

# Advancing the Discipline of Entrepreneurship

GCEC Awards Submission // July 2012

McGuire Center for Entrepreneurship // The University of Arizona

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Today's rapid rates of technological and social change force entrepreneurs to be more fundamentally mission-minded as they develop ventures, prepared for inevitable changes in delivery, competition, customer choice and technological capability. So too must entrepreneurship centers and educational programs be adaptable, forward-moving and mission-minded as they respond to changing needs and opportunities locally and globally. By advancing the discipline in this way — focusing on launching entrepreneurial talent versus start-ups, capitalizing on opportunities to collaborate with industry, helping regions reverse economic stagnation and cultivate economic resiliency and graduating not just entrepreneurs but also future executives armed with the skills and mindsets to keep their companies growing and creating jobs — entrepreneurship centers like the McGuire Center play a central role in the health and wellness of our communities.

## Economic Development & Community Outreach

Today we recognize that there is no U.S. national economy or even individual state economies. Instead, we have hundreds of regional economies, and it's imperative that regions be able to respond to economic opportunity and compete independently: Regions need to operate entrepreneurially in a global economy.

As resources for intellectual assets, technology, education and training--universities are called upon to take the lead in mobilizing regions to participate effectively this economic reality, but for that to happen, the universities themselves must first learn how to become creators of economic value.

### *Partnering for Economic Impact and Engaging the Entrepreneurial Community*

Particularly in the post 2008-era, the McGuire Center for Entrepreneurship has taken a lead role in helping the University of Arizona and the Southern Arizona region respond to economic shifts and prepare for its role in the new economy. Developing entrepreneurial talent, equipping entrepreneurs with tools and resources and building entrepreneurial intelligence among a wide range of professions and industries (both profit and non-profit) is not only possible, it is essential. Characteristics and attributes of entrepreneurs and their successes are easily recognizable. Therefore they are definable, replicable and teachable. While there will always be those in whom entrepreneurship is "hardwired," through deliberate outreach, the McGuire Center is working to cultivate broad and deep community of entrepreneurial understanding, activity and success.

- **Tech Launch Arizona:** The McGuire Center has served as one of the primary planning and development partners in Tech Launch Arizona, a restructuring of units and resources at the University of Arizona designed to better align forces for commercializing important scientific discoveries. The Center will continue to be a central player as this initiative evolves. Tech Launch Arizona will be located within the McGuire Center for Entrepreneurship, reports directly to the UA President, and is chaired by Eller College dean and Professor of Entrepreneurship, Len Jessup.
- **Entrepreneurial Economy Task Force:** The McGuire Center led the Entrepreneurial Economy Task Force, which, over the course of two years, created a now widely adopted blueprint for how educational institutions, legislatures, civil leaders and other Southern Arizona organizations can work together to develop a more vibrant entrepreneurial regional economy.
- **Office of Technology Transfer:** The McGuire Center's partnership with the UA Office of Technology Transfer (OTT) has driven many of the University's and region's most important strides forward in developing a more entrepreneurial economy. One recent example, the McGuire Center and OTT partnered on creating a unique legal structure to allow students to develop ideas for commercializing UA technologies while maintaining clear distinctions regarding IP ownership. The McGuire Center and OTT have co-hosted capacity-building workshops, co-authored books on intellectual property, shared staff and dramatically expanded entrepreneurial networks on and beyond the UA campus.
- **Patent Data Center:** The McGuire Center is driving development of a research tool that creates significantly more meaningful access to U.S. patent data. Our Patent Data Center combines multiple data sets to allow users to search *millions* of records at a time — a feature available nowhere else. The data sets are updated weekly and not only can the tool return hundreds of thousands of results to

a search, its proprietary algorithm also ranks the innovation value of each patent. This new data source allows for rich information gathering on patents that can be used in strategic analyses — data that will be made accessible to academics worldwide for review, scrutiny and query, enabling the next wave of innovation-focused research.

- **Mentors in Residence:** Drawn from the entrepreneurial community; educators within the McGuire Entrepreneurship Program
- **New Ventures Expo** (in conjunction with the Southwest Angels Summit) and **Entrepreneurs Grand Championship:** Annual showcases of student ventures developed through the McGuire Entrepreneurship Program; members of the entrepreneurial community are also tapped as judges for the Grand Championship venture competitions
- **Southwest Angel Summit and Angel in the University Conference:** Annual meeting of Angel investor groups from around the southwestern U.S. and Mexico to focus regional opportunities, challenges, and new knowledge. Meeting is co-sponsored by McGuire to coincide with McGuire's New Venture Expo, enabling all McGuire students to interact one on one with dozens of qualified Angel Investors over a two day period. 2010 culminated in a Angel in the University Conference. At this conference teams from 10 universities, comprised each of an entrepreneurship director, tech transfer senior official, and regional angel investor, shared information, best practices, and explored challenges of regional innovation eco-system management.
- **Innovation Law Lab:** Ongoing initiative through which third-year law students under the supervision of practicing attorneys provide no-cost legal knowledge to emerging regional enterprises
- **Technology Commercialization Course:** UA course offered 2x/year through which students in science, business, law, engineering, finance, entrepreneurship and other relevant disciplines assess portfolios of live IP in the university and entrepreneurial community
- **Entrepreneurship and Innovation Seminar Series:** Annual series that provides a forum for connecting student and scholars working on issues related to entrepreneurship ranging from technology transfer to the impact of tax policies
- **Science for Business Workshops Series:** Recurring series to engage entrepreneurially minded UA students in discussions of University discoveries and their potential business value
- **Entrepreneurship and idea generation workshops:** Various events throughout the year designed to build entrepreneurial capacity in the region, totaling 1,000+ seats annually
- **IdeaFunding:** Annual full-day workshop, now in its 17th year, providing information and resources to entrepreneurs, early-stage companies and established firms exploring entrepreneurial directions
- **Local, National, and International presentations:** McGuire personnel frequently are commissioned to speak to agencies and organizations regarding economic and regional development. These range from industry specific organizations, to state legislatures and other policy bodies, and at the international level, to other schools and regions through academic relationships and through international economic development entities. A [select] list of states and countries includes Arizona, Florida, Texas, California, Sonora, Jalisco, Russia, Hungary, New Zealand, China, Portugal.

## Service to the Discipline / Education Development

As one of the first named centers for entrepreneurship in the country, the McGuire Center began as a pioneering institution and remains a model and benchmark to the growing number of entrepreneurship centers across the country and around the world. Many students come to the University of Arizona explicitly to engage the McGuire Center, and our graduates go on to become not only entrepreneurs but business leaders, policy makers and community leaders who bring a vital entrepreneurial perspective to their respective spheres of influence. Since its establishment in 1983, the Center has continually evolved to develop highly distinct, effective approaches to entrepreneurship education that have influenced the development of initiatives at many other colleges and universities: our benchmark-based curriculum, our model for real-world legal engagements, the Applied Doctoral Minor, the Entrepreneurship & Innovation minor for non-business undergraduates, the Innovation Law Lab for emerging ventures, our systematic approach to assessing the alternate values of ventures, our independent Academic Review and much more. Most

recently, we provided a live webcast of our end-of-year Grand Championship at the request of educators in India and Chile who have been closely following our educational approach. Their schools and others then asked us to explore ways that their students might directly engage ours, becoming part of the cohort through distance-collaboration technology. We will, no doubt, find a way to bridge that distance, creating yet another pioneering model in the process as we respond to, learn from and advance innovative education from around the world.

### *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*

Each year since 1995, the McGuire Center has organized and edited an annual volume in the series Advances in the Study of Entrepreneurship, Innovation, and Economic Growth through Emerald Publishing. The series aims to present the latest research on entrepreneurship, innovation, and the impact on economic performance. Topics include all aspects of entrepreneurial behavior, the determinants of research and development, intellectual property concerns, innovation within and across firms, the effect of government regulation and tax policies, patenting and other property rights issues, organizational factors, market structure effects, marketing strategies, entrepreneurship programs and other educational activities, and the relative performance of entrepreneurial firms. The disciplines covered include economics, marketing, management, finance, and history. The target audience includes both academics and practicing entrepreneurs. The overall objective is to disseminate research in a clear and effective manner to promote communication between the business and academic communities and to foster entrepreneurship within the society. A single volume is published annually edited by Gary D. Libecap and Sherry Hoskinson. Beginning in 2012, the series editorial team will be Donald F. Kuratko and Sherry Hoskinson, and will draw from topics illuminated through the entrepreneurial leadership teams across the country and world. Recent titles include:

- Vol 23: (forthcoming): ***A Novel Framework for Understanding Innovation in the Social Context***, 2012
- Vol 22: ***Entrepreneurship and Global Competitiveness in Regional Economies: Determinants and Policy Implications***, 2011
- Vol 21: ***Spanning Boundaries and Disciplines, University Technology Commercialization in the Idea Age***, 2010
- Vol 20: ***Frontiers in Eco-Entrepreneurship Research***, 2009
- Vol 19: ***Measuring the Social Value of Innovation: A Link in the University Technology Transfer Equation***, 2008
- Vol 18: ***Technological Innovation: Generating Economic Results***, 2007

### *Measuring the Social Value of Innovation*

In an effort to mobilize a deeper knowledge-pool relative to the social value of specific innovations for the purpose of informing curriculum design, advising policy and individual entrepreneurs, and to address an inherent disconnect in the university technology transfer formula, the McGuire Center initiated the **Social Value of Innovation** Project. This project consisted initially of invited papers in the areas of: the potential for valuing innovation in non-commercial terms as a means of stimulating alternate cultivator pools (including inventing faculty); potential metrics and measures; and implications for a University specific pilot project with transferability to other institutions. Following the collection of papers, authors and other discussants were invited to a private, intensive three-day colloquium focusing on the three areas. Authors and discussants included scientists, sociologists, economists, technology transfer professionals, university senior administrators, and entrepreneurs.

Following paper review and colloquium discussions, proceedings were organized into a volume: ***Measuring the Social Value of Innovation: A Link in the University Technology Transfer Equation***, Emerald Publishing, Vol 19 Advances in the Study of Entrepreneurship, Innovation, and Economic Growth. This volume and the subsequent volume: ***Frontiers in Eco-Entrepreneurship Research*** (Vol 20, AISEIEG), which includes a framework for valuing individual innovation, represent important contributions to the non-commercial valuation dimension of innovation optimization--and of course to entrepreneurial education. As a direct result, McGuire Program benchmarks addressing student competency in assessing, qualifying, and communicating non-commercial values, are embedded in curriculum, as is a specific framework approach, both enabling students of entrepreneurship to advance social value of innovation throughout their careers. The curriculum and framework are shared with average 20 schools per year.

### *Documenting the Impact of Entrepreneurship Education*

**The Entrepreneurship & Innovation Assessment Project:** The McGuire Center is currently conducting a large-scale study of student awareness, perceptions, and appreciation of entrepreneurship and its role in society and the organization, as well as their personal expectations of entrepreneurship. In this landmark study, survey responses from every Eller entering freshman will be compared with responses of the same graduating seniors with the goal of pinpointing changes in perception and appreciation and the sources of the change. Sources will include examinations of **Student:** Course specific learning outcomes; **Student culture:** Impact on student/student appreciation, understanding, and awareness of entrepreneurship; **Faculty and peer culture**—entrepreneurship. How other populations within Eller/UA view and value entrepreneurship; and **Brand**—how other populations outside of McGuire including local, national, and international constituents perceive and value McGuire specifically. The full assessment project consists of 11 separate assessment activities. All data is collected on a micro level and merged with UA Business Analytics data, so that external implications, general UA course and major selection, even faculty and department specific interactions can be analyzed. Analyses will serve other centers as they refine their own approaches to entrepreneurship education. The study began in fall 2011 and will conclude in spring 2015. Data is being collected and analyzed each semester

- S-1:** Number of students completing three credit EI requirement
- S-2:** EI requirement course rating average 8.0 (combined instructor rating + course difficulty, max 10)
- S-3:** Increased demand for EI coursework beyond three credit requirement
- S-4:** Number of students citing entrepreneurship as highlight in Eller education
- C-5:** Statistically significant increase in positive attitude toward entrepreneurship
- C-6:** Statistically significant increase in personal interest in entrepreneurship
- C-7:** Overall increase in composite scores of Eller candidates accepted to the entrepreneurship major
- C-8:** Increased number of Eller faculty whose research intersects meaningfully with entrepreneurship
- C-9:** Increased number of faculty teaching classes in entrepreneurship
- M-10:** # of unique visits per month to affiliated websites
- M-11:** Composite ranking in national and appropriate international rankings

— **Long-Term Outcomes:** The McGuire Center designed and conducted the standing authoritative study of the long-term impact of entrepreneurship education, funded by the Kauffman Foundation. Researchers found that McGuire Program alumni remain contributors to an entrepreneurial economy beyond immediate years following graduation. Controlling for personal characteristics and looking at a 15-year post-graduation window, researchers found that alumni were three times more likely to be involved in the creation of a new business and had significantly higher incomes and greater personal assets. Companies owned by or employing entrepreneurship alumni had more than five times the sales and employment growth compared to other companies. Finally, entrepreneurship graduates were significantly more likely to be involved in developing new products, were more engaged in R&D activities and were significantly more likely to be employed full-time in technology-oriented industries. Although the study is over 10 years old, **this constellation of findings remains one of the most important tools for policymakers and program developers** working to gain ground for entrepreneurship education in K-12 and university education.

### *illuminating the Dynamics of Entrepreneurial Forces*

One of our key goals is to not only be a leader in advancing innovation and entrepreneurship but to also cultivate an ecosystem that encourages and enables others to become leaders, as well. Within the context of academia, we lead and foster **research to illuminate the dynamics of commercial innovation**. Many of these inquires are being explored by educators outside the McGuire Center, thanks in part to five endowed chairs in entrepreneurship we have established at colleges across campus.

#### A Sampling of Current and Recent Research Inquiries

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▪ Do innovations in societies emerge through individual or social processes?</li> <li>▪ How does shifting from a manufacturing logic to a</li> </ul> | <ul style="list-style-type: none"> <li>▪ Can internal resources guide companies' decisions on directions for R&amp;D?</li> <li>▪ What processes and forces shape entrepreneurship in</li> </ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

<p>service logic affect innovation?</p> <ul style="list-style-type: none"> <li>▪ What does social media reveal about the adoption and abandonment of innovation?</li> <li>▪ What are the long-term outcomes associated with entrepreneurship education?</li> <li>▪ What factors influence a person's decision to become part of a venture?</li> <li>▪ What characteristics distinguish entrepreneurs from conventional managers?</li> <li>▪ How does social influence impact technology adoption?</li> <li>▪ How do peer-to-peer platforms affect innovation financing and resources?</li> <li>▪ How does a focus on more external collaboration shift the locus of innovation?</li> </ul>	<p>China?</p> <ul style="list-style-type: none"> <li>▪ What factors affect founders' decisions to sell or retain controlling interests?</li> <li>▪ What are the market effects of corporate parenting?</li> <li>▪ What factors drive decisions around manufacturing vs. tech licensing?</li> <li>▪ What relationships exist between leadership reputations and success at innovation?</li> <li>▪ How does patent data influence the stock market?</li> <li>▪ What patent policies drive production of higher-quality products?</li> </ul>
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## Aligning Economic Needs with High-Quality Education

Today we recognize that there is no U.S. national economy or even individual state economies. Instead, we have hundreds of regional economies, and it's imperative that regions be able to respond to economic opportunity and compete independently: Regions need to operate entrepreneurially in a global economy. As resources for intellectual assets, technology, education and training, universities need to take the lead in helping regions participate effectively this economic reality, but for that to happen, the universities themselves must first learn how to become creators of economic value.

While the McGuire Center actively partners with other units on campus and in the region to stimulate economic activity and create more focused and effective entrepreneurial activity in our communities, student education remains the primary way in which we stimulate entrepreneurial activity, and the best expression of our philosophy.

### *Philosophy & Goals*

1. **Access to World-Class Entrepreneurship:** We stand to gain the most when everyone has access to entrepreneurship education. Entrepreneurship education ultimately develops highly competent leaders and agents of change — the people who move societies and economies forward, not simply the people who launch new ventures. For this reason, we have worked diligently to provide opportunities campus wide. Simply stated, today, every student at the University of Arizona — a colossal institution with 40,000 students, 23 colleges, countless majors, and recipient of over \$650,000,000 annually in research funding — can engage with the McGuire Center for Entrepreneurship to access world-class entrepreneurship education.
2. **Rich Integration of Contemporary Values:** Entrepreneurship education needs to adaptively serve contemporary economic, social, and economic circumstances. Today's unprecedented rate of technical advancement, for example, makes human capital and change management more critical elements of entrepreneurship education than even five years ago. Similarly, in an environment where enterprises win or lose on far more fronts than just profit and loss, alternate value assessment and development is an increasingly important dimension to a McGuire education. We continually survey the real-world circumstances our students will face on graduation and adapt our programs to best prepare them for what lies ahead.
3. **Learning, not launching:** University-based entrepreneurship education must focus on learning, not launching. We are not trade schools. Moreover, we must resist the entrepreneurial chatter that permeates regions today. Entrepreneurial skills are the same skills underlying every critical area of social and economic development, from legislation and governance to medical advancement, social reform and environmental stewardship. Entrepreneurship education teaches critical thinking, strategic planning and tactical skills for turning innovative ideas into sustainable enterprises. That knowledge set must not focus on launching one specific business but rather one launching one lifetime of success in any given endeavor.

## Included Supplemental Materials

- Tech Launch Arizona announcement, UA News
- Entrepreneurial Economy Taskforce Overview (pg 1-2 of 30)
- Student Work Product and Innovation Memoranda of Understanding
- Patent Data Center Overview
- Entrepreneurs' Grand Championship and New Ventures Expo Promotional
- Southwest Angel Summit Promotional
- Innovation Law Lab Overview
- Technology Commercialization Class Overview
- Entrepreneurship and Innovation Seminar Series Announcement
- Science for Business/ Entrepreneurial Dimensions of Entrepreneurship Workshop Series Announcement
- Entrepreneurship and Idea Generation Workshop Overview
- IdeaFunding Program
- Academic Review Overview
- Social Value of Innovation Colloquium
- Entrepreneurship and Innovation Assessment Overview
- Impact of Entrepreneurship Education Study Outcomes

Tech Launch Arizona announcement, UA News

# New Center to Advance Movement of Ideas to Market

By La Monica Everett-Haynes, University Communications, | November 28, 2011

*UA President Eugene G. Sander charged administrators with creating TLA-Tech Launch Arizona, a new technology commercialization center designed to consolidate efforts around moving knowledge and inventions to market.*

Len Jessup, the UA Eller College of Management dean, has been appointed board chair of the newly created Tech Launch Arizona.

UA technology transfer activities stem from the arts, law, humanities, information technology, life sciences, optical sciences and engineering, among other disciplines. Leslie Tolbert, UA's senior vice president for research, graduate studies and economic development, said Tech Launch Arizona is very directly about producing practical, public benefits from knowledge creation.

Technology commercialization is about transferring knowledge creation in the academy into practical applications for the public benefit, driving economic development in the process. (Photo credit: Patrick McArdle/UANews)

A new University of Arizona center has been formed to ensure greater cohesion among the community, business sector and institutional inventors and offices promoting the transfer of ideas and technology to market.

Advanced under the charge of UA President Eugene G. Sander, TLA-Tech Launch Arizona represents both a major restructuring and a repositioning of the University's technology commercialization efforts.

The new UA entity is grounded in a two-part mission: to more easily move beneficial knowledge creation and inventions into the public sphere while propelling economic development forward in Arizona and elsewhere.

"Tech Launch Arizona is a dramatic step forward in how the UA contributes to economic growth," said President Sander.

"This effort will not only result in an expansion of the UA's technology commercialization capacity, but also create much more robust partnerships between the University and entrepreneurs and business leaders," he added.

Len Jessup, dean of the UA's **Eller College of Management**, said "a clear economic development imperative" is behind the center's creation.

"We want to better harness all of the discovery going on at the UA and to find ways to get these discoveries into the marketplace so they not only create jobs, but also can be translated into products, services and companies that can ultimately save lives and preserve the planet," said Jessup, also the newly named chair of the center's board of directors, which will include several other UA deans.

Tech Launch Arizona's trajectory is already riding on recent success related to an increase in inventions and methods born out of the UA, some of which have earned widespread recognition and utilization.

One such example comes out of the Artificial Intelligence Lab at Eller.

**Hsinchun Chen**, who directs the lab, and his team developed the award-winning crime fighting analysis software, COPLINK, which was acquired by i2 Holdings Ltd. The company now employs about 100 people in its Tucson office, and IBM recently announced it has agreed to buy i2 for an estimated \$500 million.

"An important goal of the UA is to help create and support an entrepreneurial spirit in Arizona," said **Leslie Tolbert**, UA's senior vice president for research. Tolbert was among the UA administrators who helped develop the center's blueprint.

"What we want to do is to create more impact for the public good," Tolbert said. "It is about creating a very strong connection among the community and the discoveries and inventions that the University's faculty, staff and students produce."

## **A New Structure**

Technology commercialization has a long, established history at the UA, with knowledge dissemination and innovation being among the institution's founding mandates.

With regard to public impact, benefits of such commercialization are manifold and include job creation and expanding education's reach. Such innovation can lead to additional external funding for the institution.

But Tech Launch Arizona's structural model and implementation are new.

Under the new structure, UA offices and divisions related to technology transfer, licensing, prototyping and investment would be folded into Tech Launch Arizona, which will be led by an executive director who will report directly to Sander. Jessup will chair an eight-member search committee that is now ready to launch a national search for the new executive.

Tolbert said another key component is the center's external advisory group, which will be comprised of entrepreneurs and business leaders from Arizona and other parts of the country.

"This group is an important touch point for the community, an open door for providing input," Tolbert said.

Additionally, the center will expand the UA's proof-of-concept and prototyping centers and collaborate directly with corporations and business partners.

Tech Launch Arizona also will serve as a contact point for the **Office of University Research Parks** and the **Arizona Center for Innovation**. In effect, the center's creation will "expand the production of commercially viable inventions," Tolbert said.

Thus, the center will consolidate human capital and resources, make stronger connections with community members and business partners and also stand as a single beacon for such activities, she added.

"It should feel like a seamless transition as you harness ideas and inventions and license them out to a company or leverage them as the basis for a new start-up," Tolbert said.

### **Transferring Ideas Into Practical Benefits**

UA inventors have already developed new approaches to drug delivery and treatment for various diseases and conditions, lower cost but more powerful optics fibers, holographic technology enabling three-dimensional moving images and an improved life-saving CPR technique, among numerous other examples.

A report on the UA's technology transfer activities Tolbert co-presented to the **Arizona Board of Regents** in April detailed an increase in recent years in invention disclosures, patents issued and the companies created based on knowledge and technology developed at the UA.

The 2010 fiscal year, which resulted in more than \$1.25 million in revenue from licensing and options, closed with 64 transactions – a record for the UA. For fiscal year 2006, that figure was at 26 for licensing and options.

Some of the more recent successes at the UA include:

- Tucson-based Valley Fever Solutions was founded by **John N. Galgiani**, a UA College of Medicine professor who directs the **Valley Fever Center for Excellence**. The company is developing a drug that can serve as a therapy for Valley Fever.
- Also based in Tucson, Desert Beam Technologies, LLC is working to take terahertz wavelength sources in compact form to market. The company was founded by UA optical sciences professors **Jerome Moloney** and **Mahmoud Fallahi**, along with Stephan W. Koch, an adjunct faculty member in the **College of Optical Sciences**.
- For distribution rights, UA's Arizona Public Media licensed "**The Phoenix Mission: Onto the Ice**" to the Public Broadcasting System. The film was produced in conjunction with the College of Science's Lunar and Planetary Laboratory.

