. There are dozens of thriving startups in Santa Barbara, many conceived by UC Santa Barbara faculty and staff. Some of the techniques popularized in Steve Blank's Lean LaunchPad (LLP) approach to entrepreneurship education were popularized in Santa Barbara years ago. UCSB's Technology Management Program, founded fifteen years ago in part with an NCIIA grant, is the on-campus hub for entrepreneurship education. This past year, we ran an LLP experiment. We taught LLP to a select group of students, then allowed the teams to enter our New Venture Competition. Four LLP teams competed alongside sixteen teams that received a more traditional educational experience. The LLP teams performed very well in the competition, and two reached the finals.

**Flipping the Classroom and Getting out of the Building: The experience of incorporating udacity and startup owners manual in a multidisciplinary entrepreneurship course at Northwestern University**

**Todd Warren and Michael Marasco, Northwestern University**

NUvention Web is a multidisciplinary course composed of undergrad and grad students in engineering, business, and other disciplines that has won multiple awards as a standout class in entrepreneurship in its five years of existence. In 2013, NUvention Web adopted the I-Corps curriculum for teaching the entrepreneurship and business elements of the course, combining it with existing software engineering practices in agile development. This talk, by the two core faculty who teach NUvention Web, will discuss what worked and did not work in adaptation of the I-Corps curriculum and how the course was revised in 2014 to incorporate the best of both approaches. Specifically, the talk will discuss the advantages and disadvantages of incorporating the Udacity MOOC, leanlaunchpad.com tools, team formation strategies, and the Osterwalder Business Model Canvas.

**The Metamorphosis of Business Plan Competitions**

**CJ Cornell, Cogswell Polytechnical College**

Business plan competitions have not died; they have merely gone through a significant metamorphosis, and are still powerful tools for energizing entrepreneurial activity and growth. This evolution is still very much in-progress, with old-style competitions withering and newer kinds thriving. We will present results of research done from studying and analyzing past and present business plan competitions, both successes and failures.



...continued

**Lean Startup****Almaden**

9:30 am – 10:30 am

**Papers**

Some of the questions to be addressed are: what is the role and effectiveness of business plan competitions in today's entrepreneurial ecosystem with accelerators, Lean Startups and university programs? What are the key components of a successful business plan competition? What is considered "success" for a business plan competition? Does winning a business plan competition matter to startups? We will present recommendations for crafting future business plan competitions, and insights on the role of business plan competitions in entrepreneurship education programs.

**Global Impact****Guadalupe**

9:30 am – 10:30 am

**Papers****Innovating for Resource-poor Regions****John Langell, University of Utah**

The University of Utah Center for Medical Innovation and the Department of Bioengineering have developed a unique multidisciplinary partnership in medical device development to improve healthcare in resource poor areas. We leverage the strengths of interdisciplinary innovation teams with a robust program in global surgery. Our first collaborative case involved a group of students in our multidisciplinary graduate track in medical device innovation who chose to develop a product that would impact medical care in developing countries. The team, composed of bioengineering graduate students, medical students and MBA students used global surgery faculty as stakeholders to understand the needs of a medically underserved region in Africa. Together they designed and developed a new mobile laparoscope that provides a high-quality image without the need for standard complex, expensive and heavy integrated imaging and lighting equipment. The resultant product is lightweight, portable and independent of a reliable electrical grid.

**Stanford-India Biodesign****Christine Kurihara, Stanford University**

Started in 2008, the Stanford-India Biodesign (SIB) fellowship is aimed at training the next generation of medical technology innovators in India. The SIB Program is administered as a collaboration between Stanford, IIT-Delhi, and AIIMS. The fellowship is directed towards Indian citizens who have an interest in the invention and development of new medical technologies. The first six months are spent at Stanford learning the Biodesign process; the following six months in India using the process to find and solve needs. Fellows work in a multidisciplinary team joining other innovators with a combination of engineering, medical and business backgrounds. Working closely with Stanford, AIIMS and IIT faculty, the teams invent, prototype, develop and patent one or more novel technologies. Now in its sixth year, the program has led to the formation of four India-based companies and the licensing of two additional products, one of which is already commercialized.

**Why do Agricultural Technology Ventures Fail?****Towards a Taxonomy of Failure Modes****Jerrel Gilliam and Khanjan Mehta, Pennsylvania State University**

Agricultural technologies strengthen and streamline Food Value Chains (FVCs) while improving the lives and livelihoods of smallholder farmers and entrepreneurs. Technologies such as greenhouses, solar food dryers, threshers, grinders, storage, and packaging equipment can make wasteful food systems in developing countries more efficient. However, there are a myriad of technological, infrastructural and operational challenges that hinder the successful design and commercialization of such products. Through a qualitative analysis of academic literature, online journals, interviews with experts in the field, and our experiences over the past decade, we have devised a taxonomy of potential failure modes during the engineering design, implementation and steady-state operation phases of agricultural technology ventures. We argue that consideration of these failure modes early in the design process will assist agricultural technology designers and entrepreneurs in avoiding pitfalls later in the venture lifecycle.

**Open Meetup****San Jose Ballroom**

9:30 am – 10:30 am

**Group discussion****To MOOC or Not to MOOC: Let's talk about online ed****Cindy Gilbert, Minneapolis College of Art and Design**

MOOCs are hot. Online education is the future (probably). But what's the best way to use online education to advance innovation and entrepreneurship? What's being done now, and what more can we do?

Come to this Open Meetup to talk about the future of online ed!

Open Meetups are 60-minute, facilitated, participant-driven sessions centered on a particular theme or purpose. Instead of passive listening while one person delivers prepared remarks in front of a PowerPoint presentation, Open Meetups encourage active participation by all attendees. Discussion leaders will provide moderation and structure. They will set the stage and then allow discussion to flourish.

**Intellectual Property****Blossom Hill**

9:30 am – 10:30 am

**Panel****Encouraging Emerging Inventors:****A new look at intellectual property and students****Phil Weilerstein, NCIIA****Marc Sedam, University of New Hampshire****Nathalie Duval-Couetil, Purdue University****Abigail Barrow, Massachusetts Technology Transfer Center****Phyl Speser, Foresight Science & Technology**

Students at the undergraduate and graduate level are becoming increasingly involved in the development of new technologies and the creation of intellectual property. Whether through the increase in hands-on, experiential innovation in the curriculum, the expansion of research experiences that put undergraduates in the research laboratory environment or the emergence of the dorm room inventor the need for new policies, practices and support systems for student originated intellectual property is an urgent priority for many campuses.