- Patricia Hoyer, a UA **physiology** professor, and Loretta Mayer, a UA associate affiliated with the **BIO5 Institute**, were issued a patent for their work toward designing a method to induce menopause in animals.

This type of work does not occur in isolation, but often requires that faculty members first land external funding to propel their ideas forward, then obtain a dedicated investment from the private sector.

Therefore, stronger linkages must be made between faculty and investors, which is one reason why the center will be closely aligned with UA's **McGuire Center for Entrepreneurship** within the Eller College.

"This is hugely significant, not just for the UA to become self-sustaining, but to fulfill the role the state needs the UA to fill in terms of economic development," said Jessup, also the Halle Chair in Leadership.

He noted that McGuire Center's faculty and students have had about 500 company launches to date, with an average of about a half-dozen annually.

Such activities are important for the long-term success of the University and the benefit of the state, he also said.

Jessup emphasized: "Fundamentally, this not only helps the University of Arizona achieve its land-grant mission, but also helps to fulfill what the state – and I argue, the country – needs, which is for the University to play a larger role, now more than ever, in economic development."

Entrepreneurial Economy Taskforce Overview (pg 1-2 of 30)

## Entrepreneurial Economy for Tucson Task Force

In 2009, a task force including TREO, the University of Arizona McGuire Center for Entrepreneurship, UA Corporate Relations, Desert Angels, Solstice Capital, Hecker & Muehlebach and others came together to create awareness of the importance of an entrepreneurial economy for Tucson. The resulting Entrepreneurial Economy for Tucson Task Force Recommendations were developed to encourage an ecosystem that will provide entrepreneurs the best environment in which to launch their companies.

The development of this report involved contributions by the following people and others.

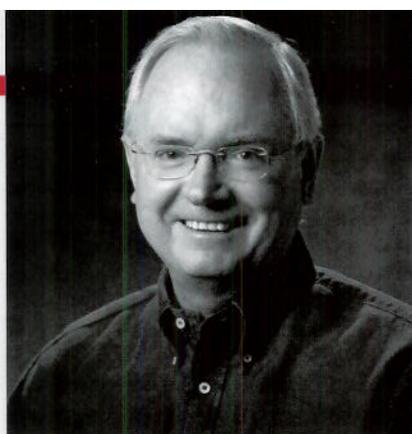
### Executive Committee

- Harry George, Solstice Capital, Chair
- Larry Hecker, Hecker & Muehlebach
- Sherry Hoskinson, UA McGuire Center for Entrepreneurship
- Laura Shaw, Tucson Regional Economic Opportunities (TREO)
- Nancy Smith, University of Arizona
- Justin Williams, StartupTucson

### Members

- Kerstin Block, Buffalo Exchange
- Louis Breton, Calimmune
- Jack Dean, Sanofi
- Darryl Dobras, Desert Angels
- Donna Gifford, Pima Community College
- Curtis Gunn, Desert Angels
- Huw Jones, Hayes Soloway
- Michael Keith, Downtown Tucson Partnership
- Daniel Kuz, Raytheon Missile Systems
- Tarek Makansi, Tempronics
- Robert Morrison, Desert Angels & UA McGuire Center for Entrepreneurship
- Tim Reckart, Rusing, Lopez & Lizardi
- David Smallhouse, Miramar Ventures
- Lucinda Smedley, TREND Report
- Joe Snell, Tucson Regional Economic Opportunities (TREO)
- Michael Voevodsky, Salutaris Medical Devices
- Marie Wesselhoft, MSDx

Photo: BallfourWalker.com



# Harry George Practical Visionary

By Donna Kreutz

Harry George helped launch 60 companies – so far.

George brought his venture capital vision to Tucson 1991, where he's invested in and mentored numerous startups. He's a co-founder of Desert Angels, one of the largest and most active networks of private investors in the United States.

He led the Task Force that produced this special BizTucson report – Vision for Tucson: Entrepreneurs Power New Economy.

George has nearly 40 years of experience in establishing, operating and investing in successful rapid-growth technology-related companies. He is an investor in SynCardia Systems, maker of the only artificial heart approved by the FDA, High Throughput Genomics (now HTG Molecular Diagnostics) and Medipacs among others. He does know how to pick 'em.

George co-founded Solstice Capital in 1995, a venture capital fund investing in early stage lifescience, information technology and clean tech companies. The first fund invested in 21 companies, including E-Ink, the company that developed the technology used in the Amazon Kindle. He's currently managing the second Solstice fund of \$57 million, which has invested in a total of 23 companies since inception.

From 1981 to 1989, George was co-founder, director and VP of Finance for Interleaf, a pioneer in electronic publishing that grew to be a publicly traded company with \$100 million in annual revenue and 800 employees. In January 2000, Inter-

leaf was acquired by Broadvision in a stock merger that valued Interleaf at approximately \$1 billion. Before that, George was a co-founder, director and VP of finance for Kurzweil Computer Products, subsequently purchased by Xerox Imaging Systems in 1980. George has been a director of 26 private and public companies.

In 1991, he moved to Tucson from Boston after falling in love with the desert, which led him to serve seven years as trustee of the Arizona-Sonora Desert Museum, then six years as co-chair of the museum's Treasure of the Desert Capital Campaign. Since 2006, he's been a trustee of the Tucson Museum of Art where he is serving as treasurer.

He has vision and he leads.

George is a director of AdiCyte, Calimmune, HTG Molecular Diagnostics (where he serves as chairman), Lumidigm, Medipacs, POST, BID.SHIP, REhnu, SynCardia and Tempronics.

He's also contributed his insights to the Arizona Venture Capital Conference and its successor Invest SW, Arizona Technology Council, Arizona Ventures Capital Association, BIO5, Pima County Bond Advisory Committee, Rocky Mountain Venture Capital Association, Southern Arizona Leadership Council, the University of Arizona Eller School of Business and the Arizona Center for Innovation.

See BizTucson Profile, "Wild About Harry," Summer 2009, [www.biztucson.com](http://www.biztucson.com)



# Vision for Tucson: Entrepreneurs Power New Economy

By the Entrepreneurial Economy for Tucson Task Force

## Arizona Pioneers Lay Groundwork for Entrepreneurial Culture

From the mid-19th century through the immediate post-World-War-II era, Arizona school children were taught the five Cs – Copper, Cattle, Cotton, Citrus and Climate – for good reason. These Cs were the driving force behind the state's economy. These land-based resources propelled vibrant growth of Arizona's towns and communities during this period, providing jobs, opportunities and prosperity.

For the last 50 years, Arizona's growth has been primarily fueled by real estate, driven by in-migration. From the mid-1950s Phoenix grew from 529,000 to 4.4 million people. Tucson grew from 197,000 to nearly one million – dramatic population growth – spurred by air conditioning, air travel and the interstate highway system.

In its early days, broadcast television had a catalyzing impact as well, romanticizing the Western culture. Real estate created the economic foundation for Arizona's other service and consumer-goods industries. Key examples include automobile sales, construction, banking and other financial services, medical and health care services, retail sales and government.

However, just as the previous era ended, the period of economic growth driven by real estate has also ended. Net in-migration to Tucson went deeply negative during 2009 and 2010 and is expected to average less than 15,000 per year going forward for the rest of the decade. Net in-migration of 15,000, as a percentage of the current nearly 1 million population base, cannot sustain healthy, prosperous growth.

## Next Economy is Knowledge-Based

What is next? The next economy is knowledge-based – and it is here. An economy based on agriculture, livestock and mining is rooted in land and natural resources, and is thereby inherently limited. A knowledge-based economy is completely different. Ideas are inex-

haustible. Today's most successful companies are based on ideas, are rapidly growing, are scalable, and access global markets. Simply put, they create jobs, new wealth and prosperity.

Building companies based on ideas requires entrepreneurs.

Entrepreneurs are pioneers. Risk takers. Visionaries who see possibilities overlooked by others.

These qualities should sound familiar. Historically, Arizona's early mining companies were led by such entrepreneurs. No one is more entrepreneurial than a cattle rancher or farmer in the desert. Arizona's real estate industry is also infused with risk-taking, visionary entrepreneurial leaders.

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“This is the best vision statement/assessment I've seen for Tucson. Great information. Solid recommendations.”

– Marshall Vest,

Director, Economic and Business Research Center,  
UA Eller College of Management

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For example, in the 1880s, two New York-based metal traders – William Dodge and Anson Phelps – formed Phelps Dodge and began to acquire promising mining properties in the wilds of the Arizona Territory. This visionary team hit the Atlanta lode in 1884, which laid the groundwork for the scale and success of Phelps Dodge today, one of the largest mining companies in the world. The company is a \$12 billion enterprise and produces 30 percent of the copper in the United States.

Other enterprising entrepreneurs worked with scientists from the University of Arizona to genetically enhance Pima cotton, long considered a superior blend and one of the world's finest grades of cotton used to make smooth,

soft and durable clothing, as well as luxurious sheets, towels and other goods. In the 1950s, UA scientists were successful in making Pima cotton even softer, more durable and more absorbent. Recently, researchers from the College of Agriculture and Life Sciences and the BIO5 Institute created biotech or Bt cotton that incorporates a Bt toxin, a natural insecticide that allows growers to keep yields high and use less pesticide. Grown in Arizona since 1996, Bt cotton now represents more than half of the state's 256,000 acres of cotton fields, protecting them from pink boll worm caterpillars which live inside the cotton boll and can destroy the crop.

Entrepreneurship is also the catalyst for the real estate sector. Pioneers such as Roy Drachman, Don Diamond, Bill Estes, Jr. and brothers George and David Mehl pursued opportunities in residential and commercial real estate and the hospitality industry that have provided jobs and economic opportunity for decades.

Beginning in the late 1970s, Don Diamond acquired 300 acres in the Catalina Foothills. Initially Diamond intended to develop this for resort living and golf, but later decided to repurpose the land for 300 high-end home lots. By 2010, the lots had sold for more than \$100 million.

Tucson's special lifestyle and unparalleled natural beauty inspired the Mehl brothers to build La Paloma and Bill Estes Ventana Canyon resorts that have been mainstays of what has perhaps been our most stable and resilient industry – tourism and area visitors. Decades earlier, Isabella Greenway foresaw the future and founded the Arizona Inn which attracted hundreds of thousands of visitors (and their dollars) to our community. These visionaries saw opportunities, and, despite the warnings of skeptics, took risks. The community prospered.

As important as these natural-resource-based businesses have been and will continue to be, they alone will not be the future economic drivers of growth in Arizona. Biz

## Student Work Product and Innovation Memoranda of Understanding

[FOR USE ONLY WHEN THE TECHNOLOGY IS OWNED BY ABOR]

**MEMORANDUM OF UNDERSTANDING  
The McGuire Entrepreneurship Program**

**DATED** as of: \_\_\_\_\_

This Memorandum of Understanding (“**MOU**”) expresses the intent of the parties with respect to development of a business plan (the “**Business Plan**”) by certain students, enrolled in the McGuire Entrepreneurship Program at the University of Arizona and executing this MOU (the “**Students**”), in cooperation with the Arizona Board of Regents on behalf of the University of Arizona as represented by the Office of Technology Transfer (“**University**”), and one or more University Employees co-signing below (the “**University Partner**”). The Business Plan is to be based on certain original materials, methods, concepts, software, technology, inventions, discoveries, or other original works and work product owned by University (“**Original Materials**”) that will be disclosed and made available for such purpose to the Students by University or the University Partner. The parties contemplate that the Business Plan may be used in connection with a potential business venture, as more fully set forth below.

In connection therewith, the parties agree as follows:

**A. NON-DISCLOSURE AGREEMENT.** Before the commencement of work on the Business Plan, the Students and University agree to sign a mutual non-disclosure agreement, in the form attached as **Schedule A**.

**B. FEASIBILITY STUDY.** Upon the Students’ completion of their initial Feasibility Study, the University Partner will evaluate the results of the students’ efforts to date and the proposed direction of the Business Plan. The University Partner will give her/his evaluation to the McGuire Entrepreneurship Program representative, on the form set forth in **Schedule B**.

- 1. If the Feasibility Study is satisfactory,** the Students may continue their development of the Business Plan, and the University Partner will be available to discuss issues that may arise as the Business Plan develops. Upon completion of the first draft of the Business Plan, University Partner and Students will mutually agree upon the focus and direction of the Business Plan for the Spring semester.
- 2. If the Feasibility Study is NOT satisfactory,** the University and University Partner will consult with the Students and their adjunct faculty advisor to determine whether the University and University Partner’s dissatisfaction with the Feasibility Study can be remedied. If the defects cannot be remedied to the parties’ mutual satisfaction, the Students will stop work on the Business Plan and return all Original Materials to the University as set forth in the Non Disclosure Agreement.

**C. USE OF THE STUDENT WORK PRODUCTS OR UNIVERSITY’S INFORMATION IN A BUSINESS VENTURE.** In exchange for the help and support provided by the University and University Partner in creating the business plan, the University will be allowed to use the general information generated by the Students at the formal completion of the Students’ McGuire Program activities. The use of the tangible forms of the Students work products, such as the Business Plan, or other intellectual property developed by the Students, such as patentable subject matter, is discussed in this Section C. When using the general information generated by the Students, the University and University

Partner, consistent with general principles of academic practice, will provide appropriate attribution to the Students and the McGuire Program in that use.

After the University's and University Partner's approval of the Feasibility Study and the Students' completion of the draft Business Plan, the parties agree to discuss the possible outcomes and use of the Students' work products or the availability of, or access to, the University's Original Materials and their underlying intellectual property rights by the Students. If either the Students or the University or the University Partner through University wishes to use the Business Plan in connection with an actual business opportunity or make derivatives of the Business Plan, then the party wishing to proceed agrees to give the other party notice of their intent. After such notice is given, the parties will discuss in good faith the terms and conditions applicable to proceeding with the proposed business opportunity, including the possibility for continued participation by the Students. Such Student participation may include, by way of example, equity or net revenue participation, employment, cash payment and/or such other forms of compensation or participation that may be agreed to by the parties at that time. If an agreement in principle is reached after the parties' discussions pursuant to this paragraph, the parties will formalize that agreement in writing.

**If the parties fail to agree** upon terms and conditions applicable to the Students' continued participation in the proposed venture, **or** if the party receiving notification pursuant to this paragraph is not interested in participating in such discussions, **or** if the Students do not complete the Business Plan after approval of the Feasibility Study, then:

- (a) The University or University Partner may use the general information as specified in the opening paragraph to this section and the Students shall remain the owners of all patent rights, copyrights, trademarks, service marks or unique identifiers ("Students' IP) in the Students' work products and Business Plan and all draft versions thereof ("Students' Materials") that would normally be owned by them; and the University or University Partner shall have no right to use, reproduce, distribute, present or otherwise make public any portion of the Students' Materials (other than the Original Materials, the rights to which will be retained by the University as provided below);
- (b) The University shall retain the sole and exclusive right, title and interest in and to the Original Materials, including without limitation all intellectual property rights and other proprietary rights therein; and the Students shall have no right to use, practice, manufacture, reproduce, distribute, present or otherwise make public any portion of the Original Materials. Notwithstanding the foregoing, however, the Students may refer to the Original Materials in the Business Plan as necessary to complete their McGuire Entrepreneurship Program requirements and Program-related activities, including without limitation, participation in business plan competitions, using the Business Plan as a writing sample for potential employers, and the like, **provided that** such uses are consistent with the restrictions on confidential information set forth in the mutual Non-Disclosure Agreement.
- (c) In addition to the foregoing, for non-commercial academic and research use at the University associated with the McGuire Program the University shall have a non-exclusive, fully-paid up license to use the Business Plan (including references to the Original Materials included therein);
- (d) The Students will return to University all Original Materials promptly after the completion of the Students' final semester in the McGuire Entrepreneurship Program; and
- (e) The University and University Partner will return to the Students all materials created or prepared by the Students for the Business Plan, including but not limited to draft and final versions of studies, reports, executive summaries, memoranda, analyses, graphics, marketing, financial, competitive and other data collected or compiled by the Students.

**D. Notice.** Any notices sent to any party in connection with this agreement should identify the Business Plan, and should be sent to the respective party's address, as given below by U.S. Mail; or by Facsimile or E-mail (with confirmed receipt); and a courtesy copy of all notices should be sent to the attention of the McGuire Entrepreneurship Program representative.

To the Students: [Name] \_\_\_\_\_

[Name] \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Fax No: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

To the University: [Name] \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Fax No: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

**E. Miscellaneous Provisions.**

1. Experimental Work. THE ORIGINAL MATERIALS ARE EXPERIMENTAL IN NATURE AND THE UNIVERSITY MAKES NO WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDING THE RESULT OF ANY RESEARCH AND DEVELOPMENT ACTIVITIES UNDERTAKEN IN CONNECTION WITH THE ORIGINAL MATERIALS, OR THE SUITABILITY OF THE ORIGINAL MATERIALS FOR COMMERCIALIZATION.
2. Assignment; Amendment; Waiver. This Agreement may not be assigned by any party without the prior written consent of the other parties. This Agreement may not be amended or modified except in writing, signed by all the parties. The waiver by any party hereto of any of its rights herein shall not be deemed to be a waiver of any other right granted herein.
3. Applicable Law. The laws of the state of Arizona govern this Agreement. Any litigation involving this agreement shall be brought exclusively in the State or Federal courts located in the State of Arizona.
4. Conflict of Interest. This agreement is subject to the provisions of A.R.S. § 38-511 and the State of Arizona may cancel this Agreement if any person significantly involved in negotiating, drafting, securing or obtaining this agreement for or on behalf of the Arizona Board of Regents becomes an employee in any capacity of any other party or a consultant to any other party with reference to the subject matter of this agreement while this agreement or any extension hereof is in effect.

5. Arbitration. Should a dispute arise between the parties, in any manner, concerning this agreement, and said dispute involves the sum of thirty thousand dollars (\$30,000) or less in money damages only, exclusive of interest, cost or attorney's fees, the parties will submit the matter to Binding Arbitration pursuant to the Arizona Rules of Civil Procedure, Rule 72a, Compulsory Arbitration, and the decision of the arbitrators shall be final and binding upon the parties.
6. University Name. Arizona law prohibits use of University's names, logos, insignia or trademarks to suggest that the University endorses a product or service. The Students agree that they will not use or license University's names, logos, insignia or trademarks in such manner without the prior written approval of the University.

**IN WITNESS WHEREOF**, the parties indicate by their signature below, their agreement to the terms and conditions expressed herein with respect to the subject matter of this Memorandum or Understanding.

**THE UNIVERSITY OF ARIZONA**

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

**STUDENTS**

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

**UNIVERSITY PARTNER'S RATIFICATION:** I have read this Memorandum of Understanding and understand and agree to be bound by all the obligations to be performed by the University Partner as set forth therein, including the performance of any related obligations through my laboratory and by other University employees and personnel who may provide services under my supervision.

\_\_\_\_\_  
UNIVERSITY PARTNER

\_\_\_\_\_  
DATE

\_\_\_\_\_  
UNIVERSITY PARTNER

\_\_\_\_\_  
DATE

**SCHEDULE B to Memorandum of Understanding**

Name of University Partner: \_\_\_\_\_

Name of Business Plan: \_\_\_\_\_

Names of Students:

\_\_\_\_\_  
\_\_\_\_\_

**THE UNIVERSITY OF ARIZONA:**

As contemplated by the Memorandum of Understanding, I have reviewed the Feasibility Study prepared by the Students in connection with the Business Plan identified above.

PLEASE CHECK ONE:

- I am satisfied with the Feasibility Study.
- I would like to discuss my concerns regarding the Feasibility Study.
- I am not satisfied with the Feasibility Study and request that the Original Materials be returned to me, as set forth in our Memorandum of Understanding.

\_\_\_\_\_  
NAME

\_\_\_\_\_  
DATE

**UNIVERSITY PARTNER:**

As contemplated by the Memorandum of Understanding, I have reviewed the Feasibility Study prepared by the Students in connection with the Business Plan identified above.

PLEASE CHECK ONE:

- I am satisfied with the Feasibility Study.
- I would like to discuss my concerns regarding the Feasibility Study.
- I am not satisfied with the Feasibility Study and request that the Original Materials be returned to me, as set forth in our Memorandum of Understanding.

\_\_\_\_\_  
UNIVERSITY PARTNER

\_\_\_\_\_  
DATE

**PLEASE SIGN AND RETURN THIS FORM TO:**

McGuire Entrepreneurship Program representative [OR OTHER]

FAX #: \_\_\_\_\_

## Patent Data Center Overview

**Proposal Title** Patent Data for Academic Research

**Principal Investigator** Len Jessup  
***Professor of Entrepreneurship and Innovation***  
Halle Chair in Leadership  
Dean Eller College of Management  
len@email.arizona.edu  
University of Arizona  
1130 E. Helen Street  
Tucson, AZ 85721-0108  
(520) 621-2125

## Proposal summary

The late Zvi Griliches (1990) had a vision to make patent data publicly available for academic researchers to utilize. Griliches and his colleagues have made attempts<sup>1</sup> to provide patent data in a useful form (Hall et al. 2001). These early data options have in some cases been pioneering and important. However, academic practitioners are looking for much more from patent data than what these current “one-off” datasets can offer; i.e., they are neither comprehensive nor contiguous.

There remains a need for a data source that assists in conducting research efficiently. We propose to meet that need by utilizing and further developing a multi-terabyte patent dataset, existing and comprised of patent data harvested from the USPTO (8 million patents and updated weekly) and a parser that has been written that turns HTML files into an objects that contain key patent variables. Using patents as a proxy for innovation, radical innovation can be predicted, modeled, compared to rival firms and predict firms chances of success moving forward. The patent data and parser also make it possible to identify and isolate the variables knowledgeable researchers in the field want in terms of form and structure-enabling a new era in academic research.

The opportunities associated with this program are significant and game changing. Long-range impact with innovation-driven firms include also the potential to organize through a central leader, such as “The Economist” to maximize value to firms seeking to organize intellectual and other firm and collaborator assets around the most promising social and commercial innovations. At a broader level, organizations such as the U.S. Council on Competitiveness may be important contributors in the development of this unique innovation profile tool.

This proposal specifically is for the development of a beta site for the data, which is currently housed on an external hard drive. This current data form is limiting and cumbersome to query, code, and output reports. We therefore propose to organize the patent data into relational tables based on all possible variables that we can parse from the USPTO’s machine-readable data<sup>2</sup> up-to and including 2011. In addition, we propose to generate additional tables that will enable researchers to merge this dataset with external databases. Finally, we propose to engineer a web interface to allow the academic community to query the dataset from our hosted solution. The ultimate value of a data center in the research context is based on (1) being comprehensive and (2) being contiguous. 1000s of articles use this data but the current data limits the research.

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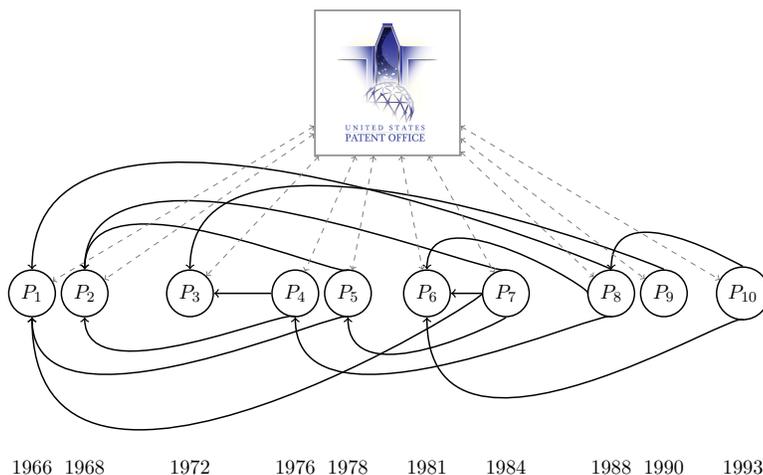
<sup>1</sup>The National Bureau of Economic Research (NBER) datasets from 1999 (<http://elsa.berkeley.edu/~bhhall/pat/datadesc.html>) and 2006 (<https://sites.google.com/site/patentdataproyect/>) are the most prevalent.