NCIIA, working together with the Association of University Technology Managers (AUTM) has developed a set of practices to provide a roadmap and guidance for university TTOs to establish effective policy for encouraging student inventors and promoting an environment of innovation in the sciences and engineering and arts. The panelists representing AUTM, and institutions large and small will discuss the changing nature of student invention and describe best practices for creating a successful culture of innovation that promotes entrepreneurial action while protecting the institution and the inventor.

**Spaces of Invention****San Carlos**

9:30 am – 10:30 am

**Workshop****Making Space for the Unknown Future****Helen Chen and Robert Emery Smith, Stanford University**

How can a space lead faculty to think entrepreneurially about what takes place in their classroom? What kinds of classrooms and environments excite faculty to create new learning experiences that are engaging and relevant for their students and themselves? Case studies from Stanford University illustrate how the in-person classroom is evolving beyond the lecture to engage external partners in projects, realize experiential learning, and leverage the flipped classroom, social media and mobile devices. We will explore how the physical space is more than just a backdrop for classroom activities; the room plays a number of roles to help the faculty move the experience, curriculum and the learning forward. This interactive workshop will challenge participants to grapple with how learning environments are evolving to create novel and optimized experiences for both teachers and learners.



**Students as Leaders****Willow Glen**

9:30 am - 10:30 am

*Panel***University Innovation Fellows Answer the President's Call for Information Accessibility****Tom Byers, Stanford University****Doug Rand, White House Office of Science & Technology Policy****John Desjardins, Clemson University****Breanne Przestrzelski, Clemson University****Nolan Nicholson, University of Nevada Reno****Mary Wilcox, Arizona State University****Humera Fasihuddin, NCIIA**

Last year the President outlined an ambitious plan to make a college education accessible for everyone. Part of the plan promotes innovation in providing information, tools and resources that help students make the most of their educational experience. At Epicenter, we believe the entrepreneurial mindset is a fundamentally important skill that must be a part of every student's college experience. That's why the University Innovation Fellows, students hand-picked by their institutions and trained to enhance the Innovation & Entrepreneurship ecosystem, rose to the call. Students created a wiki ([universityinnovation.org](http://universityinnovation.org)) that 'open sources' a rich trove of information about courses, programs, tools and resources on their own campuses. This allows peers access to information about curricular and extracurricular opportunities that cut across a university's schools, departments and centers. Students are able to navigate all available resources to cultivate their creative potential, nurture their innovative abilities and adopt an entrepreneurial mindset. In addition, Fellows and Faculty identify student-perceived gaps that can be bridged using new and creative methods. Panelists will describe strategies campuses can use to gather landscape information, ways to share the information and opportunities to engage students as part of the solution. Interactive discussion follows brief panel remarks allowing participants at campuses of different size and ecosystem maturity to discuss student engagement on their own campus.

**BREAK 10:30 am - 11:00 am****SATURDAY 11:00 am - 12:00 pm****Students as Leaders****Blossom Hill**

11 am - 12 pm

*Panel***The Maker & Hacker Culture: Who are they, and why you need to know****Marc de Vinck, Lehigh University**

All too often in higher education the idea of Makers & Hackers has a negative connotation. This could not be further from the truth. We are all makers, and many of us are hackers. The Maker movement grew out of the DIY culture, specifically from the halls of MAKE magazine and other thriving communities. Innovation is happening in Maker & Hacker spaces across America. The business model is based on open-source hardware and software. It is not a typical plan to say the least, but that is exactly why it works. We are redefining the financing and banking industry by crowdfunding our projects on Kickstarter. We are creating the third industrial revolution, and it is not always happening at corporate headquarters—it is happening in your neighbor's garage.

**Teaching Tools****Guadalupe**

11 am - 12 pm

*Papers***A Visual and Intuitive Approach to Teaching and Learning Engineering and Computer Science Concepts****Dani Raviv, Florida Atlantic University**

This presentation describes an innovative teaching approach that incorporates students' learning preferences, i.e., visual, intuitive, interactive, playful, and user-friendly, that allow for understanding concepts with minimal use of mathematics. The focus is on explaining ideas using familiar daily experiences (such as A/C systems or driverless cars, for clarifying the concept of closed loop systems), knowledge (such as an algorithm for crossing

*...continued***Teaching Tools****Guadalupe**

11 am - 12 pm

*Papers*

the Panama Canal), interactive puzzlers (e.g., bridge crossing teasers), and games (e.g., Quarto). An advantage of this approach is that it allows for better web-based learning and for easier introduction of concepts and material to interested individuals who do not have the "official" background/prerequisite. In fact, when developing the material we tried to answer the question: "Will a fourth grader be able to understand it? If not... keep improving." This approach can be extended to other disciplines and courses.

**Effective Mentoring Practices for Entrepreneurship Education****Benjamin Lutz and Cory Hixson, Virginia Polytechnic Institute and State University**

Mentoring student teams is critical to entrepreneurship education, but the nature of that mentoring is often poorly defined, with little robust understanding of effective practices. To bridge the gap, this study presents a qualitative study of mentoring practices in an entrepreneurship startup class supported by a grant from NCIIA. By combining classroom observations with semi-structured interviews from mentors and students, the data provide a complete view of mentoring behaviors and their salience within an entrepreneurship learning environment. Two frameworks guided data collection: problem-based learning and mentoring in capstone design courses. Interviews with mentors showed that coaching and protection were critical for developing and maintaining productive relationships, while students highlighted the perceived value of building rapport with their mentors. Observational data served to confirm and triangulate the findings from the interviews. The results of this study describe effective mentoring practices and explore how students value and respond to those practices.

**Working Alongside as Pedagogy****Trexler Proffitt, Muhlenberg College**

The predominant pedagogy in higher education is classroom- and faculty-centered. The faculty as chief knowledge source informs and directs students in their assignments. Rarely does the faculty member actually do the assignment with the students. Seeking a more student-centered classroom, some faculty, including entrepreneurship educators, have found success by "working alongside." This technique requires the teachers and learners to perform similar learning exercises together, and often results in a decentralized, team-oriented classroom environment. Working alongside can be anything in which the professor models the behavior and experiences as if they were a student in the course. Examples might include completing a business plan at the same time as students, entering an appropriate venture competition with students, or attending an educational workshop like Startup Weekend with students. Used widely in "writing to learn" pedagogies, the technique has promise for greater application in entrepreneurship and innovation.

**Program Models****Almaden**

11 am - 12 pm

*Papers***Intercollegiate Student Projects as Tools for Developing the Entrepreneurial Mindset and Competencies in Engineering Students: Lessons learned****Nassif E. Rayess, University of Detroit Mercy**

Four Universities (Baylor University, University of Dayton, University of Detroit Mercy and Villanova University) have piloted a series of intercollegiate senior design projects in which students from different schools collaborate on senior projects. Two types of project structures are employed. The first has the teams collaborating on the customer discovery and ideation phase while building separate designs. The second has the teams collaborating all throughout the project up to delivery of a prototype that is assembled from components built by the various teams. Another variation of the projects has the students working with corporate clients (industry-sponsored projects), with individual clients (people with disabilities, inventors, etc.) or on competition projects. Also, the gender makeup of the teams varied with some predominantly male teams to others with a balanced ratio of males to females. This rich mosaic of educational experiments will be presented with basic assessment and lessons learned.

*...continued***Program Models****Almaden**

11 am - 12 pm

**Papers****Invention to Innovation: Accelerating technology commercialization****Molly Wasko, University of Alabama at Birmingham**

The University of Alabama at Birmingham (UAB) has untapped potential for the commercialization of its research and ideas. In 2012, UAB implemented a novel Invention to Innovation (i2i) program with the support of NCIIA Course and Program funding. The i2i program accomplished three key objectives: (1) scout innovative inventions with strong commercial potential from sources such as existing UAB intellectual property and adjacent possible ideas (i.e., ideas arising from existing technologies); (2) educate scientists and potential (student) entrepreneurs in technology innovation through classroom instruction and experiential learning in the UAB Graduate Certificate in Commercialization and Entrepreneurship; and (3) engage mentors from local business networks to connect regularly with E-Teams to stimulate creativity and business networking. This content will advance the field of invention, innovation and entrepreneurship education by describing the key elements of the program design, integrating entrepreneurship education to cross-disciplinary teams of scientists and graduate students.

**NSF Research Experience for Teachers Through the Lens of Rehab Engineering Design****Jon Pearlman and Mary Goldberg, University of Pittsburgh**

We have developed a NSF-funded Research Experience for Teachers (RET) program to promote STEM fields and innovation in primary and secondary schools using Quality of Life Technology (QoLT) and Rehab Engineering Design as the thematic backdrop for the curriculum and projects. The RET training is highly experiential, including flipped classroom techniques that incorporate research and development of a QoLT technology mentored by a graduate student and potential clients. Following a fifteen-week project-based research and design training, teachers participate in a four-week workshop where they translate the R&D concepts and design tools into curricular units, which they use the subsequent semesters with their primary and secondary students who participate in team-based design projects. Final designs from all student teams compete through an online peer review process. In this paper, we describe our model, our assessment methods, and the outcome of the first cohort of teachers and their students.

**Program Models****Willow Glen**

11 am - 12 pm

**Panel****Engaging Community and Campus to Support an Entrepreneurial Ecosystem****Steven Tello, Joseph Hartman and Thomas O'Donnell, University of Massachusetts, Lowell**

The University of Massachusetts, Lowell and the Merrimack Valley Sandbox are working together to support the development of an entrepreneurial ecosystem in the industrial mill cities of Lowell and Lawrence, Massachusetts. Each partner brings a different perspective to the collaboration. The university's economic development efforts have traditionally focused on research, technology incubation and service learning, while the Sandbox is committed to encouraging community entrepreneurship across the Merrimack Valley. When the Sandbox first introduced its Campus Catalyst pitch contests to the region, it was unclear how these rapid-fire events and incentive awards would contribute to the development of an entrepreneurial culture. However, three years later, these two partners and several other key organizations have committed to the development of a continuum of services and activities that are now growing the region's entrepreneurial ecosystem. This panel will examine this process, the challenges and the success of the effort.

**Open Meetup****San Jose Ballroom**

11 am - 12 pm

**Group discussion****Open Meetup: Open Educational Resources to Meet Grand Challenges for Development****Charina Choi, White House Office of Science and Technology Policy**

Imagine a world without hunger, thirst, disease, illiteracy, or climate change. Realizing this better world requires talent to solve the many global challenges around us. Open educational resources (OER) provide a powerful tool to inspire and empower a multitude of diverse students. The White House Office of Science and Technology Policy (OSTP) and the United States Agency for International Development (USAID) believe it would be worthwhile to fund multidisciplinary OER pilots, focused on global development challenges, to inspire and empower students to embrace grand challenges at home and abroad.

**Research****San Carlos**

11 am - 12 pm

**Papers****Good Versus Great Teams****Alison Hynd, Kimberly Benard and Libby Mahaffy, Massachusetts Institute of Technology**

Our talk will be part cautionary tale and part aspirational goal for advising students on successful innovative enterprises. This presentation will delve into the differences between good and great through the exploration of these three subject areas: Team Dynamics, Organizational Structure, and Use of Resources. We will then discuss how one can lead students through a reflection on their personal growth and professional development. While education is traditionally a safe place for failure, the mission of our talk is to share methods that will minimize such failure when students are working on projects that influence real people.

**Social Entrepreneurship Fieldwork: Student self-reported outcomes****Katelyn Holmes, Khanjan Mehta and Abdalla Nassar, Pennsylvania State University**

The Humanitarian Engineering and Social Entrepreneurship (HESE) Program at Penn State brings together students and faculty from diverse disciplines to develop market-centric, technology-based solutions for developing countries. HESE endeavors are integrated into a series of five academic courses. The programmatic learning outcomes encompass competencies in Context-Driven Design, Social Entrepreneurship, Global Engagement, Systems Thinking, Ethical Reflection, Multidisciplinary Teamwork, Communication and Scholarly Research & Publication. Formal assessment indicates that students develop these competencies and mindsets at varying degrees. Students reflect on their experiences at the culmination of the fieldwork course that involves collaboration with multi-sectoral partners to advance ventures. Students' self-reported personal and professional development outcomes provide a compelling perspective on the multiplicity of meanings that emerge from an intense entrepreneurial experience. These student narratives (n=120) illustrate and embellish pedantic programmatic learning outcomes. They can be leveraged to strengthen fieldwork experiences and develop effective strategies for branding the value of entrepreneurship education.