<sup>2</sup>All patents have *already* been systematically harvested from the public-domain source (USPTO) through 2010.

Once we organize the existing data into a database, the McGuire Center for Entrepreneurship will create a portal for the academic community to study innovation using our data. We propose a model that is analogous to the CRSP model<sup>3</sup> with an acronym like ECRI (Entrepreneurship Center for Research in Innovation). The basic data (from the USPTO) would be available to researchers at academic institutions for free or near free, through four options:

1. If researchers are able and willing to contend with large database issues, they could request a DVD of the compressed data (small fee).
2. If the user would prefer to use our search interface, they can immediately see a few results (around 10 records) so they know what the data output would be as they prepare to do analysis.
3. If the user wants to run a full report (e.g., results of 250,000 patents), this could be done by making a free request—limit one per month that would be fulfilled within 5-10 days (since it will take significant<sup>4</sup> computing power to return the necessary data).
4. If a user wanted real-time results (rather than waiting like (3) describes above), they pay for a service similar to the CRSP model (monthly or also possibly per use).

*Additionally and importantly, ECRI data can be linked to CRSP data (by matching patents to a firm identifier, PERMNO). This new option for academic researchers to link innovation (ECRI) to financial outcomes (CRSP) will forever alter our abilities to study innovation and entrepreneurship.*



### EXAMPLE VARIABLES

**TYPES:** Utility, Design<sup>®</sup>, PP<sup>®</sup>, H<sup>®</sup>, RE<sup>®</sup>, etc.

**TIME:** Date filed/granted

**CITATIONS#:** Parent-child relationships

**OWNERSHIP:** Inventors, Assignees

**TECHNOLOGY<sup>®</sup>:** Classifications

**COMPLEXITY<sup>®</sup>:** Figures, Tables, Drawings

**CLAIMS<sup>®</sup>:** Number, Lines, Bytes

**FIRMS\*:** Names → PERMNO

**LOCATION\*:** City, State → Longitude, Latitude

**RENEWAL FEES\*:** See Moore (2005)

**Example of USPTO Patent Network.** A toy-example of a patent graph to describe the genealogy of the patent network with temporal constraints. Nodes represent patents, links represent citations between patents. The direction of the arrows defines the nature of the link;  $P_{10}$  is a forward citation of  $P_8$  which necessarily implies that  $P_8$  is a backward citation of  $P_{10}$ . To the right, we summarize several variables of interest:

(<sup>®</sup>) indicates the variable has never been created in a relational form;

(\* ) indicates that secondary data would need to be integrated with the raw patent data;

(#) indicates that computational/index tables can be created to provide longitudinal data in a form known to researchers.

<sup>3</sup>CRSP (Center for Research in Security Prices): University of Chicago has developed a financial dataset, more information is available online [<http://www.crsp.com/crsp/about/index.html>]

<sup>4</sup>In one example using the *existing* dataset, 1.7 million patents were queried to compute the necessary report that contained about 60,000 rows.

## Scope of the Problem

There is a large amount of interest in conducting research utilizing patent data by academicians and industry analysts each year. This interest grows each year. Because there is not a central repository of data in an open, disseminated form, thousands of hours are wasted each year by many attempting (many times unsuccessfully) to get the relevant variables from patent data they need to study innovation within their discipline. If a centralized, open-source dataset were created and maintained based on input from the academic and business community, we believe it would establish a foundation upon which better research can be produced to study entrepreneurship and innovation using patent data.

“Indeed, as Mairesse noted in a recent roundtable of some of the leading thinkers on the topic, ‘We have exhausted all we can get from our old data sets on R&D, patents, citation counts.’” (Tellis et al. 2009) ***We need new patent data.***

Thousands of articles utilizing patent data have been written in economics, entrepreneurship, marketing, strategy, and law (Trajtenberg 1989, 1990, Harhoff et al. 1999, Shane 2001, Hall et al. 2001, Sorescu et al. 2003, Allison et al. 2004, Moore 2005, Hall et al. 2005, Chandy et al. 2006, Narasimhan et al. 2006, Tellis et al. 2009, Hegde et al. 2009). Most research has been limited in scope because the variables needed require the ability to query the entire data structure in ways that are not currently plausible. The organization of patent data into relational form (Codd 1969) will make such unique queries achievable.

## Project goals

1. Identify ALL variables that can be extracted from patent data
2. Defining the BEST relational design based on potential statistical/network analyses
3. Parse the data (8 million patents) and store in annual relational tables (e.g., by patent type, by year)
4. Fully document the nature of the data (data dictionary, white papers, tutorials)
5. Build a web application to allow others to query this new dataset

Additionally, due to prominence among innovation leaders in both the academy and industry, we would welcome the ability to work with Kauffman Foundation to formulate long range uses and applications of the database and related capabilities. The work associated with this proposal is based on doctoral dissertation work and is patented. Some dimensions of the project will be proprietarily held by the inventor.

## Outcomes

Academic researchers will no longer be limited by the data; we engineer a better way, so academics can focus on advancing knowledge and not be bogged down with “one-off” data collections. The new data will allow researchers to address a plethora of ideas that currently are not doable. The open-source underpinnings of this project has unlimited potential.

Applying lessons learned from this project, other adjacent datasets regarding innovation can be fully relationalized as well: USPTO image-based patent data (prior to 1975), USPTO patent application data, international patent data, FDA product approval data, M&A data, etc.

**Budget****Budget Proposal**

	<u>TOTAL</u>		<u>Kauffman</u>	<u>Other</u>
<b>Postdoc support</b>	45,000	Monte J. Shaffer	5,000	40,000
<b>Equipment</b>	25,000	Computer Server (Hardware)	—	25,000
<b>Technician</b>	15,000	System Configuration DB Engineer	15,000	—
<b><u>Interdisciplinary Work</u></b>				
<b>Statistician, PhD</b>	5,000		5,000	—
<b>Computer Scientist, PhD</b>	5,000		5,000	—
<b>Mathematician, PhD</b>	5,000		5,000	—
<hr/>				
<b>Summary</b>	100,000		35,000	65,000

Monte J. Shaffer earned his Ph.D. (May 2011) in Marketing with a dissertation entitled "Entrepreneurial Innovation: Patent Rank and Marketing Science." Len Jessup, the PI on this proposal, served on his committee and is a co-author on one of Monte's essays "Assessing Diffusion of Radical Innovation: Longitudinal Identification of a Patent's Lifetime Value (PLV) and a Firm's Patent Portfolio using Patent Rank" which is currently under review at the Journal of Business Venturing. Over the past two years, Monte developed the dataset and the parsing algorithms to extract data from the patent files he harvested from the USPTO. He also has a background in web application development. With his subject-matter expertise, his novel data, and his ability to create website portals, Monte has a very unique set of skills that can be utilized to make this research project a reality.

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Entrepreneurs' Grand Championship and New Ventures Expo Promotional

2012 Debut Series Postcard  
Expo & Year-End Celebration Events Promo

Meet the  
Generation  
Driving the  
Next Economy

Join us on the UA Campus

**April 2 & April 27**

**McGuire Venture Debut Series 2012**

Angel investors and business leaders from across Arizona engage the 2012 class of the McGuire Entrepreneurship Program over 22 exciting new venture plans.

## 22 New Venture Plans from One of the Country's Top-Ranked Programs

Arizona's next economy is one of knowledge, vision and risk-taking backed by the skills to turn great ideas into scalable businesses with global reach. Join us for two special events on the UA campus in April and meet the students who will grow Arizona's next economy:

**April 2** | New Ventures Expo at the Southwest Angels Regional Summit

**April 27** | Entrepreneurs' Grand Championship Awards & Year-End Celebration

*RSVPs for this event appreciated at [entre.rsvp@eller.arizona.edu](mailto:entre.rsvp@eller.arizona.edu)*

[entrepreneurship.arizona.edu](http://entrepreneurship.arizona.edu)

More critical than recruiting existing enterprises to the region, entrepreneurship is the key to advancing Arizona to a knowledge-based economy. **The McGuire Entrepreneurship Program at the Eller College of Management** is a National Model Program of the United States Association for Small Business and Entrepreneurship, a NASDAQ Center for Entrepreneurial Excellence and one of the top-ranked entrepreneurship education programs in the country.

## Innovation Law Lab Overview

# New UA Lab Offers Legal Knowledge to Regional Start-Ups

The Innovation Law Lab helps ventures meet a critical need as they navigate the intersections of business and law

Since 2006, the University of Arizona's Eller College of Management and Rogers College of Law have partnered in student education through the Business/Law Exchange. This semester the program adds a new dimension to its work — one that extends beyond the classroom into the world of venture start-ups: the Innovation Law Lab.

Led by Gabriel Beckmann and Larry Hecker, the Innovation Law Lab provides critical legal strategy, leadership, and advice to innovation-based, scalable start-ups in the Tucson/Southern Arizona region.

Initially, the Innovation Law Lab will focus on ventures incubated within the Arizona Center for Innovation and those associated with the University's newly established Tech Launch Arizona, a center created to consolidate and synergize the work of moving knowledge and innovations to market.

Business/Law Exchange students within the College of Law will spend a full year working with start-ups through the Innovation Law Lab. As they help these ventures develop, they simultaneously develop their own knowledge and acumen, positioning them to serve in mock law firms that work with emergent ventures in the UA's nationally-recognized McGuire Entrepreneurship Program.

These law firms have been at the heart of the Business/Law Exchange, with business-focused law students providing research, knowledge and counsel to new venture teams under the supervision of members of the local bar as students on both sides navigate the complex intersections of business and law: issues around intellectual property, regulation, employment and more.

Since its introduction in 2006, the Business/Law Exchange has been a focus of national attention in the innovation, law and education communities for its model of developing talent and expertise, preparing students in both law and entrepreneurship to be leaders in today's Ideas Economy.

Beckmann and Hecker are adjunct faculty at the UA Rogers College of Law. Hecker is a principal in the firm of Hecker & Muehlebach, PLLC. Beckmann retired from the law firm of Lewis and Roca, LLP, as a senior partner in 2009. The McGuire Entrepreneurship Program is a cornerstone of the McGuire Center for Entrepreneurship in the UA Eller College of Management.

[Facebook Wall Post](#)

## Technology Commercialization Class Overview

## **Technology Commercialization Course for Graduate Business and Science Students**

The Eller College of Management's MBA and Entrepreneurship Programs will be offering in the fall of 2012 a one semester course in technology commercialization for both MBA and science graduate students. The course will focus on University of Arizona developed science and technology and will coordinate its activities with the University's newly formed Tech Launch Arizona initiative. This is not only an opportunity for students to learn important skills, but to make a significant contribution to the University's technology commercialization activities.

The course will fully explore the technology commercialization process by teaching the principles of technology commercialization including ideation and innovation, target markets and channels, potential partners with complementary assets, evaluating financial potential and the protection of intellectual property. The greater part of student participation will be working with researchers and their staffs in University laboratories to better determine the commercial potential of developing technologies. As promising technologies are identified, a process will be implemented to select those technologies worthy of further study of their commercialization potential. Such study will take the form of developing a business, licensing, or technology development plan.

Students will be organized in teams with four MBA students and one or two graduate science students. Each team will be assigned to a particular department within one of several of the University's science colleges and the BIO5 Institute. At the beginning of the semester team members will join scientists from their respective areas in participating in two half day seminars. During the first six weeks of the semester there will be one class session each week to further cover the topics necessary to complete the commercial feasibility studies. While much of the remaining course will be field work, student teams will be under the supervision of a mentor while researching and developing their commercialization plans.

Here are the requirements for the team members:

**MBA students.** Completion of the first year of MBA or MSMIS program is required. Previous work experience in financial or marketing analysis is a plus as is an undergraduate degree in science or engineering. Advanced aptitude in problem solving, including the ability to logically structure an appropriate analytical framework is required. The ideal candidate will be a self-starter, team member, multi-tasker, who is adaptable, comfortable dealing with ambiguity, and able to clearly communicate.

**Scientists and Engineers.** Completion of at least one year of an advanced graduate study program in a relevant science or engineering discipline or the first year of the Professional Master's Degree Program is required. Previous work experience or advanced competency is a plus. The ideal candidate will have an aptitude for applied science and an interest in learning the fundamentals of commercialization. A team member, willing to be cross-trained, with ready communication skills, and an ability to thrive in a fast-paced environment will be most suited for this assignment.

## Entrepreneurship and Innovation Seminar Series Announcement

# McGuire Center for Entrepreneurship

## Entrepreneurship and Innovation Seminar Series

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In order to provide a forum for scholars working on issues related to entrepreneurship, the McGuire Center hosts the Entrepreneurship and Innovation Seminar (EIS) in the Eller College of Management

### Objectives and Coverage

Research topics of relevance include (but are not limited to):

- University technology transfer and entrepreneurship
- Impact of monetary incentives and intrinsic motivation on entrepreneurship
- Impact of tax policy on entrepreneurial activity
- Venture (and other financial) capital, including the design of financial contracts
- Use and enforcement of intellectual property in entrepreneurial firms
- Mobility of scientists and its impact on knowledge spillovers and innovation
- Sociological and economic determinants of network formation and its implications for entrepreneurship
- Behavioral and experimental psychology and economics as applied to entrepreneurship

Interested social scientists and legal scholars in the Eller College of Management and colleagues from other departments within The University of Arizona are cordially invited to participate on a regular basis. Subject to budgetary and scheduling constraints, the plan is to try to alternate between presentations by scholars from The University of Arizona and invited speakers from other universities.

If you have an interest in presenting a paper at one of the EIS seminars, or if you have suggestions for outside academic speakers whom we may wish to invite, please [contact us](#).

- [2007-2008 Speakers](#)
- [2008-2009 Speakers](#)
- [2009-2010 Speakers](#)
- [2010-2011 Speakers](#)
- [2011-2012 Speakers](#)

For additional information, please [contact us](#).

Science for Business/ Entrepreneurial Dimensions of Entrepreneurship Workshop  
Series Announcement

## ***Exploring the Entrepreneurial Dimensions of Science and Technology Research***

### **A University of Arizona, open-forum lunch workshop series**

Hosted by the McGuire Center for Entrepreneurship and the Office of Technology Transfer

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The McGuire Center for Entrepreneurship and the Office of Technology Transfer is pleased to announce a lunch workshop series titled "Exploring the Entrepreneurial Dimensions of Science and Technology Research."

This series is designed to engage the university learning community, including faculty, students, and administrators, in lively discussion of the potential applied values of the scientific and technological discoveries made at The University of Arizona.

Further, the workshops will help enhance the entrepreneurial network that exists throughout the academic and business community, thereby promoting collaborative efforts toward moving technologies out of the university in the form of innovative solutions to many of the problems facing our community and broader society.

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### **Workshop 1**

**in partnership with the Bio5 Research Institute**

**The Molecular Biology of *Neisseria gonorrhoeae* Infection, with Dr. Kevin Bourzac, Ph.D.**

**October 19, 2007 from 12:00n to 1:30pm**

**McClelland Hall, Room 127**

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#### **Welcome and Bio5 Institute mission overview**

*by* Nina Ossanna, Ph.D., Director of Business Development, BIO5 Research Institute, and Special Projects for Life Sciences, Office of Technology Transfer

#### **Research presentation: *Neisseria gonorrhoeae***

*by* Kevin Bourzac, Ph.D., Postdoctoral Fellow, So Lab/BIO5.

Presentation will include overview of anticipated technologies from research in the So Lab

#### **Exploratory discussion / open forum**

*facilitated by* Dr. Ossanna. Goals of the open discussion include:

- Identification and exploration of potential applications of base technology, including possible application to specific social problems.
- Identification and exploration of possible barriers to transferring resulting technologies to broad application.
- Identification and exploration of potential transferability to the work of workshop participants and general insights into approaching scientific work with an entrepreneurial lens.

Seating is limited and RSVP is requested. **Lunch and drink will be provided!** Please email Matt Mars at [mmars@eller.arizona.edu](mailto:mmars@eller.arizona.edu) by October 17, 2007 to reserve your spot in this exciting and worthwhile workshop. Please note, reservations are on a first-come, first-served basis and seating is limited 50 participants.

## Entrepreneurship and Idea Generation Workshop Overview

# Request for Proposals

## Entrepreneurship / Idea Generation Education Grants Program

- Issue date: June 9, 2009
- Proposal due date: July 13, 2009, 9:00am
- Project start date: August 1, 2009
- Project end date: June 15, 2010
- Proposal questions to: [entre.proposal@eller.arizona.edu](mailto:entre.proposal@eller.arizona.edu)
- Proposals should be prepared in MS Word, PDF, or other commonly used word processing program.
- Proposals may be submitted via any of the following:
  - Email:* [entre.proposal@eller.arizona.edu](mailto:entre.proposal@eller.arizona.edu)
  - Fax:* 520.626.5269
  - Regular mail or in person:* McGuire Center for Entrepreneurship  
Education Grants Program  
McClelland Hall, Room 202  
The University of Arizona  
Tucson, AZ 85721

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### Background

This initiative seeks to provide education to individuals in Southern Arizona on early stage entrepreneurship, idea generation, and innovation development.

Fund availability is through Innovation Frontier Arizona, a partnership focusing on innovation and workforce development and transformative economic development across the four Southern Arizona counties. Entrepreneurship in the form of early stage idea generation, assessment, and management are critical to the growth of new scalable business and innovative business solutions.

The purpose of this call for proposals is to stimulate short term, accessible, workshop style education options, serving 1,000 individuals across the region between July 1, 2009 and June 30, 2010.

### Purpose

IFA seeks to provide grants to entrepreneurship educators and advisors across the IFA region and in appropriate partnership to plan, organize, and deliver entrepreneurship/idea generation workshops, ensuring workshop availability to individuals in all geographic areas, and containing high quality, critical, entrepreneurship content. Grants are expected to range from \$500 to \$10,000, but IFA reserves the right to make grants outside of this range.

These workshops will teach entrepreneurs and would-be-entrepreneurs critical skills and knowledge to formulate, validate, build effective strategies, and organize resources to bring high quality ideas to market.

Grants will be made to individual organizations, coalitions, or to individual providers who demonstrate partnership status with other providers in the proposal service area.

Proposals must indicate service areas and expected number of clients by partner.

On review of proposals, funding board may invite or request specific partnerships in order to eliminate service overlaps, and may provide additional incentive to serve underserved areas/populations.

Priority will be given to program proposals that have a plan for sustainability or will otherwise leverage funded workshops as pilot/basis for future education activities.

### **Eligibility**

Organizations that provide business education and/or consultation in the southern Arizona region (Cochise, Pima, Santa Cruz, Yuma Counties are eligible).

Proposal submitters must be positioned and able to access and attract adult (*youth and other specialty programs, please see notation below*) entrepreneurs and would-be-entrepreneurs to participate in formal workshop formats, and must be able to manage administrative aspects of managing grant fund and reporting as appropriate.

This Request for Proposals is intended to be inclusive and not to create undue barriers to participation by appropriate organizations. If you have questions regarding eligibility, please contact us. We will be happy to discuss your opportunity. You can do so at [entre.proposal@eller.arizona.edu](mailto:entre.proposal@eller.arizona.edu), or 520.621.4823.

Workshop hosts must be able to participate in attendee information collection necessary for federal funding support. A centralized system will be available, or an additional \$250 grant, per workshop will be provided to offset costs of necessary information collection. More information will be made available to grant recipients.

### **Proposal requirements**

The proposal requirements are minimal, consisting of six segments. Please see **Proposal Detail** section for specific submission detail

1. Overview
2. Target population
3. Workshop design/model
4. Necessary resources
5. Evaluation, reporting, and sustainability
6. Submittal information

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#### ***Youth and other special program needs***

Although this RFP targets adult entrepreneurs and would-be-entrepreneurs, IFA invites community feedback regarding programs and need for support for youth and other specialty programs in entrepreneurship/ innovation that are not eligible under this proposal announcement. Please send a brief statement to [entre.proposal@eller.arizona.edu](mailto:entre.proposal@eller.arizona.edu). Thank you.

**Proposal detail**

*Please respond to each element*

**OVERVIEW** *Why here, why you, why now, with whom?*

*[Up to 500 words]*

Please tell us who you are, and why you want to offer workshops in the proposed area. Be sure to include a brief statement of the expected outcomes of the workshops.

**TARGET POPULATION**

*[Up to 500 words]*

Please tell us about the population you expect to serve, including the number of individuals specifically. What region do they represent? What other access to entrepreneurship education do they have, and what is different about what you are proposing. How will you market and make your workshop(s) accessible to those individuals?

**NOTE:** *Funding recipients will be responsible to serve the head count provided in the proposal. If initial workshop numbers fall short, additional workshop and education options will be required to meet the regional head count requirements.*

**WORKSHOP DESIGN/MODEL**

*[Up to 1000 words]*

Please tell us about your workshop. Please summarize the model organization including duration/length, teaching outcomes, sources of expertise, student experience, materials, etc. Please also indicate if this is a new model/design, or something you have offered in the past.

**NOTE:** *If your organization requires technical expertise or outside consulting for content or delivery, be sure to include these costs in your proposal. If you need assistance in identifying sources, please let us know. We will be happy to help.*

**NECESSARY RESOURCES**

Please summarize the costs of the workshop(s) and breakdown to a per person cost. Tell us how much you expect to cover from other resources, including in kind/leveraged, and how much you are requesting in this proposal. Please provide a brief (few sentences) budget narrative for each cost category.

	<b>Total cost</b>	<b>In kind/other</b>	<b>Requested</b>
Personnel			
Materials/supplies			
Registration scholarships			
Consultants expertise			
Travel			
Other/operations			
<b>Total projected costs</b>			
<b>Total projected attendees</b>			
<b>Per attendee cost</b>			

**Cash flow accommodation:** Please tell us if your organization will require funds in advance, rather than reimbursement, along with estimated need date so that if awarded, appropriate transaction can be planned.

Is advance payment required ? Please indicate Yes or No

If yes, please provide estimated date.

**NOTES:**

*We encourage all organizations to charge a registration fee for all workshops, even if nominal. Registration fee will go to the host organization and does not need to be reflected in the proposal budget.*

*If registration fee will be prohibitive to some or all of your target population, consider a scholarship line in your proposal budget. Individual scholarship amount may not exceed general registration fee.*

**EVALUATION, REPORTING, AND SUSTAINABILITY**

*[Up to 1000 words]*

- 1) Please tell us how you will evaluate and report the learning outcomes of the workshop(s) and effectiveness of your workshop overall. Please include timeline and consider costs of evaluation and reporting in your budget.
- 2) Please be sure to include preliminary thoughts on how your organization will meet a shortfall of attendees in the proposed workshop.
- 3) Please tell us how you expect to use the grant supported workshop to create sustained innovation/entrepreneurship teaching in your region.