**Standing Apart: What makes students more likely to launch a venture or commercialize a product?****Sarah Zappe and Elizabeth Kisenwether, Pennsylvania State University**

Several years ago, a program for students called Lion Launch Pad was created at Penn State with the goal of encouraging undergraduate students to take innovative ideas and commercialize them. While many students at Penn State enroll in the now university-wide entrepreneurship program, not all students become involved with Lion Launch Pad. The research question explored in this paper is this: What makes the students in Lion Launch Pad more entrepreneurial? In other words, how or why do these students stand apart from others who may be interested in entrepreneurship or innovation, but do not take the extra step to launch a venture or commercialize a product? Data is currently being collected this semester from Lion Launch Pad students and appropriate comparison groups. Several constructs are being examined including locomotion and self-assessment, creative self-efficacy, entrepreneurial self-efficacy, and locus of control.

## SATURDAY 12:00 pm – 2:00 pm

**Luncheon**  
San Jose Ballroom**NCIIA alumni panel moderated by NPR science correspondent Joe Palca**

**Joe Palca, NPR**  
**Richael Young, Mammoth Trading**  
**T. Patrick Walsh, Greenlight Planet**  
**Evan Edwards, Kaleo**

A panel of some of our most successful student inventors telling their stories, sharing experiences and lessons learned. The panel will be moderated by award-winning NPR science correspondent Joe Palca.

**Joe Palca is a science correspondent for NPR.** Since joining NPR in 1992, Palca has covered a range of science topics — everything from biomedical research to astronomy.

Palca began his journalism career in television in 1982, working as a health producer for the CBS affiliate in Washington, DC. In 1986, he left television for a seven-year stint as a print journalist, first as the Washington news editor for *Nature*, and then as a senior correspondent for *Science Magazine*.

In October 2009, Palca took a six-month leave from NPR to become science writer in residence at The Huntington Library and The Huntington Library, Art Collections, and Botanical Gardens.

Palca has won numerous awards, including the National Academies Communications Award, the Science-in-Society Award of the National Association of Science Writers, the American Chemical Society James T. Grady-James H. Stack Award for Interpreting Chemistry for the Public, the American Association for the Advancement of Science Journalism Prize, and the Victor Cohn Prize for Excellence in Medical Writing.

With Flora Lichtman, Palca is the co-author of *Annoying: The Science of What Bugs Us* (Wiley, 2011).

He comes to journalism from a science background, having received a Ph.D. in psychology from the University of California at Santa Cruz where he worked on human sleep physiology.

## SATURDAY 2:00 pm - 3:00 pm

**Teaching Tools**  
Guadalupe  
2 pm – 3 pm**Papers****Crowdfunding: More than money, a powerful new way of jumpstarting entrepreneurship education**

**CJ Cornell, Cogswell Polytechnical College**

Crowdfunding platforms are efficient and economical ways of training entrepreneurs in many 'real world' fundamentals of entrepreneurship by providing a powerful combination of market validation, product validation and customer feedback. The crowdfunding process forces entrepreneurs to sharpen their pitches, refine their ideas, and learn to engage and empower advocates. It is the new machinery of the lean startup. We will present results of research done from studying, interviewing and analyzing data from the past five years of popular crowdfunding platforms. Recommendations will be offered in response to the following questions: What are the major aspects of crowdfunding that can be

...continued

**Teaching Tools**  
Guadalupe  
2 pm – 3 pm**Papers**

applied to entrepreneurship education? How can educators integrate crowdfunding into both curricula- and project-based entrepreneurship education programs? How can educators use crowdfunding platforms to reinforce learning of 'lean startup' techniques and other modern startup skill sets? How can educators use crowdfunding platforms to stimulate student interest and engagement in the entrepreneurial process?

**Model-based Innovation and Entrepreneurship**  
**Max Shtein, University of Michigan, Ann Arbor**  
**Eugene Shteyn, Stanford Continuing Studies Program**

Innovation is a primary source of economic growth, and yet only one idea out of 3,000 becomes a successful product or service. In our book, *Scalable Innovation*, we introduce a historically validated model for the innovation process, helping innovators to understand the nature and timing of opportunities and risks on the path to success. We de-mystify the "luck" component of success of many technological innovations, providing tools for turning challenges into opportunities for practical, scalable innovation. The most common false beliefs about innovation are outlined, along with barriers in reasoning that impede practitioners from seeing problems in a new light. We propose a specific system model that helps identify essential present and missing elements of scalable systems needed for solving high-value problems. This approach enables practitioners to anticipate and expedite the creation of value through the guided innovation process, accelerating innovation development and evaluation cycle.

**Accelerating Student Commercialization Success through Enhanced Prototyping and Design for Manufacturing Skills**  
**Matthew Wettergreen, Rice University**

Engineering design and entrepreneurship share similar emphasis on rapid innovation and creative problem solving. Combining these two disciplines will enable students to more effectively deliver innovative technological solutions that can ultimately translate to the marketplace. To support this outcome, we are developing two education modules. The first addresses student understanding and capabilities in design for manufacturing, and the second fosters the development of business strategies around engineering inventions. This paper focuses on the manufacturing modules. We have developed exercises in physical prototyping, generating engineering drawings and specifications, part count minimization, manufacturing processes and standards, and sourcing material types and forms. This paper presents our initial efforts and evaluation of the fabrication and design for manufacturing module with an initial test case from our summer design internship program for rising sophomores.

**Biomedical Engineering**  
Almaden  
2 pm – 3 pm**Papers****A Student-driven Course Brings Medical Students into the Innovation Arena**

**Aparna Ramanathan, University of Texas Southwestern Medical Center**

Medicine is an area teeming with opportunities for innovation. However, medical education remains focused on the memorization of large volumes of information rather than cultivation of critical thinking skills. Students who enter with aspirations in service-learning or device development have no outlet for these passions. For these reasons, students at the University of Texas Southwestern Medical School created and have been running a health innovations course called Innovating Healthcare Solutions (IHS) to instruct students in the design process as they design projects to improve health outcomes in partner communities within Dallas and abroad. Over the past few years this course has developed into a year-long program with faculty and administrative support from within the medical center and also from partner university engineering programs. Student projects created during the course have impacted healthcare within Dallas and also within partner communities abroad, demonstrating the value of design education within the medical school curriculum.

...continued

**Biomedical Engineering****Almaden**

2 pm - 3 pm

**Papers****Creating a Benchmark Medical Technology Entrepreneurship Competition**  
**Patrick Loftus, University of Utah**

We will present our experience in creating a benchmark medical technology innovation and entrepreneurship competition through cross-campus interdisciplinary and industry-academic collaborations. Our faculty-guided, student-run program is industry-sponsored and has engaged over 250 graduate students from health sciences, engineering, business and law in the first three years of the program. During this period, we have provided over \$300K in development funds and milestone-based awards, generated in excess of 42 provisional patents, and saw the creation of 48 novel technologies and eight new ventures. This program has energized the university innovation culture and cemented long-term industry partnerships.

**Clinical Experience in Rwanda Informs Student-driven Design of Appropriate Technology****Dustin Ritter, Texas A&M University**

In the summer of 2013, thirteen students (ten undergraduate and three graduate students) from five universities across the U.S. participated in a two-month immersive program in Rwanda, Africa, as part of a three-year NCIIA-funded research and design program focused on developing and commercializing innovative solutions to global health challenges in resource-poor settings. Aside from language and technical training, students were placed in public hospitals throughout Rwanda for a month, where they worked with local biomedical equipment technicians (BMETs) to repair medical equipment (112 pieces; ~225,000 USD) and perform needs assessments. Armed with insight gained from BMETs and on-the-ground experience derived from equipment repair, students proposed six device designs aimed at addressing critical needs. The most promising designs are being further developed by vertically integrated, interdisciplinary design teams at Texas A&M University. Prototypes will be field tested in Rwanda in the summer of 2014, and manufacturing and distribution pathways will be investigated.

**Research****Willow Glen**

2 pm - 3 pm

**Workshop****Founding Stories of Engineering Education Entrepreneurship Programs: Research to inform practice****Angela Shartrand, NCIIA****Sheri Sheppard, Carolyn Estrada and Helen Chen, Stanford University**

This session is devoted to understanding the "founding stories" of entrepreneurship programs for undergraduate engineers. Which conditions facilitate program creation and growth? What is the mindset of the founders? How do programs adapt to changing conditions? How do programs evolve and thrive? These and other questions will be addressed in a two-part format. In the first part of the session, top findings from our recent Epicenter research study of entrepreneurship programs in the U.S. will be reviewed. In the second part of the session, moderators will facilitate a lively panel with entrepreneurship program directors, in order to learn first-hand how programs go from idea to reality. This session is designed to inform entrepreneurship innovators at campuses that wish to build up programming for engineers, as well as entrepreneurship researchers who are interested in mixed-methods studies of programs and organizations. Questions from attendees will be welcome and encouraged.

**Students as Leaders****San Jose Ballroom**

2 pm - 3 pm

**Panel****Roundtable Discussion with NCIIA Alumni****Eric Phelps, NCIIA****Richael Young, Mammoth Trading****Evan Edwards, Kaleo****T. Patrick Walsh, Greenlight Planet**

Join an informal conversation with the NCIIA Alumni who presented on their ventures at lunch. This continuation of the Alumni Panel is an opportunity to get a deeper level of understanding of how these founders developed their innovations and launched their companies. The entire session will engage participants in Q&A with the panelists; expect to learn more about their mistakes and successes as well as how their educational experiences prepared them to be entrepreneurs.

**Program Models****Blossom Hill**

2 pm - 3 pm

**Workshop****Mobilizing the Regional Epicenter Model****Michael Lehman, Lehigh University****Elizabeth C. Kisenwether, Pennsylvania State University**

Epicenter's goal is to unleash the entrepreneurial potential of undergraduate engineering students across the U.S. to create bold innovators with the knowledge, skills and attitudes to contribute to economic and societal prosperity. In May 2013, fifteen Pennsylvania colleges and universities gathered for a two-day meeting to network, collaborate, and determine definitive projects that had value for the institutions and their faculty to make the Epicenter mission happen on a regional scale. Nine "affinity groups" were formed based on faculty interests and needs to help engineering students become innovation leaders. This workshop has two goals: 1) bring together Epicenter-PA faculty to share how the regional approach has been modeled and is working and 2) support other regional Epicenters in setting goals and establishing and monitoring metrics for success. This workshop will help guide future Epicenter-PA work, as well as bolster the nationwide Epicenter ecosystem.

**BREAK 3:00 pm - 3:30 pm****SATURDAY 3:30 pm - 4:30 pm****Best Practices****Willow Glen**

3:30 pm - 4:30 pm

**Workshop****Exploring How Engineering Entrepreneurship Competencies Align with ABET Criterion 3a-k****Elizabeth C. Kisenwether, Pennsylvania State University****Nathalie Duval-Couetil, Purdue University****Joseph Tranquillo, Bucknell University**

The Epicenter program goal is to unleash the entrepreneurial potential of undergraduate engineering students across the United States to create bold innovators with the knowledge, skills and attitudes to contribute to economic and societal prosperity. However, meeting ABET standards is the most significant driving force in engineering curriculum and programs. Since fall 2012, work has been underway to tackle two objectives: 1) determine a set of entrepreneurship education outcomes that align with ABET Criterion 3a-k, and 2) find field-tested engineering entrepreneurship and innovation activities that support meeting ABET Criterion 3a-k. The goal of this session is to review the engineering entrepreneurship competencies selected for study, get feedback from engineering entrepreneurship faculty on the ABET 3a-k mapping, and have discussions on the challenges to implementing Epicenter-based changes in core curriculum.

**Assessment****Almaden**

3:30 pm - 4:30 pm

**Panel****Assessment Methodologies for Entrepreneurship Education****John "Jack Lesko" and Scott Walker, Virginia Polytechnic Institute and State University****Angela Shartrand, NCIIA****Oscar Ybarra, University of Michigan**

As entrepreneurial skill development becomes increasingly important among undergraduates, graduate students and faculty, institutions and agencies are considering how to implement initiatives such as courses and workshops that can facilitate development of these skills. While the information that is taught during these courses is a primary concern, similar attention needs to be given to the assessment of those courses and workshops. This presentation discusses various assessment methodologies that are currently being used and proposes one methodology that can be used to specifically assess changes in mindset among participants. Other institutions may use this information to consider how best to assess current initiatives underway on their campus and share information collected to improve course design.



**Open Meetup**

San Jose Ballroom  
3:30 pm - 4:30 pm

**Group discussion****Open Meetup: Failures! Flops! Successes!**

Michael Lehman, Lehigh University  
Rhett Weiss, Cornell University

As technical entrepreneurship educators, we are fortunate to work with bright and innovative students, forward-thinking colleagues and institutions that support programs that respond to market and economic demand. Despite all of these attractive ingredients, we undoubtedly encounter challenges on a regular basis. Often the more new things we try, the greater the probability of experiencing failures, flops and a multitude of frustrations: new courses that are not as subscribed as we had hoped, cross-campus programs that do not produce the interest to justify the investment of time and money, and underutilized creative spaces of innovation. At the same time, plenty of initiatives go on to become great successes.