**SUBMITTAL INFORMATION**

- Organization name
- Key contact name
- Telephone, email, and fax
- Address
- Program name

IdeaFunding Program

# IdeaFunding 2010

Presented by  
IdeaXchange, a partnership of:

Hecker & Muehlebach, PLLC

Desert Angels

Eller College of Management Corporate  
Connections, The University of Arizona

McGuire Center for Entrepreneurship, The  
University of Arizona

Office of Corporate and Business Relations,  
The University of Arizona

Office of University Research Parks, The  
University of Arizona

Tucson Regional Economic Opportunities, Inc.  
(TREO)

17th Street Communications

*The Power and Possibilities of a University  
Community in the Knowledge Age*

**Thursday, October 28, 2010**  
Tucson Marriott University Park

[www.ideafunding.org](http://www.ideafunding.org)

Connect with us



## IdeaXchange Partners

Hecker & Muehlebach, PLLC



## NEW for 2010

### • GUEST GIFT

Rather than add to that pile of pens and notebooks from other conferences you have attended, IdeaXchange opted to use the money we would spend on a guest gift to make a difference this year. Instead of giving a guest gift, we are pleased to announce our support of four IdeaAgent organizations in the community. Read more about the IdeaAgents on page 7.

### • POSTER SESSION

This year, IdeaXchange is thrilled to team up with sponsor sanofi-aventis on the Life Science Poster Session and Innovation Award. Read more about it on page 7.

### • TRADE SHOW VOTING

What trade show participant was most useful or interesting to you? This year, we are asking participants to vote for their top trade show booth. You will be given a ticket at registration for voting.

Connect with us online. Share what you've learned from the day and stay updated on news from IdeaXchange.

Twitter: [www.twitter.com/IdeaFunding](http://www.twitter.com/IdeaFunding)

Facebook: [www.facebook.com/IdeaFunding](http://www.facebook.com/IdeaFunding)

Email updates: [www.ideafunding.org](http://www.ideafunding.org)

# IdeaFunding 2010

October 28, 2010

Dear IdeaFunding Participants,

Welcome to IdeaFunding 2010: The Power and Possibilities of a University Community in the Knowledge Age. This topic seems a small departure from IdeaFundings of the past—but really—it is right at the core. There is currently not a topic that is more relevant to the economic and community prosperity of Southern Arizona than that of leveraging a premier asset—a world class research university. Not only is the discussion significant to everyone's business in the region, the university itself is undergoing a critical economic shift as it aligns to work more closely and productively with industry and region. What an exciting time! And so it is also an important time to slow down for a day and merge the community, economic, and university based discussions into one conversation that spans these areas.

Today, we challenge you to see what we can accomplish together. We are very pleased that so many bright minds from all segments of business and service in Southern Arizona have joined. When we convene our collective knowledge and experience at events like IdeaFunding, we can produce innovative and valuable ideas.

The day is designed so that all voices have a platform, including yours. Please share your thoughts today and be committed to continuing the discussion and adoption of new ideas following this event. We look forward to working with you throughout the year.

With best regards,

**Lawrence (Larry) Hecker**, *Principal, Hecker & Muehlebach, PLLC*

**Sherry Hoskinson**, *Director, McGuire Center for Entrepreneurship; Co-director, Business / Law Exchange, University of Arizona*

**Robert (Bob) Morrison**, *Mentor in Residence, McGuire Center for Entrepreneurship and Executive Director, Desert Angels*

# Agenda-at-a-Glance

Thursday, October 28, 2010

Emcee: Jason Fenwick, *Web Editor, Carondelet Health Network*

Thank you to Jason, an IdeaXchange member, for serving as the “voice” of IdeaFunding 2010.

<b>7:30 am – 8:30 am</b> <i>Room: Atrium and foyer</i>	<b>Breakfast and Registration</b>
<b>8:30 am – 9:15 am</b> <i>Room: Madera &amp; the Canyons</i>	<b>Opening Session: Tapping the Source of Renewal and Competitiveness: Creating Wealth, Prosperity, and Solving Critical Issues of Society</b>  Welcome and Introduction by Lawrence (Larry) Hecker, <i>Principal, Hecker &amp; Muehlebach, PLLC</i>  Tax Credit Update by Sandra Watson, <i>Assistant Deputy Director of Innovation and Global Business Development, Arizona Department of Commerce</i>  Keynotes: Fred DuVal, <i>Vice Chair, Arizona Board of Regents</i> and Rick Myers, <i>Regent, Arizona Board of Regents and Chief Operating Officer, Critical Path Institute</i>
<b>9:15 am – 12 noon</b> <i>Room: Madera &amp; the Canyons</i>	<b>Morning Plenary Session: Boundary Spanning Modules</b>
<b>9:15 am – 9:45 am</b>	<b>Perspectives from University Researchers</b> Interviewer: JoAnn MacMaster, <i>President, Cortiva Institute</i> Panelists: Eugene Gerner, Ph.D., <i>Director, Specialized Program of Research Excellence (SPORE) in GI Cancers, Arizona Cancer Center, University of Arizona and co-founder, Cancer Prevention Pharmaceuticals (CPP)</i> Kim Ogden, Ph.D., <i>Chemical and Environmental Engineering Professor, University of Arizona Department of Chemical and Environmental Engineering</i> Peter Smith, Ph.D., <i>Thomas R. Brown Distinguished Chair of Integrated Science, University of Arizona</i>
<b>9:45 am – 10:15 am</b>	<b>Perspectives from Industry</b> Interviewer: Lawrence (Larry) Hecker, <i>Principal, Hecker &amp; Muehlebach, PLLC</i> Panelists: Christian d'Aubigny, Ph.D., <i>VP Engineering, TeraVision</i> Paul R. Eynott, Ph.D., <i>US Head of Partnering &amp; Innovation, Early to Candidate DPU, sanofi-aventis</i> William Richardson, <i>Research and Development Director, SOLON Corporation</i>
<b>10:15 am – 10:30 am</b>	<b>Refreshment Break</b>
<b>10:30 am – 11:00 am</b>	<b>Perspectives from Investors</b> Interviewer: Robert (Bob) Morrison, <i>Mentor in Residence, McGuire Center for Entrepreneurship and Executive Director, Desert Angels</i> Panelists: Harry George, <i>Managing General Partner, Solstice Capital</i> Matt Mars, Ph.D., <i>Lecturer in Entrepreneurship, McGuire Center for Entrepreneurship, University of Arizona</i> Lillian Montoya-Rael, <i>Principal, Flywheel Ventures</i> William (Bill) H. Payne, <i>Bill Payne &amp; Associates</i>
<b>11:00 am – 11:30 am</b>	<b>Perspectives from Economic Developers</b> Interviewer: David Welsh, <i>Executive Vice President, Tucson Regional Economic Opportunities (TREO)</i> Panelists: John Grabo, <i>Director of Business Development, University of Arizona Science and Tech Park</i> Amanda Jacobs, <i>Economic Development Manager, Town of Oro Valley</i> Kathy Ward, <i>Economic Development &amp; Communications Manager, Town of Sahuarita</i> Josh Wright, <i>Assistant to the Town Manager, Town of Marana</i>
<b>11:30 am – 12 noon</b>	<b>Perspectives from Small Business</b> Interviewer: Sherry Hoskinson, <i>Director, McGuire Center for Entrepreneurship; Co-director, Business / Law Exchange, University of Arizona</i> Panelists: Suzette Colley, <i>Principal, Colley Business Services</i> Bradley Feder, <i>Co-founder, Simply Bits</i> Lauren G. LeBeau, M.D., <i>Assistant Professor of Pathology, University of Arizona and Medical Director, Kino Hospital</i> Emre Toker, <i>Mentor in Residence, McGuire Center for Entrepreneurship, University of Arizona; member, Desert Angels and Desert Technology Investors</i>

<p><b>12 noon – 1:30 pm</b> Room: Sabino/Pima</p>	<p><b>Luncheon: Presentation of the Thomas R. Brown Entrepreneurship Award and Grubb &amp; Ellis/Innovation Park Emergent Entrepreneur Award</b> Introduction by Lawrence (Larry) Hecker, <i>Principal, Hecker &amp; Muehlebach, PLLC</i> and Sherry Hoskinson, <i>Director, McGuire Center for Entrepreneurship; Co-director, Business / Law Exchange, University of Arizona</i></p> <p>Thomas R. Brown Entrepreneurship Award presented by Sarah Brown Smallhouse, <i>President, Thomas R. Brown Foundations</i></p> <p>Grubb &amp; Ellis/Innovation Park Emergent Entrepreneur Award presented by Robert (Bob) Davis, <i>Senior Vice President, Grubb &amp; Ellis</i></p> <p><b>Keynote Address: Collaborating with the University</b> Meredith Hay, Ph.D., <i>Executive Vice President and Provost, University of Arizona</i> Mike Proctor, <i>Vice Provost for Outreach and Global Initiatives and Dean of the Outreach College, University of Arizona</i> Nancy Smith, <i>Director of Corporate and Business Relations, University of Arizona Office of the Vice President for Research, Graduate Studies, and Economic Development</i> Bruce Wright, <i>Associate Vice President for University Research Parks, University of Arizona</i></p>
<p><b>1:30 pm – 2:15 pm</b> Room: Ventana &amp; Foyer</p>	<p><b>sanofi-aventis Life Science Poster Session</b> <b>Resources for Entrepreneurs Tradeshow • Networking</b></p>
<p><b>2:15 pm – 3:30 pm</b></p>	<p><b>Small Discussion Groups: Hot Topics for Regional Prosperity</b></p>
<p>Room: Sabino</p>	<p><b>Enabling Partnerships</b> Moderator: Molly Gilbert, <i>Director of Strategic Initiatives, Office of University Research Parks (OURP)</i> Britton Dornquist, <i>Program Manager, Regional Transportation Authority - MainStreet Business Assistance Program</i> Thomas Shambo, <i>Director, Small Business Development Center</i> Nancy Smith, <i>Director of Corporate and Business Relations, University of Arizona, Office of the Vice President for Research, Graduate Studies, and Economic Development</i> Ernie Webster, <i>Manager, University of Arizona Small Business Supplier Diversity Program</i> David Welsh, <i>Executive Vice President, TREO</i> Justin Williams, <i>Director, Tucson Regional Office at Arizona Technology Council</i></p>
<p>Room: Pima</p>	<p><b>Innovation Friendly Capital Resources</b> Moderator: Jane Prescott-Smith, <i>Director of Corporate Connections, University of Arizona Eller College of Management</i> Kevin Heath, <i>Business Banking Manager, Wells Fargo</i> Karen Burns, <i>Microlending Director, Microbusiness Advancement Center</i> Sandra (Sandy) DiCosola, <i>Owner, Summit Contract Management</i> Paul R. Eynott, Ph.D., <i>US Head of Partnering &amp; Innovation, Early to Candidate DPU, sanofi-aventis</i> Curtis Gunn, <i>Chairman, Desert Angels</i> Jeremy Woan, <i>President &amp; CEO, CyraCom</i></p>
<p>Room: Madera</p>	<p><b>Communications &amp; Messaging</b> Moderator: Laura Shaw, <i>Sr. Vice President, Marketing and Communications, TREO</i> Ann Brown, <i>Senior Media Relations Specialist, Caliber Group</i> Lisa Contreras, <i>Senior External Media Relations Consultant, Carondelet Health Network</i> Johnny Cruz, <i>Assistant Vice President for Communications, University of Arizona</i> Becky Pallack, <i>Reporter, Arizona Daily Star</i> Joe Pangburn, <i>Senior Reporter, Inside Tucson Business</i> Wendy Erica Werden, <i>APR, Director of Marketing &amp; Brand Management, Arizona Public Media</i></p>
<p>Room: the Canyons</p>	<p><b>Talent Pools</b> Moderator: Randy Accetta, Ph.D., <i>Mentor in Residence-Communication and Distance Learning Manager, McGuire Center for Entrepreneurship, University of Arizona</i> CJ Battle, <i>Tucson Young Professionals</i> Kim Bourn, <i>Executive Director, Greater Tucson Leadership (GTL)</i> Harry George, <i>Managing General Partner, Solstice Capital</i> Daisy Jenkins, <i>Senior Vice President of Human Resources, Carondelet Health Network</i> Eileen McGarry, <i>Director, University of Arizona Career Services</i> Leslie Porter, <i>Director of Recruitment and Employee Advising, University of Arizona</i></p>
<p><b>3:30 pm – 4:15 pm</b> Room: Ventana &amp; Foyer</p>	<p><b>sanofi-aventis Life Science Poster Session</b> <b>Resources for Entrepreneurs Tradeshow</b> <b>Networking • Refreshment Break</b></p>
<p><b>4:15 pm – 4:30 pm</b> Room: Madera &amp; the Canyons</p>	<p><b>Afternoon Wrap-Up</b> Presentation of Awards for sanofi-aventis Life Science Poster Session, IdeaAgents Cause Innovation, Resources for Entrepreneurs Tradeshow Moderator: Lawrence (Larry) Hecker, <i>Principal, Hecker &amp; Muehlebach, PLLC</i></p>
<p><b>4:30 pm – 5:30 pm</b> Room: Madera &amp; the Canyons</p>	<p><b>Today's Science, Tomorrow's Business</b> Moderator: Emre Toker, <i>Mentor in Residence, McGuire Center for Entrepreneurship, University of Arizona; member, Desert Angels and Desert Technology Investors</i> Roger Angel, Ph.D., <i>Regents' Professor of Astronomy and Optical Sciences, University of Arizona</i> Bonner Denton, Ph.D., <i>Professor of Chemistry and a Professor of Geosciences, University of Arizona</i> Stephen Goff, Ph.D., <i>Principal Investigator and Project Director, iPlant Collaborative at the University of Arizona BIO5 Institute</i> Julie Lang, M.D., <i>Assistant Professor, University of Arizona College of Medicine, Department of Surgery in the section of Surgical Oncology and Director, University of Arizona Cancer Center Breast Surgical Oncology Program</i> Corey Smith, <i>President and CEO, bioVidria, Inc.</i> Frederic Zenharsen, Ph.D., <i>Professor, University of Arizona College of Medicine, Phoenix, Basic Medical Sciences Department and Founder and Director, Center for Applied Nanobioscience and Medicine (ANBM), University of Arizona</i></p>
<p><b>5:30 – 6:30 pm</b> Room: Madera, the Canyons &amp; Foyer</p>	<p><b>CyraCom Closing Reception</b></p>
<p><b>6:30 pm</b> Room: Sabino &amp; Pima</p>	<p><b>Desert Angels Dinner</b> (separate registration fee applies)</p>

# IdeaFunding 2010 Sponsors

## DIAMOND



## PLATINUM



## GOLD



## SILVER

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Center for Corporate Entrepreneurship and New Venturing



Focus Forward



## MEDIA



# New in 2010

# Idea

## IdeaAgents

IdeaXchange has selected four organizations that support social entrepreneurship to tell their story to the Tucson entrepreneurship community at IdeaFunding 2010. The IdeaAgents will present their three-minute pitches throughout the morning session and materials on each organization will be available at the IdeaAgent table near the registration desk.

Attendees will have the opportunity to vote for their top cause and the money that IdeaXchange would spend on a guest gift for each participant will be allocated to the IdeaAgent organizations. Money will be distributed to each group based on the percentage of the day's votes, so make sure to take time during the afternoon trade show to vote. Each participant will be given a ballot at registration and ballot boxes will be located at the IdeaAgent table near the registration desk.

### **Camp Wildcat:**

[www.campwildcat.org](http://www.campwildcat.org)

Camp Wildcat is a student-run, non-profit organization at the University of Arizona devoted to improving the lives of Tucson's financially, mentally, and physically disadvantaged youth. Over 100 dedicated student volunteers work each year to facilitate free, fun activities and portray college as an attainable goal for all of Tucson's children.

### **Native American Youth Entrepreneur Camp (NAYEC)**

[www.nni.arizona.edu/nayec](http://www.nni.arizona.edu/nayec)

Each July, Native Nations Institute convenes its annual Native American Youth Entrepreneur Camp (NAYEC), on the UA campus. The aim of NAYEC is to foster skills to encourage private-sector development on Indian Reservations by teaching high-school youth the basics of economics, computer skills, strategies for success, and business-plan preparation.

### **Social Venture Partners Greater Tucson**

[www.svpgt.org](http://www.svpgt.org)

The mission of SVPGT is to inspire and promote strategic philanthropy using a venture capital approach to effect positive social change in the greater Tucson metropolitan area. SVPGT Partners invest in nonprofit organizations using an entrepreneurial model that pools financial, professional and human resources.

### **Watershed Management**

[www.watershedmg.org](http://www.watershedmg.org)

Watershed Management Group (WGM) develops community-based solutions to ensure the long-term prosperity of people and health of the environment. We provide people with the knowledge, skills, and resources for sustainable livelihoods.

## sanofi-aventis Life Science Poster Session and Innovation Award

**sanofi aventis**

Because health matters

Top scientists will display high-quality, original, translational research that has the potential to be developed into opportunities to treat patients. A panel of three judges will review the poster presentations. The judges represent University of Arizona faculty, sanofi-aventis team members, and regional business leadership. All

selected participants will receive a certificate of merit that acknowledges that they were selected to represent their research at IdeaFunding 2010. The participant with the highest judges' score will receive a prize of \$4,000.

IdeaFunding attendees are invited to review the posters and meet the scientists during the afternoon trade show. The poster session will be held in the Ventana Room.

# OPENING SESSION

## *Tapping the Source of Renewal and Competitiveness: Creating Wealth, Prosperity, and Solving Critical Issues of Society*

### OVERVIEW

Arizona Regents Rick Myers and Fred DuVal will begin the day by sharing perspectives on the University of Arizona's high order potential in business, entrepreneurial culture, and community interaction, including policy implications and unique areas of opportunity.

**TIME:** 8:30 am – 9:15 am

**ROOM:** Madera & the Canyons

**WELCOME AND INTRODUCTION BY:** Lawrence (Larry) Hecker, *Principal, Hecker & Muehlebach, PLLC*

**TAX CREDIT UPDATE BY:** Sandra Watson, *Assistant Deputy Director of Innovation and Global Business Development, Arizona Department of Commerce*

### KEYNOTE SPEAKERS:



**Fred DuVal**  
*Vice Chair,  
Arizona Board of  
Regents*



**Rick Myers**  
*Regent, Arizona Board  
of Regents and Chief  
Operating Officer, Critical  
Path Institute*

### NOTES

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# BOUNDARY SPANNING: FIVE MODULE PLENARY SESSION

## *Perspectives from the Innovation Supply Chain*

### OVERVIEW

**Perspectives from partners in the success equation. Hear from University researchers, industry leaders, investors, economic developers and small businesses regarding the range of opportunities, challenges, and mindsets that exist in spanning what have been traditional university - community boundaries. The plenary will consist of five different modules where leaders in each field will discuss the university-community connection. Audience members will have the opportunity to ask questions during each module.**

**TIME:** 9:15 am – 12 noon    **ROOM:** Madera & the Canyons

#### **PERSPECTIVES FROM RESEARCHERS**

**TIME:** 9:15 am – 9:45 am

**INTERVIEWER:** JoAnn MacMaster,  
*President, Cortiva Institute*

##### **PANELISTS:**

Eugene Gerner, Ph.D., *Director, Specialized Program of Research Excellence (SPORE) in GI Cancers, Arizona Cancer Center, University of Arizona and co-founder, Cancer Prevention Pharmaceuticals (CPP)*  
Kim Ogden, Ph.D., *Chemical and Environmental Engineering Professor, University of Arizona Department of Chemical and Environmental Engineering*  
Peter Smith, Ph.D., *Thomas R. Brown Distinguished Chair of Integrated Science, University of Arizona*

#### **PERSPECTIVES FROM INDUSTRY**

**TIME:** 9:45 am – 10:15 am

**INTERVIEWER:** Lawrence (Larry) Hecker, *Principal, Hecker & Muehlebach, PLLC.*

##### **PANELISTS:**

Christian d'Aubigny, Ph.D., *VP Engineering, TeraVision.*  
Paul R. Eynott, Ph.D., *US Head of Partnering & Innovation, Early to Candidate DPU, sanofi-aventis*  
William Richardson, *Research and Development Director, SOLON Corporation*

#### **PERSPECTIVES FROM INVESTORS**

**TIME:** 10:30 am – 11:00 am

**INTERVIEWER:** Robert (Bob) Morrison,  
*Mentor in Residence, McGuire Center for Entrepreneurship and Executive Director, Desert Angel*

##### **PANELISTS:**

Harry George, *Managing General Partner, Solstice Capital*  
Matt Mars, Ph.D., *Lecturer in Entrepreneurship, McGuire Center for Entrepreneurship, University of Arizona*  
Lillian Montoya-Rael, *Principal, Flywheel Ventures*  
William (Bill) H. Payne, *Bill Payne & Associates*

#### **PERSPECTIVES FROM ECONOMIC DEVELOPERS**

**TIME:** 11:00 am – 11:30 am

**INTERVIEWER:** David Welsh, *Executive Vice President, TREO*

##### **PANELISTS:**

John Grabo, *Director of Business Development, University of Arizona Science and Tech Park*  
Amanda Jacobs, *Economic Development Manager, Town of Oro Valley*  
Kathy Ward, *Economic Development & Communications Manager, Town of Sahuarita*  
Josh Wright, *Assistant to the Town Manager, Town of Marana*

#### **PERSPECTIVES FROM SMALL BUSINESS**

**TIME:** 11:30 am – 12 noon

**INTERVIEWER:** Sherry Hoskinson,  
*Director, McGuire Center for Entrepreneurship; Co-director, Business / Law Exchange, University of Arizona*

##### **PANELISTS:**

Suzette Colley, *Principal, Colley Business Services*  
Bradley Feder, *Co-founder, Simply Bits*  
Lauren G. LeBeau, M.D., *Assistant Professor of Pathology, University of Arizona and Medical Director, Kino Hospital*  
Emre Toker, *Mentor in Residence, McGuire Center for Entrepreneurship, University of Arizona; member, Desert Angels and Desert Technology Investors*

# LUNCHEON, AWARDS & KEYNOTE ADDRESS



**TIME:** 12 noon – 1:30 pm  
**ROOM:** Sabino & Pima

**INTRODUCTION BY:** Lawrence (Larry) Hecker, *Principal,*  
*Hecker & Muehlebach, PLLC*

## THOMAS R. BROWN ENTREPRENEURSHIP AWARD

This award was created in honor of Tom Brown, the founder of Burr-Brown Corporation, Tucson's first major high-tech company which was acquired by Texas Instruments in 2000 for \$7 billion. The Entrepreneurship Award is given in recognition of the recipients' commitment and contributions to entrepreneurial growth and excellence.

The award will be presented by Sarah Brown Smallhouse of the Thomas R. Brown Foundations.

### Past winners:

- 2009: Kerstin Block, *Founder, Buffalo Exchange*
- 2008: Doug Goodman, *President, Ridgetop Group*
- 2007: Louise Francesconi, *President, Raytheon Missile Systems*
- 2006: Sarah Brown Smallhouse, *President, Brown Family Foundation*
- 2005: James Wyant, *Founder of Wyco Corporation and dean of the College of Optical Sciences, The University of Arizona*
- 2004: Charles Horn, *Founder and Chairman of Scriptsave*
- 2003: Anthony Mulligan and Mark Angier, *Founders, Advanced Ceramics Research, Inc.*
- 2002: Thomas Grogan, *Founder and Director, Ventana Medical Systems and Professor of Pathology, The University of Arizona*
- 2001: Thomas R. Brown, *Founder, Burr-Brown Corporation*

2010 THOMAS R. BROWN AWARD WINNER:

## JEREMY WOAN

Jeremy is Chairman and CEO of CyraCom International, Inc, a leading provider of language services headquartered in Tucson, AZ.

Jeremy Woan joined CyraCom International from the Bampton Group, a venture capital investment and advisory firm with offices in San Francisco and the UK that, for over ten years, has successfully invested in and worked with a wide range of transatlantic and U.S. technology and service companies. All companies in which Bampton has invested have subsequently gone on to IPO or trade sale. Through his work, Jeremy has served as a board member and chairman of various private and public companies in fields including: enterprise software, cellular telephony, healthcare technology and services, and media.