Come to this Open Meetup to talk about them all: the failures, flops and successes. This discussion will inspire participants to learn from our collective bumps in the road, creating stronger programs for NCIIA-member institutions.

Open Meetups are 60-minute, facilitated, participant-driven sessions centered on a particular theme or purpose. Instead of passive listening while one person delivers prepared remarks in front of a PowerPoint presentation, Open Meetups encourage active participation by all attendees. Discussion leaders will provide moderation and structure. They will set the stage and then allow discussion to flourish.

**Students as Leaders**

San Carlos  
3:30 pm - 4:30 pm

**Papers****Student Leaders as Catalysts for Innovation and Entrepreneurship Programs**

Lynn Andersen Lindberg and Hannah Goode, Southern Illinois University Carbondale

Student leaders emerge on campus through a variety of pathways--in classes, in research, and in service to organizations and people on and off campus. These leaders, some official and some de facto, are becoming a critical resource for innovation and entrepreneurship activities on campus that are not part of the traditional classroom or program of study. During the past several years, student leaders have been catalysts for the development of new programs and activities targeted toward student innovation and entrepreneurship. Learn how to identify and tap into these key resources on campus to build new programs and offer new activities to student innovators and entrepreneurs in your community.

**mystartupXX: Empowering the next generation of female technology entrepreneurs**

Lada Rasochova and Rosibel Ochoa, University of California, San Diego

To address the lack of female participation in technology startups, UC San Diego's Rady School of Management and von Liebig Entrepreneurism Center at the Jacobs School of Engineering piloted the mystartupXX program (named for the female chromosome). Mentoring and business coaching is the most important part of the program. It is tailored to the needs of individual female participants and focused on guiding them through forming and leading a team (consisting of both male and female students), evaluating the business idea, obtaining market feedback, and developing a business model. Additionally, the teams receive \$3,000 for prototype development. Since its launch, mystartupXX graduated seven female-led teams. Six graduates of the program have decided to launch a company, four females became CEOs and two became VP-level management team members. The startup companies continue to raise significant amounts of venture capital, launch products, generate revenues, and create jobs.

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**Students as Leaders**

San Carlos  
3:30 pm - 4:30 pm

**Papers****Lean Startup**

Blossom Hill  
3:30 pm - 4:30 pm

**Workshop****Program Models**

Guadalupe  
3:30 pm - 4:30 pm

**Papers****Case Studies of Student Entrepreneurs**

Larry Richards, Michael Gorman and Esther Klinger, University of Virginia

The Intelliject Inc. case study puts students in the shoes of an entrepreneur whose initial work was supported by the NCIIA. It allows undergraduate students to make decisions based on those made by Evan Edwards, starting with his decision to become an entrepreneur while at the University of Virginia and following the bumps in the road that he had to overcome or work around on his way to designing and selling a new drug delivery system. Students are taken through seven decision points that reflect the kinds of dilemmas Evan and his fledgling company faced. The goal of the case study is to inspire students by showing them one of their own who turned obstacles into opportunities, and gain wisdom from the lessons he learned.

**Lean Launchpad Masterclass with Jerry Engel**

Jerry Engel, University of California, Berkeley  
Todd Warren, Northwestern University  
Marc Sedam, University of New Hampshire

The Lean Launchpad (LLP) approach has recently swept into broad adoption as an effective, experiential approach to teaching entrepreneurship. Students learn by doing: proposing and immediately testing hypotheses. They get out of the classroom, talk to customers, partners and competitors and encounter the chaos and uncertainty of commercializing innovations and creating new ventures. In this masterclass session led by Jerry Engel, NSF I-Corps National Faculty Director and co-instructor with Steve Blank of the LLP Educators Seminar program, best practices will be presented and discussed with a panel of seasoned instructors who have deployed the LLP approach in different disciplinary environments. The session is designed for experienced LLP instructors and those who are new to it. The session will be highly interactive, drawing on the experiences of panelists and attendees alike. Participants will take away new perspectives on effectively engaging students, overcoming barriers and deploying new learning and teaching tools.

**Developing Entrepreneurial Competencies in 21st Century Engineers and Scientists**

Tom Thoen and Jeremy Bonsall, California State Polytechnic University, Pomona

Education in STEM Entrepreneurship (ESTEME) is a program aimed at developing 21st century skills in undergraduate engineering, science, and business students through entrepreneurship training. The key innovation in ESTEME is that students not only create a novel product and write a business plan, but actually produce and take the product to market. ESTEME is being assessed to identify 1) the entrepreneurial competencies SPIEED students develop, 2) the processes by which these competencies are developed, and 3) any incremental learning that occurs through commercializing an original technology, product, or service. Our goal is to collect systematic data to begin to understand what and how the students learn. We want to provide insights into how engineering and science students develop entrepreneurial behavior and by so doing influence the design of entrepreneurial STEM programs.

**The Berkeley Method of Entrepreneurship**

Kenneth Singer and Ikhtlaq Sidhu, University of California, Berkeley

The Berkeley Method of Entrepreneurship is a holistic approach that enables engineers to be more entrepreneurial. It encompasses three main multi-faceted elements: infrastructure and supporting environment; culture, social psychology and mindset; and strategies, tactics and judgment. These are woven together through a curriculum that emphasizes experiential learning of entrepreneurship within the safe classroom environment. Courses de-emphasize grades and focus more on goals using a highly gamified and product-based learning approach that leverages real-world competition and industry assessment of success. For this paper, we will present the Berkeley Method of Entrepreneurship in detail, including the following aspects: the rationale behind the method; the activities,

*...continued***Program Models****Guadalupe**

3:30 pm - 4:30 pm

**Papers**

courses and pedagogy developed to teach the method; and the entrepreneurship ecosystem created within the Center for Entrepreneurship and Technology at Berkeley and the surrounding innovation community to weave these into a coherent student experience.

**Introducing Entrepreneurship Education in Undergraduate Programs at Chalmers University of Technology, Gothenburg, Sweden**

**Hanna Sundström, Chalmers University**

Engineering education in Sweden has for a long time focused on theoretical, mathematical subjects, using traditional forms of teaching such as lectures, exercises and group assignments. During the fall of 2013 a new course was introduced to the undergraduate program in Mechanical Engineering at Chalmers University of Technology focusing on entrepreneurship and innovation and using new methods of teaching. The course uses flipped classroom methods and has Facebook as its platform for assignments and discussions among students and teachers. Entrepreneurship and innovation was a subject only taught at graduate level previously, with the students' only previous experience being theoretical ways of evaluating solutions to problems in product development. The idea is to give the students something new but equally important for their future. The goal is to make this course an elective for all undergraduate students at the university, unleashing the entrepreneurial spirit of Swedish engineering students.

**SATURDAY 6:30 pm**

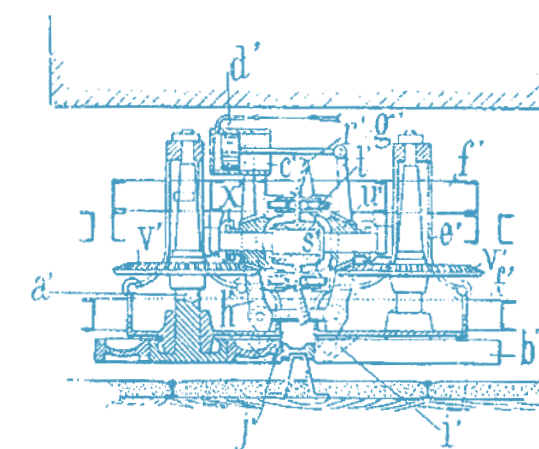
**Open Minds @ the Tech Museum**

Cap off the conference in style by attending Open Minds, a favorite event of NCIIA conference attendees. Open Minds is an exhibition of cutting-edge innovation from our best student teams. It is a great opportunity to see entrepreneurship education in action. Seventeen teams will be on hand to demonstrate their products, showcase their ventures and practice their pitches.

FOR THE FULL SCHEDULE  
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For the full schedule, list of presenters, conference papers and more, visit [nciia.org/open](http://nciia.org/open). You can also see who's attending the conference by heading to [nciia.org/open/connect](http://nciia.org/open/connect) and connecting via LinkedIn.



[NCIIA.ORG/OPEN](http://NCIIA.ORG/OPEN)

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## Programs for Faculty

The NCIIA supports faculty in higher education through grants, training and other programs that are designed to stimulate and support entrepreneurship on university campuses nationwide.

### Funding

[Course & Program Grants \[nciia.org/grants/courseandprogram\]](http://nciia.org/grants/courseandprogram)

Awarded to improve existing or build new programs in invention, innovation and entrepreneurship.

Up to \$50,000 | Next deadline May 9, 2014

[Sustainable Vision Grants \[nciia.org/grants/sustainablevision\]](http://nciia.org/grants/sustainablevision)

Awarded to transformational educational programs and/or courses where breakthrough technologies are created and commercialized for emerging markets.

Up to \$50,000 | Next deadline Fall 2014

### Training

[Lean LaunchPad Educators Program \[nciia.org/LLP\]](http://nciia.org/LLP)

April 21-23, 2014 | Stanford University

Rethink your approach to entrepreneurship and experience the Lean LaunchPad process and customer development approach to teaching entrepreneurship and new venture development. Led by Steve Blank and Jerry Engel.

### Open Annual Conference

Washington, D.C. | March 20-21, 2015

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## Programs for Students

NCIIA supports undergraduate and graduate students in colleges and universities nationwide. NCIIA provides funding, training and investment for student innovators working on technologies that will have a positive impact on the world.

### Funding & Training

[E-Team Program \[nciia.org/eteam\\_program\]](http://nciia.org/eteam_program)

For college- and university-based innovators and entrepreneurs.

Funding + Training + Investment

Up to \$75,000 | Next deadline May 9, 2014

[University Innovation Fellows \[nciia.org/universityinnovationfellows\]](http://nciia.org/universityinnovationfellows)

A student-led program at campuses nationwide focused on university innovation and entrepreneurship.

Fall and Spring enrollment

### Biomedical Competitions

NCIIA organizes two annual biomedical engineering competitions for university students to identify and recognize innovative, commercially promising medical devices and technologies developed by entrepreneurial student teams.

[BMEidea \[nciia.org/competitions/bmeidea\]](http://nciia.org/competitions/bmeidea)

Open to all graduate and undergraduate student teams

Up to \$10,000 | Next deadline April 4, 2014

[BMESTart \[nciia.org/bmestart\]](http://nciia.org/bmestart)

Open to undergraduate student teams only

Up to \$10,000 | Next deadline May 23, 2014

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# EPICENTER

EMPOWER UNDERGRADUATE ENGINEERING STUDENTS TO BRING THEIR IDEAS TO LIFE



## University Innovation Fellows

training and support for engineering students to lead entrepreneurship and innovation movements on their campuses

## Pathways to Innovation

program that guides teams from entrepreneurship-ready universities through a process of institutional change in engineering education

## Research

studies on program models, entrepreneurial interests and skills of engineering students, and ways to infuse entrepreneurship into technical engineering classes

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# EPICENTER

EMPOWER UNDERGRADUATE ENGINEERING STUDENTS TO BRING THEIR IDEAS TO LIFE



Epicenter is thrilled to be part of NCIIA's Open conference for the third year. Learn more and get involved at these sessions hosted by Epicenter leaders and community members:

THURSDAY  
20  
March

Ideas at Play: The Gaming of Innovation and Entrepreneurship Education

FRIDAY  
21  
March

Online Learning Workshop: Landscape of Opportunities  
Online Learning Workshop: Inventing the Future

SATURDAY  
22  
March

Making Space for the Unknown Future  
Founding Stories of Engineering Education  
Entrepreneurship Programs: Research to Inform Practice  
Mobilizing the Regional Epicenter Model

SUNDAY  
23  
March

Exploring How Engineering Entrepreneurship Competencies Align with ABET Criterion 3 a-k  
ED.gov Datapalooza: University Innovation Fellows Answer the Call  
Spaces of Invention Workshop