Previously, Jeremy successfully built two technology companies through to IPO, one in high performance notebook computing and the other in electronic patient record systems. Prior to this, he worked for several leading international investment banking firms where he specialized in the international growth and financing of technology companies and worked on a wide range of UK and international IPO's.

Jeremy has frequently been a panelist and speaker at U.S. and European conferences on technology investing and especially on the issues of raising finance and building a management team domestically and internationally. He holds graduate degrees from Cambridge University in law and public international law and was 2007 Entrepreneur in Residence at the McGuire Center for Entrepreneurship within the University of Arizona's Eller College of Management. He chairs the Northern California branch of the Cambridge Alumni, and is a Director of the English-Speaking Union of the United States.



# 2010



## THE GRUBB & ELLIS / INNOVATION PARK EMERGENT ENTREPRENEUR AWARD

This award is in its second year and recognizes and celebrates promising nascent entrepreneurship in Southern Arizona. The award carries with it a cash prize and will be awarded by Robert (Bob) Davis of Grubb & Ellis.

This annual award will be given to a firm that exhibits the following attributes:

- Innovative products / services represent clear market opportunity
- Shows evidence of clear business perspective
- Stands to contribute significantly to the economic and social landscape of Arizona

2009 Inaugural Winner:

### **PlayAbility Toys**

[www.playabilitytoys.com](http://www.playabilitytoys.com)

*Designs and develops toys for children with special needs.*



**INNOVATION**PARK  
ORO VALLEY, ARIZONA

# LUNCHEON, AWARDS & KEYNOTE ADDRESS



**TIME:** 12 noon – 1:30 pm

**ROOM:** Sabino & Pima

## KEYNOTE ADDRESS: COLLABORATING WITH THE UNIVERSITY

As described in the 2005 Tucson Regional Economic Opportunities blueprint, “The University of Arizona is a central pillar of Tucson’s innovation ecology, attracting talent from across the world, providing a social and cultural environment that ignites and connects the local and global community, and serving as the foundation for building the region’s new technology-based, knowledge economy.” Hear from top administrators about the many ways the University of Arizona contributes to the regional economic development landscape, plus recent developments designed to spur the licensing and commercialization of intellectual property developed by faculty researchers.

### KEYNOTE SPEAKERS:



**Meredith Hay, Ph.D.**  
*Executive Vice President and  
Provost, University of Arizona*



**Mike Proctor**  
*Vice Provost for Outreach and  
Global Initiatives and Dean of the  
Outreach College, University of  
Arizona*



**Nancy Smith**  
*Director of Corporate and  
Business Relations, University  
of Arizona, Office of the Vice  
President for Research,  
Graduate Studies, and Economic  
Development*



**Bruce Wright**  
*Associate Vice President for  
University Research Parks,  
University of Arizona*



# TRADESHOW

## *Resources for Entrepreneurs*

### OVERVIEW

The tradeshow will showcase firms that support and advance entrepreneurs through their products and services. This year, attendees will be given an opportunity to vote for their favorite tradeshow booth. Be sure to visit all the tradeshow booths and vote with the ticket given to you at registration. The winner will be recognized at the afternoon wrap-up.

**TIME:** 1:30 pm – 2:15 pm, 3:30 pm – 4:15 pm

**ROOM:** Foyer

### TRADESHOW COMPANIES

**Arizona Department of Commerce**

**Cyracom**

**Grubb & Ellis / Innovation Park**

**Lewis & Roca, LLP**

**Mastek-Innerstep**

**Office of University Research Parks, University of Arizona**

**Ridgetop Group**

**Town of Marana**

**UA Office of Technology Transfer, University of Arizona**

**UA Outreach College, University of Arizona**



# SMALL DISCUSSIONS GROUPS

## *Hot Topics for Regional Prosperity*

### OVERVIEW

Participate in lively discussions regarding distinct aspects of developing entrepreneurial partnerships between the university and the broader regional community. The conversations will heat up as experts in each field lead roundtable dialogues that will allow you to discuss your thoughts on key themes that have emerged from the presentations in the morning and at lunch.

**TIME:** 2:15 pm – 3:30 pm

**ROOM:** Sabino, Pima, Madera & the Canyons

### ENABLING PARTNERSHIPS

**ROOM:** Sabino

**MODERATOR:** Molly Gilbert, *Director of Strategic Initiatives, Office of University Research Parks (OURP)*

Britton Dornquast, *Program Manager, Regional Transportation Authority - MainStreet Business Assistance Program*

Tom Shambo, *Director, Small Business Development Center*

Nancy Smith, *Director of Corporate and Business Relations, University of Arizona Office of the Vice President for Research, Graduate Studies, and Economic Development*

Ernie Webster, *Manager, University of Arizona Small Business Supplier Diversity Program*

David Welsh, *Executive Vice President, TREO*

Justin Williams, *Director, Tucson Regional Office at Arizona Technology Council*

### INNOVATION FRIENDLY CAPITAL RESOURCES

**ROOM:** Pima

**MODERATOR:** Jane Prescott-Smith, *Director of Corporate Connections, University of Arizona Eller College of Management*

Kevin Heath, *Business Banking Manager, Wells Fargo*

Karen Burns, *Microlending Director, Microbusiness Advancement Center*

Sandra (Sandy) DiCosola, *Owner, Summit Contract Management*

Paul R. Eynott, *Ph.D., US Head of Partnering & Innovation, Early to Candidate DPU, sanofi-aventis*

Curtis Gunn, *Chairman, Desert Angels*

Jeremy Woan, *President & CEO, CyraCom*

## COMMUNICATIONS & MESSAGING

**ROOM:** Madera

**MODERATOR:** Laura Shaw, *Sr. Vice President, Marketing and Communications, TREO*

Ann Brown, *Senior Media Relations Specialist, Caliber Group*

Lisa Contreras, *Senior External Media Relations Consultant, Carondelet Health Network*

Johnny Cruz, *Assistant Vice President for Communications, University of Arizona*

Joe Pangburn, *Senior Reporter, Inside Tucson Business*

Becky Pallack, *Reporter, Arizona Daily Star*

Wendy Erica Werden, *APR, Director of Marketing & Brand Management, Arizona Public Media*

## TALENT POOLS

**ROOM:** the Canyons

**MODERATOR:** Randy Accetta, *Ph.D., Mentor in Residence-Communication and Distance Learning Manager, McGuire Center for Entrepreneurship, University of Arizona*

CJ Battle, *Tucson Young Professionals*

Kim Bourn, *Executive Director, Greater Tucson Leadership (GTL)*

Harry George, *Managing General Partner, Solstice Capital*

Daisy Jenkins, *Senior Vice President of Human Resources, Carondelet Health Network*

Eileen McGarry, *Director, University of Arizona Career Services*

Leslie Porter, *Director of Recruitment and Employee Advising, University of Arizona*

## NOTES

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# AFTERNOON SESSION

## *Today's Science, Tomorrow's Business*

### OVERVIEW

End the day with a glimpse into the most cutting-edge research from the University of Arizona and local R&D companies. Don't miss out – these short presentations will give us a hint into future entrepreneurial ventures by discussing the commercialization potential of scientific research being conducted. Presenters will be around following the presentations to provide an opportunity for your discussion and further exploration.

**TIME:** 4:30 pm – 5:30 pm

**ROOM:** Madera & the Canyons

**MODERATOR:** Emre Toker, *Mentor in Residence, McGuire Center for Entrepreneurship, University of Arizona; member, Desert Angels and Desert Technology Investors*

Roger Angel, *Ph.D., Regents' Professor of Astronomy and Optical Sciences, University of Arizona*

Bonner Denton, *Ph.D., Professor of Chemistry and a Professor of Geosciences, University of Arizona*

Stephen Goff, *Ph.D., Principal Investigator and Project Director, iPlant Collaborative at the University of Arizona BIO5 Institute*

Julie Lang, *M.D., Assistant Professor, University of Arizona College of Medicine, Department of Surgery in the section of Surgical Oncology and Director, University of Arizona Cancer Center Breast Surgical Oncology Program*

Corey Smith, *President and CEO, bioVidria, Inc*

Dr. Frederic Zenhausern, *Ph.D., Professor, University of Arizona College of Medicine, Phoenix, Basic Medical Sciences Department and Founder and Director, Center for Applied Nanobioscience and Medicine (ANBM), University of Arizona*

### NOTES

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# CLOSING RECEPTION & *Desert Angels Dinner*

## CYRACOM RECEPTION

**Stop by the Closing Reception presented by CyraCom to wrap up networking for the day. Speak with other attendees about the exciting topics discussed today and make plans to follow up on ideas presented. If you have any questions for the presenters from the Today's Science, Tomorrow's Business session, they will be around during the reception to discuss their research in more depth.**

**TIME:** 5:30 pm – 6:30 pm

**ROOM:** Foyer, Madera & the Canyons



## DESERT ANGELS DINNER

**The Desert Angels was formed in 2000, and since that time has grown to become one of the country's leading angel organizations. Today, the group has over 70 members of which many have invested in a significant portfolio of companies. The main focus of the Desert Angels is the funding of entrepreneurial ventures and to that end reviews over 100 companies per year as possible investments. However, as the organization has grown it has increasingly become involved in a range of educational activities such as sponsoring the local presentation of the Kauffman Foundation's "Power of Angel Investing" seminar, assisting the McGuire Center for Entrepreneurship at the University of Arizona's Eller College of Management, and co-sponsoring IdeaFunding.**

**TIME:** 6:30 pm

**ROOM:** Sabino & Pima



*The Desert Angels holds monthly dinner meetings from September through June. These meetings are the primary means for presenting those companies who have been selected to appear before the general membership. In addition, speakers are often invited to these meetings to give short presentations on topics relevant to the goals of the organization. Potential members are always welcome to attend Desert Angels meetings as guests of the organization. Please contact Bob Morrison at [morrisonr@qwest.net](mailto:morrisonr@qwest.net) if you are interested in learning more about the organization.*

# 2010



# BIOGRAPHIES

**Randy Accetta**, *Ph.D., Mentor in Residence-Communication and Distance Learning Manager, McGuire Center for Entrepreneurship, University of Arizona.* Randy is part of the McGuire Entrepreneurship Program teaching team and coordinates the development of McGuire's distributed learning offerings.

**Roger Angel**, *Ph.D., Regents' Professor of Astronomy and Optical Sciences, University of Arizona.* Dr. Angel founded the Steward Observatory Mirror Lab, the Center for Astronomical Adaptive Optics and the Steward Observatory Solar Lab. He is also CEO of REhnu LLC, a startup company commercializing the technology developed at the University for utility scale photovoltaic generation of solar electricity.

**Paul August**, *Ph.D., Director, US Head of Early to Candidate Unit, sanofi-aventis.* Paul has more than 20 years of experience in pharmaceutical discovery and the management of global, collaborative research projects. He recently established a team at the new, sanofi-aventis site in Oro Valley, Arizona, which is focused on building a strong position in the field of human regenerative medicine and dedicated to the identification of both local and national external partnering opportunities.

**CJ Battle**, *Tucson Young Professionals*

**Kim Bourn**, *Executive Director, Greater Tucson Leadership (GTL).* In her current role, Kim directs GTL's adult leadership class, develops community forums on topics of regional importance and plans and coordinates GTL's outreach and special events.

**Ann Brown**, *Senior Media Relations Specialist, Caliber Group.* Ann is the former Arizona Daily Star editorial page editor. She currently works for the Caliber Group, a brand marketing and public relations firm specializing in building and maintaining successful brands, relationships and reputations. In addition, she is a freelance writer and editor.

**Karen Burns**, *Microlending Director, Microbusiness Advancement Center.* Karen brings a strong financial background and a long history of service to Arizona and the Tucson community. She has worked as a corporate underwriter, portfolio manager, and litigation manager for the Valley National Bank of Arizona, Resolution Trust Corporation, Bank of America, and chaired the Arizona State Land Department Board of Appeals.

**Suzette Colley**, *Principal, Colley Business Services.* As the former Southern Arizona regional director for the Arizona Small Business Association, Suzette has extensive experience working with business development, community relations, non-profit management, strategic planning, financial management, and marketing.

**Lisa Contreras**, *Senior External Media Relations Consultant, Carondelet Health Network.* Lisa worked in the field of broadcast journalism for 19 years before moving into corporate media relations consulting. She most recently served as Interim Vice President of Marketing and Communications for Carondelet Health Network before returning to her current role as Sr. External Media Relations Consultant.

**Johnny Cruz**, *Assistant Vice President for Communications, University of Arizona.* In his current role, Johnny oversees the office that serves as the world's portal for news and information about the UA and provides message management services to the University and its various subdivisions.

**Christian d'Aubigny**, *Ph.D., VP Engineering, TeraVision.* As a MIT start up, TeraVision was created to bring THz expertise and enabling technologies developed at the University of Arizona (U of A) and the Massachusetts Institute of Technology (MIT) to market.

**Robert (Bob) Davis**, *Senior Vice President, Grubb & Ellis.* Bob is a veteran real estate professional who has been among the top producers in the county every year for the last 28 years. His comprehensive experience in all phases of office development, leasing and sales has produced more than 2,200 transactions totaling \$1.5 billion. Bob currently works with the Company's Private Capital Investment Group on the sale of commercial investment properties.

**Bonner Denton**, *Ph.D., Professor of Chemistry and a Professor of Geosciences, University of Arizona.* His research centers on developing and applying new detection technology to a wide variety of fields, including optical and mass spectrometry. Dr. Denton has served as the editor of four texts on Scientific Optical Imaging, and has authored over 190 peer-reviewed manuscripts

**Sandra (Sandy) DiCosola**, *Owner, Summit Contract Management.* Sandy's company is dedicated to helping inventors, entrepreneurs and small businesses work with local and federal government agencies. She specializes in the Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) programs. Sandy also assists small businesses pursue GSA schedule contracts and opportunities with city, county and state agencies.

**Barbara Dolan**, *Principal, 17th Street Communications*. Barb has diverse public and government relations, marketing and special event experience. As the owner and founder of 17th Street Communications, she is enthusiastic about working collaboratively with her clients' teams to achieve their public outreach goals in a creative and efficient manner.

**Britton Dornquast**, *Program Manager, Regional Transportation Authority - MainStreet Business Assistance Program*. Britton has been a successful entrepreneur and actively involved in the small business community. In his current role, he helps businesses during transportation projects by providing information, facilitating communication and offering individual and group business consulting services.

**Fred DuVal**, *Vice Chair, Arizona Board of Regents*. Regent DuVal also Chairs the Strategic Planning, Budget, and Finance Committee and the Public Outreach and Legislative Affairs Committee, in addition to the Getting AHEAD project. Additionally, he serves on the Board of the University Medical Center in Tucson. DuVal served 5 years on the Arizona Commerce and Economic Development Commission. In 2004, he authored the book *Calling Arizona Home* and has published over two dozen opinion pieces on foreign affairs, economic development, and education. DuVal spent 7 years as a senior staff in the Clinton White House and 10 years as a senior advisor to AZ Governor Bruce Babbitt.

**Paul R. Eynott**, *Ph.D., US Head of Partnering & Innovation, Early to Candidate DPU, sanofi-aventis*. Paul has extensive experience in leading global clinical and nonclinical development, driving project deliverables and managing cross-functional teams. Currently, Paul works with academics, Angel Investors, VC's and Biotech's to access and integrate external innovation to create value.

**Bradley Feder**, *Co-founder, Simply Bits*. In addition to Simply Bits, Southern Arizona's largest private voice and data network, Brad was also the co-creator of RightFAX and grew the company from 2 employees to 220 and over \$60 million in annual gross sales.

**Jason Fenwick**, *Web Editor, Carondelet Health Network*. Jason's experience stretches from broadcast journalism to entrepreneur to health care. He currently plays a key role in the marketing and communications department at Carondelet Health Network. He is founder of Bill The Dog, LLC, a communications company in Tucson. Prior to that, he created Inside Arizona Business, a multi-media approach to covering local business news on television (KVOA-NBC Tucson), internet and email.

**Harry George**, *Managing General Partner, Solstice Capital*. As an active angel investor, Harry has extensive experience founding, operating and investing in successful rapid growth technology-related companies.

**Eugene Gerner**, *Ph.D., Director, Specialized Program of Research Excellence (SPORE) in GI Cancers, Arizona Cancer Center, University of Arizona and co-founder, Cancer Prevention Pharmaceuticals (CPP)*. Gene Gerner is a scientist, professor and entrepreneur. He was the founding leader of the Cancer Biology Graduate and Gastrointestinal Cancer Programs at UA and co-founded CPP. He has received international recognition for creating a two-drug combination that effectively treats risk factors for colon cancer.

**Molly Gilbert**, *Director of Strategic Initiatives, Office of University Research Parks (OURP)*. She leads strategic initiatives and special projects for OURP and serves as project manager for the Arizona Bioscience Par and the Border Security and Technology Commercialization Center. She is currently serving as the Interim Director for the Arizona Center for Innovation, a technology business incubator located at the University of Arizona Tech Park.

**Stephen Goff**, *Ph.D., Principal Investigator and Project Director, iPlant Collaborative at the University of Arizona BIO5 Institute*. Trained in molecular and cell biology, Dr. Goff was a researcher at Biogen Inc. in Cambridge and Geneva, at Tuft's Medical School and at the Plant Gene Expression Center, USDA/UC Berkeley. Prior to joining BIO5, he headed a group at Syngenta Biotechnology in Research Triangle Park, N.C., focusing on new business and scientific opportunities at the intersection of plant and animal biology.

**John Grabo**, *Director of Business Development, University of Arizona Science and Tech Park*. John is responsible for business development and attraction for the Tech Park. In this role, he manages OURP's Global Advantage program of international business outreach, development and partnerships.

**Curtis Gunn**, *Chairman, Desert Angels*. A Tucson-based angel investment group, Desert Angels has invested in many early-stage start-up companies and technologies, including BioVidria, Amplimed, Medipacs and SynCardia Systems. In addition to his success as an investor, Curtis is a world-class cyclist.

**Meredith Hay**, *Ph.D., Executive Vice President and Provost, University of Arizona*. Dr. Hay is chief operating officer with responsibility for the university budget and for ensuring excellence and coordination for all academic, research, and outreach programs. She also leads the University's Transformation Plan, which is designed to advance excellence in all areas of the University's missions of education, discovery, and innovation as well as the UA land-grant mission of services to the State of Arizona. Dr. Hay is currently preparing for the pending launch of the new UA Research Corporation (UARC) – a new entity that will be positioned outside the University (and under the UA Foundation) to expand University licensing and commercializing activity.

**Kevin Heath**, *Business Banking Manager, Wells Fargo*. A 35-year veteran in the financial services industry, Kevin has a proven track record in commercial banking and middle-market lending. Kevin leads the Downtown Tucson Business Banking Team for Wells Fargo.

**Lawrence (Larry) Hecker**, *Principal, Hecker & Muehlebach, PLLC*. The focus of Larry's law practice is primarily in the areas of corporate law and securities regulation, real estate, business formation, capital formation transactions, corporations and corporate finance. He is a frequent panelist and speaker on securities regulations and capital formation education programs and is an Assistant Adjunct Professor at the James E. Rogers College of Law teaching Law and Entrepreneurship and overseeing the "Mock Law Firm" in collaboration with the McGuire Center of Entrepreneurship.

**Sherry Hoskinson**, *Director, McGuire Center for Entrepreneurship; Co-director, Business / Law Exchange, University of Arizona*. Sherry is responsible for designing, planning and implementing the center's nationally acclaimed academic programs, as well as outreach and development, research and scholarship and entrepreneurship awareness and promotion.

**Amanda Jacobs**, *Economic Development Manager, Town of Oro Valley*. Amanda manages economic development programs to attract project development, capital investment and job creation. She is also responsible for business retention and expansion programs and serves as a liaison for large commercial projects, existing businesses and residents of the Town.

**Daisy Jenkins**, *Senior Vice President of Human Resources, Carondelet Health Network*. Formerly VP of Human Resources at Raytheon Missile Systems in Tucson, Daisy is responsible for developing human resources strategies and initiatives that contribute to achieving Carondelet's health ministry's goals. She brings a wealth of knowledge about current and future regional talent needs through her work with TREO and local P-20 educational systems.

**Julie Lang**, *M.D., Assistant Professor, University of Arizona College of Medicine, Department of Surgery in the section of Surgical Oncology and Director, University of Arizona Cancer Center Breast Surgical Oncology Program*. Dr. Lang is involved in various research endeavors that will allow her to continue to provide her patients with the most up to date treatment options available. Her research interests include breast cancer stem cells, circulating tumor cells, cancer genomics and inflammatory breast cancer.

**Lauren G. LeBeau**, *M.D., Assistant Professor of Pathology, University of Arizona and Medical Director, Kino Hospital*. Dr. LeBeau is working on the development of commercialization of novel tools for pathologic assessment of surgically excised specimens.

**JoAnn MacMaster**, *President, Cortiva Institute*. JoAnn is a high tech entrepreneur and entrepreneurship educator.

**Matt Mars**, *Ph.D., Lecturer in Entrepreneurship, McGuire Center for Entrepreneurship, University of Arizona*. Matt is an entrepreneurship researcher, teacher and author. He conducts research centered on the sociological dimensions of student and faculty entrepreneurship.

**Eileen McGarry**, *Director, University of Arizona Career Services*. Returning to the UA where she graduated with both a bachelor's and master's degree in 1983, Eileen brings over 25 years of experience in the career services and talent development field. She comes most recently from UNLV where she led the Career Services department for over 20 years.

**Lillian Montoya-Rael**, *Principal, Flywheel Ventures*. Lillian is a seasoned operations professional with extensive experience in strategic planning and implementation, financial planning/budgeting, and communications. In the past, she helped corporate, government and non-profit leaders navigate everyday strategic and organizational challenges.

**Robert (Bob) Morrison**, *Mentor in Residence, McGuire Center for Entrepreneurship and Executive Director, Desert Angels*. Bob has been involved in all phases of technology business development. He was the founder of Sunquest Information Systems which became the world's largest vendor of hospital laboratory information automation products. Bob has spent a number of years consulting with emerging companies and assisting them in their business development.

**Rick Myers**, *Regent, Arizona Board of Regents and Chief Operating Officer, Critical Path Institute*. Governor Jan Brewer appointed Rick Myers to an eight-year term on the Arizona Board of Regents in January 2010. He is currently the Chief Operating Officer of Critical Path Institute, a non-profit organization that works with the pharmaceutical industry, patient groups, academia, and the Food and Drug Administration to tackle significant issues in drug development. Prior to joining Critical Path Institute, Rick was the general manager of IBM Tucson. He retired from IBM in 2003 after a 25-year career with the company.

**Kim Ogden, Ph.D.,** *University of Arizona, Chemical and Environmental Engineering Professor, University of Arizona Department of Chemical and Environmental Engineering.* Dr. Ogden is a founding member of the Society of Biological Engineers, as well as a member on numerous committees that aid research and development. Her research interests include bioremediation and biotechnology, biofuels and biodegradation.

**Becky Pallack,** *Reporter, Arizona Daily Star.* Becky covers higher education for the newspaper. In seven years at the Star, she has also covered real estate, workforce issues, crime and high school sports.

**Joe Pangburn,** *Senior Reporter, Inside Tucson Business.* Joe covers science and technology, government and the University of Arizona. He also plans and assigns freelance work and manages special sections.

**William (Bill) H. Payne,** *Bill Payne & Associates.* Bill is a business executive, entrepreneur, author, and angel investor. He has significant experience in new product development, commercializing new products and using strategic partnerships to facilitate new product implementation. Bill is an advocate for technology transfer from universities with ceramic engineering programs into U.S. companies through his involvement in advisory committees to materials science and engineering departments at four U.S. universities.