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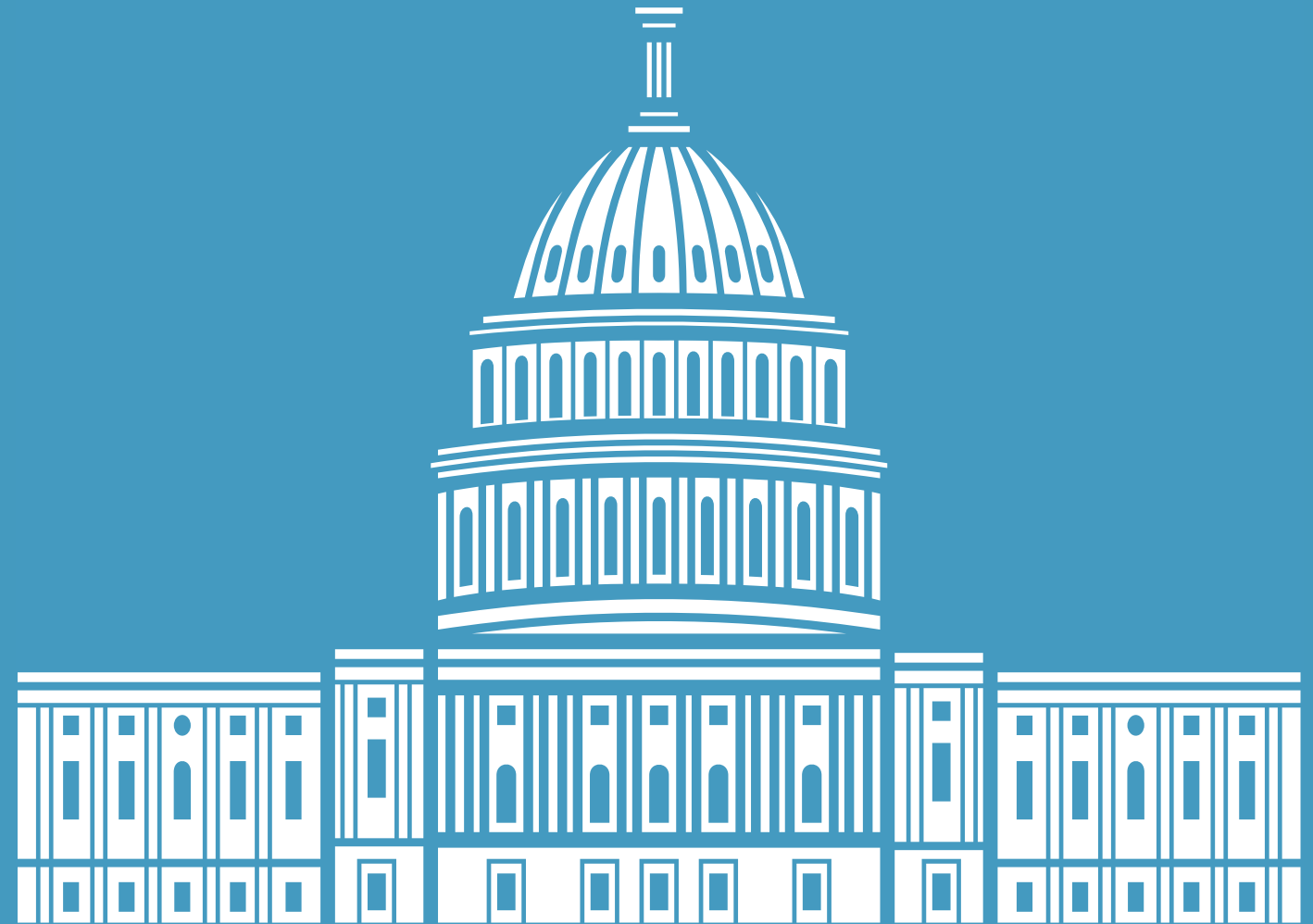


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Registration opens in September

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Fig. 1

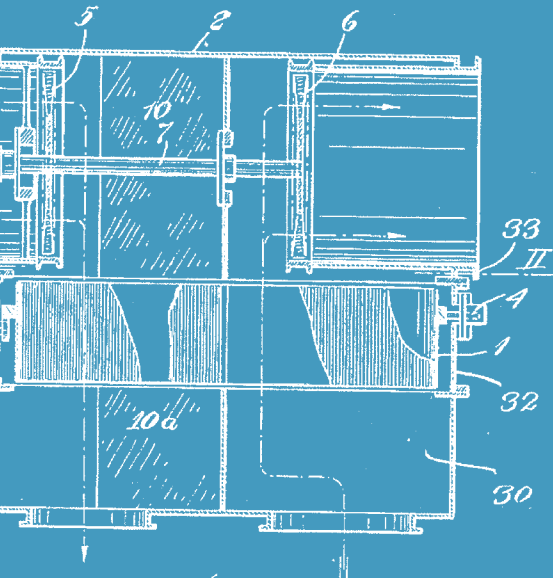
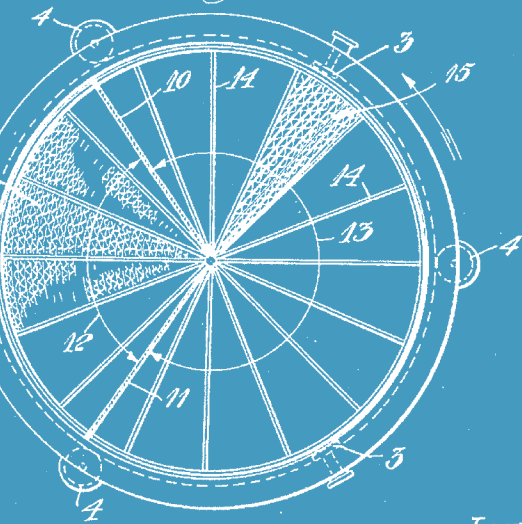


Fig. 2



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Fig. 3

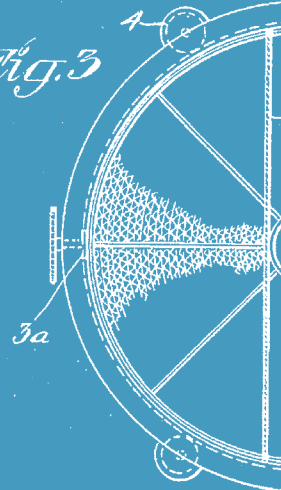
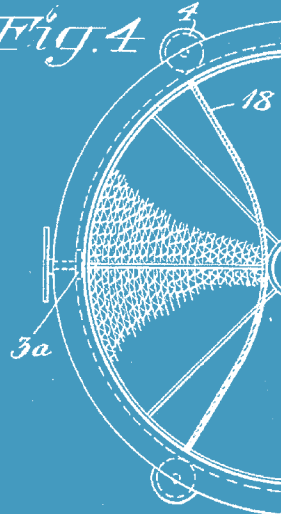


Fig. 4



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FSC logo

Fig. 5