**Leslie Porter,** *Director of Recruitment and Employee Advising, University of Arizona.* Leslie has worked as a human resources professional at the University of Arizona since 1991. During her tenure, she has worked in compensation and classification, recruitment and employment, employee relations and benefits administration. Her current role includes oversight for recruitment, employment and employee and career advising services.

**Dale Prentiss,** *Special Projects Intern, McGuire Center for Entrepreneurship.* Dale is a second year full-time MBA student at the University of Arizona with concentrations in entrepreneurship and marketing. Previously, Dale was a teacher for eight years in Arizona and California.

**Jane Prescott-Smith,** *Director of Corporate Connections, University of Arizona Eller College of Management.* In her current role at Eller College, Jane works to optimize the number and quality of interactions between students and members of the business community.

**Mike Proctor,** *Vice Provost for Outreach and Global Initiatives and Dean of the Outreach College, University of Arizona.* In his current role, Mike works to expand the reach of UA-faculty driven programs across Arizona and abroad and to provide credit and noncredit educational opportunities beyond the traditional campus experience. Proctor is also a professor in Watershed Management in the School of Natural Resources and the Environment and teaches Environmental Law in the Department of Soil, Water and Environmental Science.

**Guillermo (Bill) Quiroga,** *President, Cottonwood Management Consulting LLC and President, CEO and Co-Founder of Native American Botanics Corporation.* Bill formerly was Director of the Rural Entrepreneurship Initiatives at the McGuire Center for Entrepreneurship and currently is President of Cottonwood Management Consulting LLC where he is a sub-contractor with U.S. Small Business Administration's E200 Native American Program assisting local entrepreneurs move to the next level.

**William Richardson,** *Research and Development Director, SOLON Corporation.* Bill heads Research and Development for SOLON Corporation where he oversees module testing and product development, as well as strategic management and evaluation of new technologies for the North American market. In 2009, Bill implemented SOLON's North American Outdoor Testing Facility, where next generation module, tracking, and systems integration testing is conducted.

**Thomas Shambo,** *Director, Small Business Development Center.* Tom has 30 plus years as an entrepreneur and has owned, operated and sold 11 companies during this time. He has assisted hundreds of small businesses in developing business plans, marketing, sales and financial strategies over the past five years.

**Laura Shaw, Sr. Vice President, Marketing and Communications, TREO.** Laura's duties include Tucson region and TREO branding, development and implementation of business attraction marketing strategies, management of TREO publications and web marketing efforts, and media relations.

**Sarah Brown Smallhouse,** *President, Thomas R. Brown Foundations.* In addition to her current role, Sarah serves on the Board of the University of Arizona Foundation, Advisory Boards of the University of Arizona's Colleges of Engineering and Science, and the Economics Department at the Eller College of Management. She also serves on several other boards in the community including Tucson Regional Economic Opportunities, the Critical Path Institute, the Governor's CANAMEX Task force and STEM Advisory Council.

**Corey Smith**, *President and CEO, bioVidria, Inc.* BioVidria, Inc. is an Arizona start-up whose mission is to commercialize nanoparticle-enhanced products for biosensing. Mr. Smith has extensive M&A and fund raising experience raising \$56MM for 4 companies, a strong sales and marketing background and 25 yrs of experience in tech companies focused on consumer products and embedded, web-based and enterprise software.

**Nancy Smith**, *Director of Corporate and Business Relations, University of Arizona, Office of the Vice President for Research, Graduate Studies, and Economic Development.* Nancy is responsible for developing and strengthening ties between the UA and the private sector, expanding research-based collaborations with industry, and coordinating the many interests within the University that link with the business community. She has enjoyed a multidimensional career as a corporate executive, consultant, industry analyst, and strategic planner.

**Peter Smith**, *Ph.D., Thomas R. Brown Distinguished Chair of Integrated Science, University of Arizona.* Dr. Smith serves as the principal investigator for the Phoenix Mars Lander Mission as well as a co-investigator for the Mars Exploration Rover science team. These projects have evolved from his long term interest in optical sciences and radiative transfer in planetary atmospheres.

**Emre Toker**, *Mentor in Residence, McGuire Center for Entrepreneurship, University of Arizona; member, Desert Angels and Desert Technology Investors.* Emre founded two biomedical technology companies in Tucson, MedOptics and Bioptics Corporations, and co-founded another in Santa Clara, California, Radicon Imaging Corporation.

**Kathy Ward**, *Economic Development & Communications Manager, Town of Sahuarita.* Kathy has extensive experience in economic development and international trade and tourism. In her current role with Sahuarita, Kathy developed the Town's Strategic Plan for Economic Development with a focus on recruitment of high wage employers and developing a local, diversified, and sustainable economy.

**Sandra Watson**, *Assistant Deputy Director of Innovation and Global Business Development, Arizona Department of Commerce.* In her current role, Sandra works to ensure the needs of Arizona's emerging technology and life sciences industries are being met. Her office at the Arizona Department of Commerce is dedicated to providing assistance and resources to accelerate the growth of innovation, technology and entrepreneurship throughout the state.

**Ernie Webster**, *Manager, University of Arizona Small Business Supplier Diversity Program.*

Ernie has been nationally recognized for his creative accomplishments in obtaining contracts for minority-owned businesses through the University of Arizona and for his assistance in helping other universities nationwide do the same.

**David Welsh**, *Executive Vice President, TREO.* David is responsible for management of a wide range of economic development programs and projects while focusing on working with stakeholders and regional economic development partners.

**Wendy Erica Werden**, *APR, Director of Marketing & Brand Management, Arizona Public Media.* Wendy Erica is responsible for all marketing and branding efforts and external communications for the local PBS and NPR affiliates, as well as Classical Radio 90.5 FM and multi-media Websites. This includes everything from paid media and publications to on-air promotions, press relations, and community events.

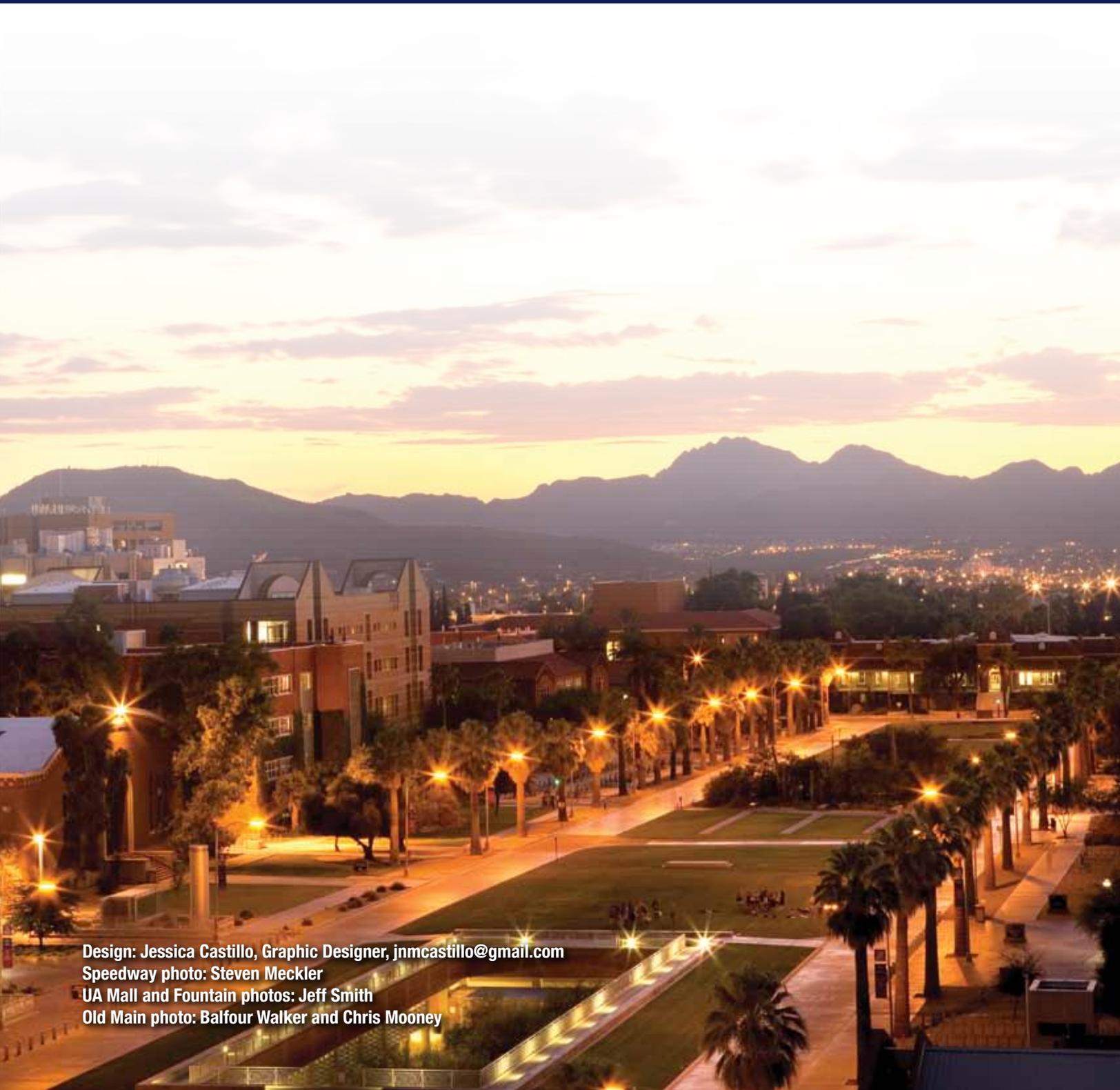
**Justin Williams**, *Director, Tucson Regional Office at Arizona Technology Council.* Justin and the Arizona Technology Council have worked extensively with both private industry and the State's Universities, helping to foster and expand the partnerships, collaboration and technology transfer that can drive the future growth of Arizona's technology industry.

**Jeremy Woan**, *President & CEO, CyraCom.* Jeremy is a frequent panelist and speaker at U.S. and European conferences on early stage technology investing and especially on the issues of raising finance and building a management team domestically and internationally. Through his work, Jeremy has served as a board member and chairman of various private and public companies in fields including: enterprise software, cellular telephony, healthcare technology and services, and media.

**Bruce Wright**, *Associate Vice President for University Research Parks, University of Arizona.* Bruce serves as CEO for both the UA Science and Technology Park and the new Arizona Bioscience Park. Wright is President of the Campus Research Corporation (CRC), which assists the University of Arizona in the development, operation, marketing, and leasing of the Tech Park and Bio Park, and President of the Arizona Center for Innovation (AzCI), a technology incubator focusing on core technologies developed at the University of Arizona and promoting the growth of start-up and emerging companies. Bruce's research interests include regional economic development, international trade, and technology development / commercialization.

**Josh Wright**, *Assistant to the Town Manager, Town of Marana.* Josh's primary duties include special projects and administering the community's economic development strategic plan. He has been with the Town since 2006 and previously worked for The University of Arizona, where he also received his bachelor's and master's degrees.

**Frederic Zenhausern**, *Ph.D., Professor, University of Arizona College of Medicine, Phoenix, Basic Medical Sciences Department and Founder and Director, Center for Applied Nanobioscience and Medicine (ANBM), University of Arizona.* Dr. Zenhausern is also Senior Investigator and Associate Director of Molecular Diagnostics and Target Validation Division at the Translational Genomics Research Institute (TGen). His role is leading platform technologies development in genomics, proteomics and physical sciences to translate biomarker panels into integrated tools for gene expression-based companion diagnostics tests. Applications range from oncology to cardiovascular to bone diseases but also medical countermeasures against radiation and pandemic emergency.



Design: Jessica Castillo, Graphic Designer, [jnmcastillo@gmail.com](mailto:jnmcastillo@gmail.com)  
Speedway photo: Steven Meckler  
UA Mall and Fountain photos: Jeff Smith  
Old Main photo: Balfour Walker and Chris Mooney

# IdeaFunding 2010 Sponsors

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## SILVER

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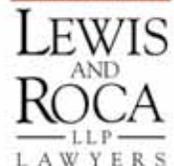
Hecker & Muehlebach, PLLC



Center for Corporate Entrepreneurship and New Venturing



Focus Forward



## MEDIA

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## Academic Review Overview

## McGuire Entrepreneurship Program Academic Review Overview

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At the McGuire Center for Entrepreneurship, although we celebrate new venture activity and achievement through venture competitions and expos, we also recognize two important limitations to these traditional venues as means of assessing *academic* performance. First, even experienced entrepreneurs (or perhaps especially experienced entrepreneurs!) are naturally influenced by the attractiveness of a venture concept rather than focusing on the evidence of a team's knowledge and skills. And second, to be fair, there truly is no way to assess in a five-minute venture pitch students' mastery of entrepreneurship as a discipline and their preparedness to meet entrepreneurial challenges and make entrepreneurial contributions through their lifetimes. For this reason, McGuire instituted an extensive academic review within our program, bringing entrepreneurship educators from other universities to our campus for two full days with our entrepreneurship students.

This review period is strategically timed between the New Ventures Expo and Entrepreneurs' Grand Championship: a time when students have achieved a fundamental milestone in the entrepreneurial process — going public with a plan — and are challenged to apply everything they've learned to date to refine that plan and their venture concept based on the Expo experience and in preparation for their greatest opportunity to shine at the year-end Grand Championship.

During their stay, these guest reviewers evaluate each team's achievements specific to the 100-plus benchmarks we've established as educational goals. The process allows for a thoughtfulness and thoroughness that surpasses quick judgment and provides real insight into student and program strengths as well as areas for improvement.

While that process has provided a much more valuable assessment of our program and student achievement, in 2011 year we took to a still higher level by adapting the academic review process around Turning Technologies Audience Response System. Now, after a period of hearing and questioning three teams in succession, our reviewers enter their evaluations for each of benchmark assessment criteria by way of handheld input devices. This seemingly small change has created profound improvements in the academic review process in three ways:

First, it ensures data completeness — whereas before reviewers would occasionally forget to enter evaluations for a particular criteria for a particular team, the system now flags any missing data, requiring its input in order to move forward;

Second, it facilitates more fair and accurate comparative evaluations across all teams — data input is standardized in Likert scales and while reviewers are not grading "on a curve," if hearing a later team sparks reconsideration of an earlier evaluation, reviewers can easily revisit and modify their prior assessments;

Finally, the system instantly translates all the reviewer data into clear graphs and reports (without error from human data entry) that demonstrate at a glance not only how individual teams performed but, more importantly, how our program performs at meeting the educational criteria we've established.

We can instantly see, for example, if Team A underperformed on a third of the benchmarks. At the same time, if we see that a third of all teams underperformed on benchmark 7, we have a clear indicator that, as a program, we need to improve our curriculum for the skills and knowledge that roll up into that benchmark.

This process informs academic planning, mentor structure, helps the program to pin down critical and emergent themes across teams and academic levels (undergraduate, masters, doctoral), and study area representation (team composition), venture and industry similarities, and dozens of other views—essential information in a continually changing teaching environment.

A snapshot of one report from the 2010-11 is provided in the supplemental materials.

McGuire Center for Entrepreneurship  
Academic Review standards data sheet

1=met benchmark standard
2=did not meet benchmark standard
3=undecided. Additional information needed

Student Team/Venture	Reviewer	Benchmark (See benchmark doc for definition)																		1's	2's	3's	% "met"	primary mentor	present order
		1)	2)	13)	(4)	5)	6)	7)	8)	9)	(10)	11)	12)	13)	14)	15)	16)	17)	18)						
Acubens Biotech	Reviewer 1	1	3	3	3	1	3	1	1	3	3	1	3	1	1	1	1	3	3	34	0	17	67%	Mentor 1	2
	Reviewer 2	1	1	1	3	3	1	1	1	1	3	1	3	3	1	1	1	3	3						
	Reviewer 3	1	3	3	1	1	1	1	1	1	3	3	1	1	1	1	3	3	3						
Baby Connection	Reviewer 1	1	1	1	1	1	1	3	1	1	3	3	3	1	1	1	1	3	3	42	0	9	82%	Mentor 2	18
	Reviewer 2	1	1	1	1	1	1	1	1	1	3	1	3	1	1	1	1	3	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	3	1	3	1	1	1	3	3	3						
BarSential	Reviewer 1	1	1	1	1	1	1	3	1	3	1	1	1	1	1	1	3	3	3	44	0	7	86%	Mentor 2	4
	Reviewer 2	1	1	1	1	1	1	1	1	3	1	1	1	1	1	3	1	3	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	3	1	1	1	1	3	1	1	3						
CampusTeach	Reviewer 1	1	1	1	1	1	3	3	3	3	3	3	3	1	3	3	1	3	3	27	4	20	53%	Mentor 2	3
	Reviewer 2	1	1	3	1	1	1	3	3	3	2	3	3	3	3	3	1	3	3						
	Reviewer 3	1	3	3	1	1	1	3	1	3	2	2	3	3	1	2	1	3	3						
Carbon Scholar	Reviewer 1	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	17	1	33	33%	Mentor 1	22
	Reviewer 2	3	3	1	3	1	3	3	3	3	1	3	1	3	1	1	1	3	3						
	Reviewer 3	2	3	3	3	1	3	1	1	3	1	1	1	3	1	1	1	3	3						
College Clubhouse	Reviewer 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	50	0	1	98%	Mentor 2	20
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3						
DesertFresh	Reviewer 1	1	1	3	1	1	3	1	1	3	3	1	1	1	3	1	1	3	3	37	0	14	73%	Mentor 2	7
	Reviewer 2	1	1	1	3	3	1	1	1	1	3	1	1	3	1	3	1	1	3						
	Reviewer 3	1	1	1	3	1	1	1	1	3	1	1	1	1	3	1	1	1	3						
EcoVilla	Reviewer 1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	3	3	50	0	1	98%	Mentor 1	21
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
FIT	Reviewer 1	1	1	1	3	1	3	1	1	3	3	3	1	1	3	1	1	3	3	35	0	16	69%	Mentor 2	1
	Reviewer 2	1	1	1	1	1	1	3	1	1	3	3	1	1	1	1	1	3	3						
	Reviewer 3	1	1	3	1	1	1	1	1	3	3	1	1	1	3	1	1	3	3						
FoodInRoot	Reviewer 1	1	1	1	1	1	3	1	1	1	1	3	3	1	1	1	1	1	3	45	0	6	88%	Mentor 1	19
	Reviewer 2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	3	1	1	1	1	3	1	1	1	3						
High Point	Reviewer 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	49	0	2	96%	Mentor 2	15
	Reviewer 2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1						
Infusion Beverages	Reviewer 1	3	3	3	3	1	3	1	1	3	3	1	3	1	1	3	1	1	3	40	0	11	78%	Mentor 2	14
	Reviewer 2	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	3	1	1	1	1	3	1	1	1	1	1	1	1	1	3						
Inscentia	Reviewer 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	51	0	0	100%	Mentor 1	23
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
JusTouch	Reviewer 1	1	1	3	3	1	3	1	1	3	1	1	3	1	3	3	1	3	3	37	1	13	73%	Mentor 1	5
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3						
	Reviewer 3	1	1	1	3	1	1	1	1	1	3	3	1	2	1	1	3	3	3						
Latter Group	Reviewer 1	1	1	1	1	1	3	1	1	1	3	1	1	1	1	1	1	3	3	48	0	3	94%	Mentor 1	17
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
Mindful Meals	Reviewer 1	1	1	1	1	1	3	1	1	3	1	1	1	1	1	3	1	3	3	46	0	5	90%	Mentor 2	9
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
	Reviewer 3	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	3						
Nutrition Hub	Reviewer 1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	3	49	0	2	96%	Mentor 1	12
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
OcuCare	Reviewer 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	47	0	4	92%	Mentor 1	11
	Reviewer 2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	3	1	1	3						
	Reviewer 3	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
Resourceful Energy	Reviewer 1	1	1	3	1	1	1	3	1	3	3	1	1	1	1	1	1	1	3	42	0	9	82%	Mentor 1	10
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	3						
	Reviewer 3	1	1	3	1	1	1	1	1	3	1	1	3	1	1	1	1	3	3						
SAB	Reviewer 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	49	0	2	96%	Mentor 2	6
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	3	3						
Velocis	Reviewer 1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	50	0	1	98%	Mentor 1	16
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
Waternet	Reviewer 1	1	1	1	3	1	3	1	1	1	3	1	3	3	1	1	1	1	3	38	0	13	75%	Mentor 1	13
	Reviewer 2	1	1	1	1	1	3	1	1	3	3	3	3	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	3	1	1	1	3	1	1	1	1	1	1	1	3						
Zealos	Reviewer 1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	3	49	0	2	96%	Mentor 2	8
	Reviewer 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3						
	Reviewer 3	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1						

## Social Value of Innovation Colloquium

**Kauffman Foundation grant number 20070985**

McGuire Center for Entrepreneurship • The University of Arizona  
Social Value of Innovation Colloquium

**Final report**

May 19, 2008

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**1. Current status (progress update of program/grant as described in proposal).**

The proposed colloquium: *Measuring the Social Value of Innovation: A link in the university technology transfer and entrepreneurship equation*, took place in February 2008 in Tucson. The colloquium related activities are complete. Work on the conference volume--JAI Press Volume 19, Advances in the Study of Entrepreneurship, Innovation, and Economic Growth is underway. Expected publication date of the volume is winter 2008-09.

The purpose of the colloquium and conference volume was to increase university based ability to advance innovation by conducting technology specific assessments of the social gains of innovation, and thereby create a better understanding and ability to communicate based on values other than strictly commercial, positively impacting the cultivator pool. The design of colloquium and selection of authors and participants targeted three specific topics relative to this outcome:

- 1) Determine if a formal protocol should be established
- 2) What metrics and measures it might include
- 3) How to structure a pilot program with the intent to transfer to other institutions

Excellent candidates to author background papers in the three target areas were recruited, and additional discussants identified and invited, resulting in a rich blend of perspective and thought relative to the three topic areas. The group included economists, sociologists, technology transfer professionals, university administrators, university entrepreneurship representatives.

*A complete list of authors, paper titles, and additional discussants is attached.*

Through the presentation of papers and resulting discussion it became clear that there are many perspectives of the concept of social value and other non commercial valuations in the context of university interests. The discussion went far beyond simply advancing individual scientific innovation and touched on social value of innovation in general, social value of graduates, social value of aggregate innovation, social value of innovation to the institution. Roles and applications of illustrations of social value included those of incentive, marketing/communication, research, pedagogy, planning, regional engagement/economic strength. A few key statements of new directions in research/exploration and application include:

- Demonstration of elevated social capital
- Social engagement of innovator or firm (not individual innovation)
- Enabling social action
- Net social value
- Social value dependence
- Market value vs social value
- Social change as value proposition

- Commercial ventures articulate goals performance--or goals--in social terms
- University innovation valuations: Academic; market; social; economic; research
- Alternate valuation focus
- Maximizing social return on financial investment--SROFI (institutional)
- Reshaping public message
- Social value bigger than any discipline; capability to embed in pedagogy
- Varying degrees of social objectives reflected in different channels
- Localized social value
- Social = aggregate; innovation = individual
- Polyvalence vs univalence in valuation methodology
- Measure it how it is harvested
- Diverse relevance act as unique link
- What are the questions: What are the questions that one might ask to reveal social value?
- What might be measures were perceived as following from answering a question.
- Social value, like any value, is associated with risk taking or risk reduction

Due to the wide range of applications as represented above, it was not possible, nor was it appropriate to keep the discussion exclusively on the three target topics. However, great value was gained in exploration across the range of ideas. It was agreed that this is a discussion that will continue to grow in importance and influence.

A few concrete outcomes of the colloquium include:

- A group of technology transfer professionals from the group are preparing a National Science Foundation proposal to measure aspects in the context of technology transfer.
- A group has developed the project into a larger one examining the governance of economic development entities and state-funded venture capital programs. The group is exploring presenting further work at the APPAM conference in LA and one has received a grant from the Rackham Graduate School at UM to further the work.
- The colloquium volume authors are reviewing one another papers and will submit for final publication.
- McGuire Center for Entrepreneurship will run experiment within entrepreneurship program over 2008-09 academic year that will provide 1)venture development phase-specific alternate valuation benchmarks by which student entrepreneurs can determine appropriate measures and methods of their venture solution, and test and communicate results, and 2) designate an Alternate Valuation Mentor, to work with students on this new set of curriculum embedded benchmarks. The McGuire will track and identify common and emergent themes from pilot year ventures and work with office of technology transfer to establish extended pilot across range of university ventures. Embedded benchmarks as follows:

<b>ALTERNATE VALUATION OVERVIEW:</b> Identifying and measuring the solutions' potential beyond conventional financial and economic measures, taking into consideration to society, environment, etc.	
<b>Formulation phase goals:</b> Formulate initial perceptions of idea and explore the problem/customer/solution equation. Determine if	<b>Formulation phase evidence of competency benchmark:</b> Students identify and explore the preliminary criteria that potentially demonstrate the likely value of the solution in terms

perceived value warrants development of concept	other than monetary measures. Students consider the preliminary criteria and potential value(s) as an alternative assessment of if the solution warrants development. Students also consider alternative value created by the solution that is realized by third parties positioned further down the distribution chain
<b>Validation phase goals:</b> Validate assumptions and perceptions of venture opportunity and, as appropriate, recast expectations of opportunity. Deepen information base of concept	<b>Validation phase evidence of competency benchmark:</b> Students identify and engage more concrete mechanisms for demonstrating the alternative value of the solution using previously identified criteria. Students identify how such alternative value is distributed across addressable markets.
<b>Strategies phase goals:</b> Mature validated information set into comprehensive strategies for launch and execution. Deepen information base of and position of venture	<b>Strategies phase evidence of competency benchmark:</b> Students integrate alternative values into marketing and product strategy in a way meaningful to both customers/target market and those constituencies targeted for investment opportunities. Operation strategy and business model are assessed to account for the retention of espoused alternative value.
<b>Business plan authorship goals:</b> Compile venture information--ranging from opportunity statement to validated research and strategies-- into comprehensive, investment quality business plan, within prescribed format. Deepen understanding of venture relationships through written communication exercise.	<b>Business plan authorship phase evidence of competency benchmark:</b> Students are able to document and concisely and convincingly communicate how the solution provides value to consumers/target populations in measures other than those monetary in nature. Also, the students are able to articulate how such alternative value contributes to the integrity of the venture.
<b>Fluency, funding, and application phase goals:</b> Gain fluent, comprehensive, complete understanding and ability to represent and discuss any element of venture, at any level, with anyone, at any time. Gain full understanding of implications of venture relative to any environment or issue	<b>Fluency, funding, and application evidence of competency benchmark:</b> Students articulate the value of the solution in concrete measures other than those that directly reflect monetary gains or savings. Equally important, students provide a detailed outline of how the solution is better able to create identified alternative value than existing and/or competing solutions.
<b>Entrepreneurship program exit goals:</b> Exit McGuire Program with mind and skill set, fully equipped to advance innovative idea to reality in any environment	<b>Entrepreneurship program exit evidence of competency benchmark:</b> Solution proposed solves the problem in such a way that alternative value that runs concurrent with economic/monetary value is created and distributed to consumers/target market.

*Comprehensive set of venture development benchmarks available on request.*

**2. Problems or barriers experienced in carrying out the program as planned, if any, and steps taken to resolve these problems.**

Barriers were limited to the ability to keep discussion on topic, however as noted, this in the end was the appropriate and productive discussion track.

**3. Changes made to your program approach, if any, since your prior report, and reasons for the changes.**

No changes.

**4. Plans to sustain the program/initiative long term.**

In addition to three ongoing plans outlined above, the University of Arizona partnership involved in the colloquium included the UA Office of Technology Transfer Director; VP for Academic Outreach and Extension; Assoc VP for Research, Graduate Studies, and Economic Development and Dean of Graduate College; Director of McGuire Center for Entrepreneurship; Director of Center for Higher Education; Entrepreneurship Research Director. Through this partnership, new awareness of the implications of clearly and concretely illustrating value beyond commercial, and communicating based on end user values, has already resulted in the discussion and planning of educational programs, research questions, and infusion in weekly presidential cabinet meetings focusing on SROFI—social return on financial investment and the ability to clearly distinguish UA from trade school approaches.

Moreover, the UA explores tying assessment and valuation (commercial and alternate) of knowledge as new institutional organization of land grant mission in meeting the community needs around knowledge management.

**5. Major changes in leadership (board, staff, etc.).**

No changes

**6. Any potential risks, e.g. financial challenges, etc.**

No particular risks, challenges. In fact, given current economic constraints, attention to social and alternate values of applied university research provides an effective validation of cost and competitive advantage.

**7. Accounting of the use of funds in a format similar to the budget report below.**

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**Budget report**

May 19, 2008

<u>Category</u>	<u>Total Budget</u>	<u>Total Actual</u>	<u>Variance</u>
<b>Revenues</b>			
Kauffman Grant	\$49,500	\$49,500	\$0
Other Sources	\$0	\$0	\$0
<b>Total revenue</b>	<b>\$49,500</b>	<b>\$49,500</b>	<b>\$0</b>
<b>Expenses</b>			
Wages & Benefits	\$2,000	\$2,570	\$570
Consultants	\$13,000	\$14,500	\$1,500
Travel	\$13,500	\$11,120	-\$2,380
Meals			
Supplies	\$500	\$448	-\$52

*Other	\$20,500	\$20,862	\$362
Other			
Other			
<b>Total Expenses</b>	<b>\$49,500</b>	<b>\$49,500</b>	<b>\$0</b>
<b>Remaining Funds</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

\*Colloquium host site, White Stallion Ranch, bills all ranch activities, accommodations, and food in one daily rate. Does not break out meals from accommodations. Base rate is \$858 per guest for entire stay. Additional miscellaneous ranch expenses included, such as breaks. Total White Stallion Ranch invoice: \$20,862. Other cost descriptions include:

- Consultant line includes all honorarium and directors' fees
- Travel includes all airfare and ground transport travel for guests
- Supplies includes miscellaneous colloquium office type supplies
- Wages & benefits covers in house salary and ERE for volume editing and manuscript preparation for colloquium volume

**8. Report attachments:**

Colloquium overview and abstract summary  
 Colloquium schedule

## MEASURING THE SOCIAL VALUE OF INNOVATION: Colloquium preview

In February 2008, the McGuire Center for Entrepreneurship and the Office of Technology Transfer at the University of Arizona, with support of the Kauffman Foundation, will host a colloquium focusing on the concept of measuring the social and economic gains of individual innovations as a viable link in the often disconnected value proposition of university innovation.

The colloquium, titled: **MEASURING THE SOCIAL VALUE OF INNOVATION: A link in the university technology transfer and entrepreneurship equation**, will explore if a formal approach to measure social and economic gains will stimulate greater cultivation and participation in knowledge transfer, thereby increasing university-based ability to advance innovation. Additional focus will be on possible measures and the implications of designing a pilot program for such a measurement protocol to be broadly transferred to other universities. 22 participants will frame a discussion organized around ten commissioned papers prepared by distinguished scholars (see topics and authors below, as well as listing of additional discussants). The papers and abstracts of the discussion will be published in the Elsevier Science/JAI Press Series: Advances in the Study of Entrepreneurship, Innovation, and Economic Growth. The colloquium is scheduled for February 7, 2008 – February 10, 2008.

Discussion topics and paper authors
<p><b>Introduction: Toward measuring the social value of university innovations: A review of the literature</b> <i>Janet Bercovitz</i>, Assistant Professor of Business Administration, College of Business, University of Illinois at Urbana-Champaign <i>Matthew Mars</i>, Entrepreneurship and Knowledge Transfer Communications Specialist, McGuire Center for Entrepreneurship and the Office of Technology Transfer, The University of Arizona</p>
<p><b>Topic/Session I: Demonstrating social and economic value of individual innovations. The benefits to the institution and the individual innovator</b> <i>Henry Etzkowitz</i>, Professor of Management of Innovation, Newcastle University <i>Michael Lounsbury</i>, Associate Professor and Director of Technology Commercialization Centre, University of Alberta <i>Woody Powell</i>, Professor of Education, Sociology, Organizational Behavior, Management Science, and Communication, Stanford University; Director of the Scandinavian Consortium on Organizational Research <i>Paula Stephan</i>, Professor, Andrew Young School of Policy Studies; Georgia State University</p>
<p><b>Topic/Session II: What metrics and measures might be used</b> <i>Zoltan Acs</i>, Professor of Entrepreneurship and Public Policy, George Mason University <i>Carlos Rosell</i>, Economic Consultant and Researcher, University of Toronto and the Institute for Competitiveness and Prosperity, Ontario, Canada <i>Donald Siegel</i>, Professor of Entrepreneurship and Associate Dean, A. Gary Anderson Graduate School of Management University of California – Riverside</p>
<p><b>Topic/Session III: Implications of pilot program development with intent to transfer to other institutions</b> <i>Michael Bastedo</i>, Assistant Professor of Education, University of Michigan – Ann Arbor <i>Gary Rhoades</i>, Professor &amp; Head, Center for the Study of Higher Education, The University of Arizona</p>

**Introduction**

*Toward measuring the social value of university innovations: A review of the literature*

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**Session abstract**

**TOWARD MEASURING THE SOCIAL VALUE OF UNIVERSITY INNOVATIONS:  
A REVIEW OF THE LITERATURE**

*Janet Bercovitz, Assistant Professor of Business Administration, College of Business, University of Illinois at Urbana-Champaign*

*Matthew Mars, Entrepreneurship and Knowledge Transfer Communications Specialist, McGuire Center for Entrepreneurship and the Office of Technology Transfer, The University of Arizona*

The research sector of higher education has long been identified as an important producer of innovation. The innovative outputs of research universities are widely diverse and often distinct according to specific disciplinary fields of study and unique interdisciplinary efforts. Regardless of innovation type, the role of research universities in creating knowledge and subsequent innovation is significant. Not surprising, the role of such institutions in the production and distribution of innovation has captured the attention of scholars across the fields of economics, sociology, management, and public and educational policy. However, much of the resulting work focuses on the outcomes of innovation at the institutional and societal levels. Consequently, research designed to develop an awareness of the outcomes of individual innovations that emerge from within the academy has been neglected. In surveying the existing literature on university innovation and entrepreneurship, this paper introduces a developing line of inquiry centered on exploring the merits of and potential methods for estimating the social and economic gains of individual innovations. Our purpose is to provide an overview of the intersections of innovation, entrepreneurialism, and the research university in the context of contemporary environments and provide a platform for research specific to individual innovations to emerge. To this end, we give specific attention to the entrepreneurial dimensions of research institutions and the existing literature on the economic outcomes of innovation and entrepreneurialism

**Session I**

**Should we *measure the social value of innovation?***

*Demonstrating social and economic value of individual innovations.*

*The benefits to the institution and the individual innovator*

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**Session abstracts**

**THE SECOND ACADEMIC REVOLUTION:  
META-INDICATORS OF THE ENTREPRENEURIAL UNIVERSITY SUCCESSION**

*Henry Etzkowitz, Professor of Management of Innovation, Business School Newcastle University*

This paper analyzes the transformation from an ivory tower to an entrepreneurial academic model. Transition is often accompanied by a rise of conflict of interest issues that are resolved as new and old roles and objectives are aligned and reappear as new formats emerge. The appearance of conflicts of interest may thus be taken as a positive sign of change as well as a negative indicator of strain. Just as research and teaching mutually inform each other; entrepreneurship, research and education are more productive in a common academic framework. Practical impetuses encourage theoretical advance and vice-versa, rather than one taking away from the other. This polyvalence of knowledge, rather than a crowding out effect, is the fundamental basis for the Second Academic Revolution just as the mutual enhancement of teaching and research was the basis for institutionalizing the First Academic Revolution. As the new mission takes hold, previous ones are integrated within a more encompassing framework, the Humboldtian mode in the late 19<sup>th</sup> century and the entrepreneurial university model today.

**TOWARDS OPEN SOURCE NANO:  
ENABLING ACCESS TO ARSENIC REMOVAL**

*Michael Lounsbury, University of Alberta School of Business and National Institute for Nanotechnology Associate Professor and Director of Technology Commercialization Centre, University of Alberta*

*Christopher Kelty, Department of Anthropology, Rice University*

*Cafer T. Yavuz, Department of Chemistry, Rice University*

*Vicki L. Colvin, Department of Chemistry, Rice University*

In the wake of growing pressures to make scholarly knowledge commercially-relevant via translation into intellectual property, various technological communities have mobilized to create *open access/open source* experiments in fields such as software and biotechnology. These efforts are based on the ideas and success of anti-proprietary Free and Open Source software, and generally try to exploit two salient features: increased openness and circulation, and distributed collective innovation. Transferring these ideas from software to science often involves unforeseen challenges, one of which is that these movements can be deemed, often incorrectly, as heretical by University officials and technology transfer personnel who valorize metrics such as number of patents filed and granted, spin-off companies created and revenue generate. In this paper, we discuss nascent efforts to foster an open source movement in nanotechnology and provide an illustrative case of an arsenic removal invention. We evaluate a multitude of challenges facing the open source nano movement that include making a technology widely accessible and the associated politics of metrics.

**MEASURES, METRICS, AND MADNESS:**

**THE CHALLENGES AND RAMIFICATIONS OF SUSTAINING ACADEMIC ENTREPRENEURSHIP**

*Walter W. Powell, Professor of Education, Sociology, Organizational Behavior, Management Science, and Communication, Stanford University; Director of the Scandinavian Consortium on Organizational Research*  
*Jeanette A. Colyvas, School of Education & Social Policy, Northwestern University*

Both scholars and practitioners have begun to develop various metrics of university entrepreneurship. These benchmarks are important because what organizations measure serves to focus their attention. But the spread of entrepreneurial practices in U.S. universities has been met with mixed success, sometimes stagnant in academic settings rich with scientific potential, while provoking novel activities in somewhat unexpected places. We argue that these uneven outcomes are in part the result of using metrics that fail to capture the underlying structure of contemporary scientific work. We enter this discussion by suggesting different and more appropriate organizational and institutional measures that indicate the extent to which academic entrepreneurship has taken hold. This paper extends our previous work on the life sciences at Stanford University, which delineated how commercialization practices became embedded in the rules, routines, and conventions of academic science. We examine the spread of entrepreneurial activity across laboratories, in particular attending to the degree to which graduate students and postdoctoral fellows become involved. We argue that current measures of inventive output and scientists' engagement overlook the extent to which entrepreneurial practices have become sustainable in an academic setting. We argue that a distinction should be drawn between metrics that promote entrepreneurial practices and those that render them self-reinforcing, and suggest ways to draw these distinctions. Our focus is on both organizational mechanisms, such as policies and procedures, and network mechanisms, in particular, the composition of research teams of inventors and the structure of collaboration. Our analysis also addresses the ramifications for students and post-docs of early involvement in commercial science on their subsequent academic careers.

**THE ALUMNI TRAIL:**

**TRACKING THE PLACEMENT OF STUDENTS AS A MEASURE OF TECHNOLOGY TRANSFER**

*Paula E. Stephan, Professor, Andrew Young School of Policy Studies; Georgia State University*

Universities have a long history of training students to work in industry and in recent years the number and percent of students, especially those trained in science and engineering, who go to work in industry, has grown. Today, fully one-third of all PhDs with a degree in S&E work in the private sector. These placements provide a major way by which universities participate in technology transfer. Students are not only up to date in terms of codified knowledge; they also possess tacit knowledge that can only be transferred by face-to-face interaction. They may also have participated as research assistants or as postdocs in the development of a technology that has been licensed by the firm where they are employed. Despite the important role that alumni play in technology transfer, universities rarely track the placements of graduate students in industry. Nor do they keep information on the contributions that alums make to innovations after graduating. Moreover, few programs socialize students to think of careers in the private sector as a top choice. Instead, many programs, especially in the biomedical sciences, socialize students to aspire to research careers in academe, with industry seen as a distinct second choice. Indeed, many PhDs only take jobs in industry after they fail to find an academic position after serving as a postdoc for four or five years.

This paper examines how alumni data can be used to measure the contribution of universities to innovation and suggests procedures for creating such a metric. It provides evidence that universities to date keep little information on placements and also examines for a sample of institutions the extent to which PhD programs provide opportunities for students to learn about careers other than those in academe.

**Session II**  
*Metrics and measures*

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**Session abstracts**

**MEASURING THE SOCIAL AND ECONOMIC GAINS OF INNOVATIONS:  
A POST-VALUATION MODEL**

*Zoltan Acs, Professor of Entrepreneurship and Public Policy, George Mason University*

This paper explores methods of valuating individual innovations by conducting a post-valuation of either Amazon.com or Netscape. By conducting a post-valuation case study, it is anticipated that potential measures specific to both the social and economic gains of individual innovations and technologies will emerge. The emergent measures are expected to inform the development of a more formalized protocol for estimating the potential social and economic gains of innovations being developed within universities and other research and development organizations.

**THE VALUE OF INDIVIDUAL INNOVATIONS WHEN MULTIPLE TECHNOLOGIES ARE REQUIRED TO PRODUCE A SINGLE GOOD**

*Carlos Rosell, Economic Consultant and Researcher, University of Toronto and the Institute for Competitiveness and Prosperity, Ontario, Canada*

An innovation's social value depends on various factors that are independent of how the particular innovation is used with other technologies. Examples of such factors are the size of the market the innovation will serve and the manner in which the innovation is managed. However, an innovation must often be implemented with complementary technologies whenever it is exercised and its benefits are realized. In such cases, an innovation's value depends on the ownership structure of the related technologies. This paper makes its contribution by examining how an innovation's social value is affected when the innovation must be applied in concert with other essential inventions. I review the relevant literature as well as propose a measure that may help in predicting an innovation's social value.

**ASSESSING THE SOCIAL RETURNS TO INNOVATION:  
AN APPLICATION OF THE GRILICHES/MANSFIELD FRAMEWORK TO UNIVERSITY TECHNOLOGY TRANSFER**

*Donald Siegel, Professor of Entrepreneurship and Associate Dean, A. Gary Anderson Graduate School of Management University of California – Riverside*

A fundamental problem in articulating the societal benefits of university technology transfer is the lack of hard empirical evidence on the economic gains associated with this activity. To fill this gap, I apply the framework and methods developed by Griliches (1958) and Mansfield (1977) to assessment of the social returns to university-based inventions. This methodology can be used to derive explicit measures of key metrics, such as social rates of return and benefit/cost ratios of specific technologies. A case study will be used to illustrate the application of this method.

**Session III**

*Implications of pilot program development with intent to transfer to other institutions*

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**Session abstracts**

**TECHNOLOGY TRANSFER, ECONOMIC DEVELOPMENT, AND SOCIAL VALUES: GOVERNANCE STRUCTURES THAT SUPPORT PUBLIC UNIVERSITY INNOVATION**

*Michael Bastedo, Assistant Professor of Education, University of Michigan – Ann Arbor*

State legislators see economic development as one of the major priorities for research universities, which public universities largely translate into initiatives related to technology transfer, patenting, and licenses. These efforts also provide significant revenues for major universities, and have become increasingly institutionalized into research university structures. The focus on short-term economic gains generated from patents and licenses, however, draws attention away from long-term efforts that would yield more significant economic and social benefits. This paper discusses the governance of technology transfer within the university, how it has become institutionalized, and how an approach more deeply embedded with university partners will enhance the economic and social impact of higher education.

**HOUSING THE MEASUREMENT OF EDUCATION'S SOCIAL VALUE: ORGANIZATIONAL SITE, PROFESSIONAL PERSPECTIVE, INSTITUTIONAL OUTLOOK**

*Gary Rhoades, Professor and Head, Center for the Study of Higher Education, The University of Arizona*

Drawing on examples from the more developed realms of technology transfer and other “managerial professions” (Rhoades, 1998; Rhoades Sporn, 2002) in the academy, this paper explores possible organizational sites for housing protocols for the measurement of the social value of individual innovations in higher education (that may enter the market or and augment or precede commercial valuation), and the possible implications of those different settings for the academy (particularly in terms of motivating more faculty to engage in more innovative and entrepreneurial activities). Organizational location matters. Organizational site is related to professional perspective and to the institutional outlook that attaches to various sorts of work in the academy. Five possible sites are explored, analyzing the dimensions of such locations from the experience of other “new” activities in universities. One type of site consists of an interstitial (Slaughter & Rhoades, 2004), non-academic, support unit of managerial professionals (neither faculty nor senior level administrators), as in an Office of Technology Transfer or an Office of Institutional Research. A second type of site would be an academic unit in which measurement tasks could be performed, as in the case of institutes in business schools that measure and report the economic impact of the university on the region. A third type of site could be a hybrid model that combines elements of the first two models, as is found in the case of entrepreneurship units in many universities. A fourth possible type of site would be to situate such activity in an intermediating association (Slaughter & Rhoades, 2004) outside of the university, which mediates between public and private sectors, and that promotes various sorts of innovation and measurement as in the case of Educause and innovative information technologies. A fifth type of site would consist of establishing university units in the community, to provide services more directly to constituents, as traditionally was the model for agricultural extension in land grant universities. Each of the models has its own benefits and challenges, its implications for what sorts of professionals would be doing the work and what they would see their principal function as being, and for the impact they would have on the academic workforce and the institution’s direction.

**Additional colloquium discussants**

**David Audretsch**, Institute for Development Strategies, Indiana University, Centre for Economic Policy Research

**Dana Bostrom**, AUTM VP Metric and Survey, Office of Technology Transfer, Portland State University

**Andrew Comrie**, Associate Vice President for Research, Graduate Studies, and Economic Development, Dean of Graduate College, Professor of Geography, The University of Arizona

**Kevin Cullen**, Director of Research & Enterprise, University of Glasgow

**Maryann Feldman**, Institute of Higher Education, University of Georgia

**Anthony Mendes**, Executive Director, Academy of Entrepreneurial Leadership, University of Illinois at Urbana-Champaign

**Sherry Hoskinson**, Director, McGuire Center for Entrepreneurship; Co-director, Business Law / Entrepreneurship Exchange, The University of Arizona

**Patrick Jones**, Director, Office of Technology Transfer, The University of Arizona; President, AUTM

**Michael Proctor**, Vice President for Outreach, Associate Dean, College of Agriculture of Life Sciences, The University of Arizona

**Mark Schankerman**, Professor of Economics, Eller College of Management; Muzzy Chair in Entrepreneurship, McGuire Center for Entrepreneurship, The University of Arizona

**Trina Callie**, Assistant Dean, Eller College of Management MBA Program, The University of Arizona

**Jon Soderstrom**, Managing Director, Office of Cooperative Research, Yale University

**Robert Strom**, Kauffman Foundation

**Discussion leaders**

**Introduction: Matthew Mars**, Entrepreneurship and Knowledge Transfer Communications Specialist, McGuire Center for Entrepreneurship and the Office of Technology Transfer, The University of Arizona

**Session I: Patrick Jones**, Director, Office of Technology Transfer, The University of Arizona; President, AUTM

**Session II: Mark Schankerman**, Professor of Economics, Eller College of Management; Muzzy Chair in Entrepreneurship, McGuire Center for Entrepreneurship, The University of Arizona

**Session III: Sherry Hoskinson**, Director, McGuire Center for Entrepreneurship; Co-director, Business Law / Entrepreneurship Exchange, The University of Arizona

**Session organizers**

**Sherry Hoskinson**, McGuire Center for Entrepreneurship; Law / Entrepreneurship Exchange, The University of Arizona

**Matthew Mars**, Entrepreneurship and Knowledge Transfer Communications Specialist, McGuire Center for Entrepreneurship and the Office of Technology Transfer, The University of Arizona

**Patrick Jones**, Director, Office of Technology Transfer, The University of Arizona; President, AUTM

MEASURING THE SOCIAL VALUE OF INNOVATION:  
**A link in the university technology transfer and entrepreneurship equation**  
**February 7-10, 2008**  
**White Stallion Ranch, Tucson, Arizona**  
**CONFERENCE SCHEDULE**

**Thursday, February 7**

6:00 pm **WELCOME RECEPTION**—  
*White Stallion Ranch main building, fireside.  
 No host bar*

7:00 pm **DINNER**—  
**Steak Cookout**  
*Colloquium tables reserved at the White Stallion  
 Ranch dining room, located in the main building*

**Friday, February 8**

7:30-8:30am **BREAKFAST**—  
*White Stallion Ranch dining room (tables  
 reserved) . Cooked to order breakfast available  
 7:30-8:30. Buffet available 7:30-8:30*

8:45-9:15am **INTRODUCTION: Toward measuring the social  
 value of university innovation: A review of  
 the literature** *White Stallion Ranch conference  
 meeting facility. Author presentations followed by  
 general discussion*

9:15-10:15am **SESSION 1: Demonstrating social and economic  
 value of individual innovations. The benefits  
 to the institution and the individual innovator**  
*Author presentations*

10:15-10:30am **COFFEE BREAK**—

10:30-12:00n **SESSION 1 continued: Demonstrating social and  
 economic value of individual innovations. The  
 benefits to the institution and the individual  
 innovator.** *General discussion*

12:00n-12:30pm **Break**

12:30-1:30pm **LUNCH**—  
*White Stallion Ranch dining room (tables  
 reserved)*

1:30-3:30pm **SESSION 2: Metrics and Measures**  
*White Stallion Ranch conference meeting facility.  
 Author presentations followed by general discussion*

3:30-3:45 pm **REFRESHMENT BREAK**—

3:45-4:45 pm **SESSION 2: Metrics and measures, continued.**  
*White Stallion Ranch conference meeting facility*

4:45-6:30pm **FREE TIME**—  
*Swimming, tennis, hiking, massage, at your leisure*

6:00 pm **COCKTAIL HOUR**—  
*White Stallion Ranch main building, fireside.  
 No host bar*

7:00 pm **DINNER**—  
*White Stallion Ranch dining room (tables reserved)*

**Saturday, February 9**

7:30-9:15am **BREAKFAST**—  
*White Stallion Ranch dining room tables reserved).  
 Cooked to order breakfast available 7:30-8:30.  
 Buffet available 7:30-8:30.  
 Horseback ride and breakfast available 7:30-9:00.*

9:30-10:45am **SESSION 3: Implications of pilot program  
 development with intent to transfer to other  
 institutions**  
*White Stallion Ranch conference meeting facility.  
 Author presentations followed by general discussion*

10:45-11:00am **COFFEE BREAK**—

11:00-12:30n **SESSION 3: Implications of pilot program  
 development with intent to transfer to other  
 institutions, continued.**  
*White Stallion Ranch conference meeting facility*

12:30-1:30 **LUNCH**—  
*White Stallion Ranch dining room (tables reserved)*

1:30-3:00pm **SESSION 4: Impressions and Recommendations**  
*Finalize discussion, additions to conference volume  
 and report.*

3:00-6:00pm **FREE TIME**—  
*Swimming, tennis, hiking, massage, horseback riding,  
 at your leisure*

6:00pm **COCKTAIL HOUR**—  
*White Stallion Ranch main building, fireside.  
 No host bar*

7:00pm **DINNER**  
**Indian Oven Dinner**  
*White Stallion Ranch dining room (tables reserved)*

**Sunday, February 10**

*Breakfast and departure at your convenience*

**Important notes:** Sessions one through three will consist of 15 minute presentations by session-specific background paper authors, followed by group discussion. Session four will focus on conference outcomes and recommendation/reports activities.

## Entrepreneurship and Innovation Assessment Overview

## Entrepreneurship Innovation Assessment: 1,000 students per year over four year pilot

MPACT CATEGORIES: **Student: Course specific learning outcomes--** Student achievement in given class

**Student: Culture--** Impact on student / student appreciation, understanding, and awareness of entrepreneurship

**Faculty and peer culture--entrepreneurship:** Other populations within UA/Eller, perception and value of entrepreneurship

**Brand:** Other populations outside of McGuire, local, national, and international, perception and awareness of McGuire

CATEGORY	item ID	IMPACT CATEGORY	PERFORMANCE METRIC	RATIONALE	DATA SOURCE and status
<i>Student learning</i>	S-1	<b>Student: culture</b>	Number of Students Completing EI Requirement	<i>Although Eller College determines enrollment cap, and requirement targets all students, this number is important as it will capture the number of students that do so in the pre business phase and the potential to impact greater numbers than just those that enter Eller.</i>	Uaccess, Analytics
	S-2	<b>Student: Course specific outcomes</b>	EI Requirement Course Rating (Instructor Rating + Course Difficulty) (Max is 10.0)	<i>As EI Requirement course options increase and more faculty become involved, this will be a important determinant of overall impact of initiative.</i>	TCE REPORTS (1 MO After sem. Ends)
	S-3	<b>Student: culture</b>	Increased demand for entrepreneurship coursework beyond three credit EI requirement	<i>Clear indicator of overall awareness and appreciation of entrepreneurship and innovation and important signal within college about future teaching investments.</i>	McGuire's application, microdata

	S-4	<b>Student: culture</b>	Number of students citing entrepreneurship as highlight in Eller education	<i>Very important measure of "Eller Community" perception of entrepreneurship and individual perception of value in subsequent activities</i>	Undergrad Exit survey. Available twice a year from Shannon Timms
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CATEGORY	item ID	IMPACT CATEGORY	PERFORMANCE METRIC	RATIONALE	
<b>Culture, perceptions, environment internal</b>	C-5	<b>Student: culture</b>	Statistically significant increase in positive attitude toward entrepreneurship	<i>Indicator of quality of overall initiative.</i>	mcguire micro data set
	C-6	<b>Student: culture</b>	Statistically significant increase in personal Interest in entrepreneurship	<i>Indicator of quality of overall initiative.</i>	mcguire micro data set
	C-7	<b>Student: culture</b>	Overall increase in composite scores (combined academic and creative scores) of Eller candidates accepted to the major in entrepreneurship	<i>Although the major in entrepreneurship is capped and entry competitive, the overall quality of student can meaningfully enhance the experience of other students in the program and advance entrepreneurship goals in the college.</i>	mcguire appl
	C-8	<b>Faculty and peer culture</b>	Increased number of Eller faculty whose research intersects meaningfully with entrepreneurship and innovation	<i>Faculty involvement and interest are directly tied to cultural development of environment where entrepreneurship teaching and research are highly valued. Most powerful contributor peer perception, institutional perception, and student perception of value and quality</i>	working
	C-9	<b>Faculty and peer culture</b>	Increase in number of faculty teaching classes in entrepreneurship and innovation	<i>Faculty involvement and interest are directly tied to cultural development of environment where entrepreneurship teaching and research are highly valued. Most powerful contributor to high quality</i>	working

*metrics for success* , Other EI Items (tentative): to be compared to actual

CATEGORY		IMPACT CATEGORY	PERFORMANCE METRIC	RATIONALE	
<b>Marketing and communications / external reputation</b>	<b>M-10</b>	<b>Brand</b>	# of unique visits per month to affiliated websites (www.mcguireexperience.com; www.entrepreneurship.arizona.edu)	<i>Indicator of interest in topic by numbers visiting, and perception of content driven quality by length of time on site. Demographics will be powerful in determining core interest groups and areas to develop and those to</i>	google analytics
	<b>M-11</b>	<b>Brand</b>	Composite ranking in national and appropriate international rankings (average of Princeton Review, US News & World Report Financial	<i>Indicator of ability to positively impact peer perceptions and overall reputation.</i>	in house manual collection

exit survey question: select three keywords to describe your Eller Experience.

## Impact of Entrepreneurship Education Study Outcomes

# INSIGHTS

A KAUFFMAN  
RESEARCH SERIES

## IMPACT OF ENTREPRENEURSHIP EDUCATION

Alberta Charney  
Gary D. Libecap

 KAUFFMAN CENTER  
FOR ENTREPRENEURIAL LEADERSHIP  
AT THE EWING MARION KAUFFMAN FOUNDATION

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**INSIGHTS: A Kauffman Research Series**

is published and disseminated by the Kauffman Center for Entrepreneurial Leadership. Its purpose is to profile cutting-edge research that educates, provokes thought and discussion, and serves as a catalyst to accelerate entrepreneurship in America.

# Entrepreneurship Education: Is the Impact as Impressive as the Demand?

*“Entrepreneurship has become one of the most sought-after areas of study among collegiate business students. Graduates of these programs are not only increasing in number, they are reshaping our understanding of market, technology and management leadership. Bent on realizing their own perceived opportunities, they continue to define the standard for business innovation – and, by doing so, will forever alter the competitive landscape for future enterprise.”*

— Michael Camp,  
Director of Research,  
Kauffman Center for  
Entrepreneurial Leadership

**Today, no matter where you turn,** stories abound of the enormous social, economic and educational benefits of entrepreneurship. As a result, entrepreneurship education programs are proliferating in colleges and universities around the country. Whereas 15 years ago only a handful of schools offered courses in entrepreneurship, today more than 1,500 colleges and universities offer some form of entrepreneurship training. There are currently more than 100 active university-based entrepreneurship centers in the U.S. and more than 270 endowed positions in entrepreneurship, an increase of 120 percent in just the last five years.

Despite the growing number of new and expanding educational programs in this area, many schools have been slow to respond to the increasing student and community interest. The growing number of students shunning traditional employment opportunities to become entrepreneurs has caught some business school faculty and administrators off guard. Many are still questioning whether entrepreneurship is worth the investment, whether entrepreneurship training enhances their students' abilities to compete in today's job market, and whether their entrepreneurship students make stronger and more successful business leaders.

In 1999, Alberta Charney and Gary Libecap pondered these questions as well. By all appearances, the Berger Entrepreneurship Program at the University of Arizona was highly successful. But how had the Program affected the entrepreneurship students it had graduated over the years? Where were they now, what were they doing, and were they faring better than other business school graduates? Charney and Libecap further wondered how the entrepreneurship program had impacted the University's Eller College of Business and Public Administration. What kind of return had the business school received for its 16 years of investment in entrepreneurship education?

This report shares the findings from Charney and Libecap's comparison of University of Arizona business school graduates who *completed* the

Berger Entrepreneurship Program to other University of Arizona business school graduates who were *not* involved in the Berger Program. In short, the results of the investigation are stunning. Whether you are a *college dean* seeking justification for the allocation of limited resources ... an *alumnus* considering a donation for university development opportunities ... a *professor* redesigning your course curriculum ... or a *student* considering various majors and their prospects for your professional career, you will find the results impressive.

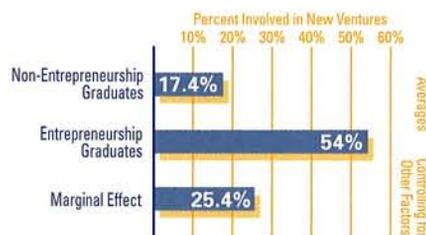
## ● Key Findings

**The findings estimate that** the Eller College of Business and Public Administration at the University of Arizona received 34 percent more outside funding – nearly \$12 million – due to the existence and activities of the Berger Entrepreneurship Program and its opportunity-oriented, practical approach to business education. Surveys of deans, department heads and development officers at the University of Arizona also indicate that pedagogical innovations in entrepreneurship have significantly improved the curriculum in other business disciplines, including the MBA program.

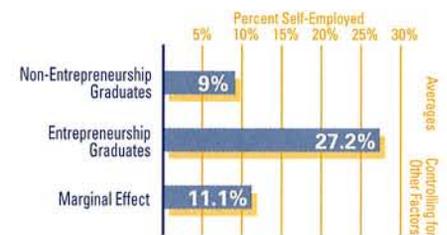
**Entrepreneurship education attracts substantial private-sector financial contributions.**

On average, graduates of the Berger Entrepreneurship Program were *three times* more likely to be involved in the creation of a new business venture than were their non-entrepreneurship business school cohorts. Controlling for the personal characteristics of the graduates and various environmental factors, entrepreneurship education increased the probability of an individual being instrumentally involved in a new business venture by 25 percent over non-entrepreneurship graduates (Figure 1). More specifically, entrepreneurship students were 11 percent more likely than were non-entrepreneurship students to own their own businesses after graduation (Figure 2).

**Entrepreneurship education produces self-sufficient enterprising individuals.**



**Figure 1.**  
Entrepreneurship education increases the formation of new ventures



**Figure 2.**  
Entrepreneurship education increases the likelihood of self-employment

**Entrepreneurship education produces successful business and industry leaders.**

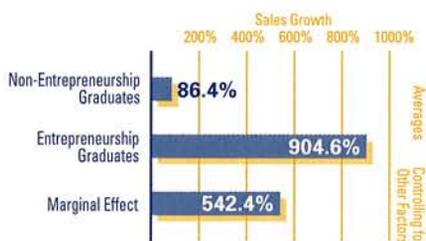
Entrepreneurship education contributed to the growth of firms, especially smaller emerging firms. On average, emerging companies that were owned by or employed entrepreneurship graduates had greater than *five times* the sales and employment growth than those that employed non-entrepreneurship graduates (Figure 3). In addition, larger firms paid entrepreneurship graduates significantly more than they paid non-entrepreneurship graduates. Controlling for individual factors, entrepreneurship graduates working for large firms earned approximately \$23,500 more per year than did other business school graduates.

**Entrepreneurship education enhances a graduate's ability to create wealth.**

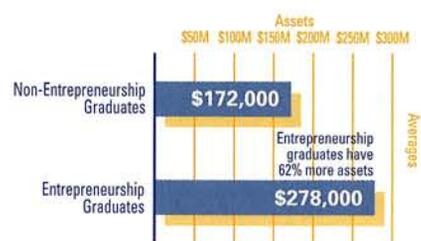
Entrepreneurship graduates received an average annual income that was 27 percent higher than the average annual income of non-entrepreneurship graduates. Controlling for personal characteristics, entrepreneurship education at the University of Arizona increased annual graduate income by \$12,561. In addition, and perhaps more significantly, entrepreneurship graduates accumulated 62 percent more in personal assets after graduation than their non-entrepreneurship counterparts (Figure 4). Entrepreneurship graduates who were employed with other companies were more likely to be employed full-time, were generally more satisfied with their employment opportunities and were less likely to be employed in a government or non-profit organization.

**Entrepreneurship education produces champions of innovation.**

Entrepreneurship graduates were significantly more apt to be involved in developing new products than non-entrepreneurship graduates. Entrepreneurship graduates spent more time in R&D related activities, worked with products that had shorter life spans and were more often employed full-time in high-tech industries. Controlling for other



*Figure 3.* Entrepreneurship education of employee increases the sales growth rate of emerging firms (<100 employees)



*Figure 4.* Entrepreneurship education increases graduates' assets

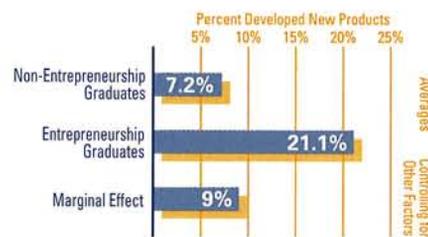
individual and environmental factors, entrepreneurship education increased a business school graduate's probability of being associated with a high-tech firm by nearly 13 percent and of developing new technological products by almost 9 percent (Figure 5).

Entrepreneurship education also enhanced the transfer of technology from the University to the private sector, and promoted technology-based firms and products. On average, entrepreneurship graduates were more likely to be employed with firms that license new technology or that license technology to others. Among self-employed entrepreneurship graduates, nearly 23 percent owned a high-technology firm, compared to less than 15 percent of non-entrepreneurship graduates who owned their own firm (Figure 6).

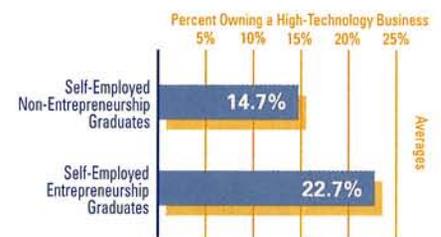
**Entrepreneurship education leads to greater opportunities with advancing technologies.**

**The Berger Entrepreneurship Program** was approved by the University of Arizona Board of Regents in 1983 and is one of the oldest entrepreneurship programs in the country. Housed in the Karl Eller Center at the Eller College of Business and Public Administration, the program has trained 339 undergraduates and 200 graduate students from the colleges of business, engineering, medicine, science and agriculture. At the time of this study, 262 of the graduates were employed by established companies, 106 operated their own companies, 31 worked for government or non-profit entities and 40 were engaged in further graduate study.

## ● The Berger Entrepreneurship Program: A Model of Excellence



*Figure 5.* Entrepreneurship education increases the likelihood of developing new products



*Figure 6.* Entrepreneurship education increases the likelihood of self-employed graduates owning a high-technology business

The curriculum for the Berger Entrepreneurship Program includes core courses in competitive advantage, venture finance, market research and business plan development. Additional courses in MIS, management, finance and marketing are recommended. A combination of tenure-track and business-adjunct faculty teaches the course offerings. Undergraduates are eligible for a major in entrepreneurship and MBA students can select entrepreneurship as an area of concentration. Most students select joint majors and areas of concentration, such as Entrepreneurship/MIS, Entrepreneurship/Marketing and Entrepreneurship/Finance. All students receive scholarships, and many are placed in internships with newly started firms or venture capital organizations during the summer just prior to entering their formal period of entrepreneurship study.

Approximately 70 students are accepted annually, 40 undergraduates and 30 graduates. The number of graduates has grown over the years from 30 in 1985 to 59 in 1999. Students, typically working in two-person teams, begin in the spring and summer with a feasibility study that is evaluated by the faculty in the fall. They develop the plan within the context of their courses during the fall and spring semesters. An internal business plan competition, where students must present and defend their plans, is the capstone of the program. Winning plans receive \$10,000 in prize money. All told, 289 business plans have been created as part of the Berger Entrepreneurship Program, and at least 81 of these ventures have been launched.

## The Research Approach: Opportunities for Further Evaluation

**This research**, sponsored by the Kauffman Center for Entrepreneurial Leadership at the Ewing Marion Kauffman Foundation, evaluated the impact of the Berger Entrepreneurship Program at the University of Arizona by comparing graduates of the program to a random sample of non-entrepreneurship University of Arizona business school graduates. The study design controlled for the socio-economic characteristics of the respondents so that the marginal effects of entrepreneurship education were observed and individual factors were held constant. The study also investigated the effects of the Berger Entrepreneurship Program on technology transfer from the University to the private

sector, private giving to the business college and pedagogy within the other disciplines of the business college. In order to address these issues, four groups were surveyed: a) entrepreneurship and non-entrepreneurship alumni; b) department heads and other college administrators; c) the college Dean, development officer and officials in the University of Arizona Foundation; and d) the staff of the University of Arizona Office of Technology Transfer.

The alumni survey questioned the students about their personal characteristics (e.g., birth, gender, high school graduation date and ethnicity), educational and employment history, new venture activity, experiences with technology transfer and perceptions of the Berger Entrepreneurship Program. *(A copy of the entire alumni questionnaire and final research report are available from the researchers upon request.)* The alumni questionnaire was mailed to 2,024 non-entrepreneurship business school graduates and 460 entrepreneurship graduates, all of whom graduated from the University of Arizona between 1985 and 1998. Of the non-entrepreneurship business graduates, 348 undergraduates and 58 graduate students returned a completed survey instrument. Of the Berger Entrepreneurship Program graduates, 68 undergraduates and 37 graduate students responded. Overall, approximately 21 percent of the survey questionnaires were returned and response rates were generally uniform across levels of degrees and types of programs.

## ● A Promising Future

**In the past 15 years,** entrepreneurship education has grown dramatically as reflected in the increased student enrollment, proliferation of formal entrepreneurship centers, intercollegiate business plan competitions, new entrepreneurship curricula and programs, and endowed chairs and professorships. Approaches to entrepreneurship education have varied across colleges and universities from single course offerings in business plan preparation to integrated curricula that include marketing, finance, competitive analysis, new product development and technology. Many institutions have implemented concentrations in entrepreneurship as well as specialized programs for non-business majors.

*“During the last 30 years, America has unleashed the most revolutionary generation the nation has experienced since its founding in 1776. This new generation of entrepreneurs has altered permanently the economic and social structure of this nation – and the world – and has set the ‘entrepreneurial genetic code’ for future generations. It will determine more than any other single impetus how the nation and the world will live, work, learn and lead ...”*

— Jeffrey A. Timmons,  
America’s Entrepreneurial  
Revolution: The Demise of  
Brontosaurus Capitalism, 1998

Entrepreneurship education has become popular for many reasons. First, the study of enterprise creation and the development of business plans allow students to integrate accounting, economics, finance, marketing and other business disciplines. As such, it offers an enriching, integrative educational experience. Second, it promotes the founding of new businesses by graduates and builds critical decision-making skills that enhance the success of graduates in the job market. Third, it increases technology transfer from the university to the market through the development of technology-based business plans and student involvement with technology licensing. Fourth, entrepreneurship education forges links between the business and academic communities. It is viewed by business leaders as a useful, applied approach to the study of business and the economy. As a result, established entrepreneurs are more willing to fund entrepreneurship programs and to endow professorships within them. Finally, because there is no set approach to entrepreneurship education and because entrepreneurship generally is outside traditional discipline boundaries, it has been possible to experiment with pedagogy and curricula. The learning gleaned from these experiments, in turn, has significantly enhanced other business school courses.

The value of the Berger Entrepreneurship Program to the University of Arizona (its students, business school and surrounding business community) has been clearly demonstrated in this study. Berger graduates receive superior financial rewards and express greater job satisfaction than their non-entrepreneurship cohorts. They also demonstrate more self-sufficiency and report better performance on behalf of the businesses that hire them. Additionally, the Eller College of Business and Public Administration has benefited from increased private sector donations and exposure to cutting-edge pedagogy. These compelling results suggest that the investment in entrepreneurship education in business schools throughout the country is paying important and substantial dividends to graduates, colleges and society.

## The Researchers

**Alberta Charney** is a researcher in the Economic and Business Research Program at the Eller College of Business and Public Administration. She has been with the University of Arizona since receiving her Ph.D. there. Her academic publications cover a wide range of topics, including transportation, taxation, econometric model building, forecasting accuracy, input-output analysis, water issues, migration and manufacturing location. She is a member of the American Economics Association, the Regional Science Association and the International Regional Science Association.

**Alberta Charney**

**Gary D. Libecap** is the Anheuser Busch Professor of Entrepreneurship and Director of the Karl Eller Center at the University of Arizona. He is also Research Associate at the National Bureau of Economic Research. He received his Ph.D. in 1976 from the University of Pennsylvania. Libecap has served in numerous board and leadership positions, including the Economics Panel, National Science Foundation; Board of Directors, Western Economics Association; Board of Trustees, Economic History Association; and Co-Editor, *Journal of Economic History*. Widely published, Libecap has received research support from the National Science Foundation, World Bank, Earhart Foundation, Center for Energy and Mineral Resources, Seagrant and the Pacific Institute. He has held faculty positions at the University of Arizona, CalTech, USC, Texas A&M, University of New Mexico and the Free University of Berlin. He is also a member of the American Economics Association, Economic History Association, Western Economics Association, Mont Pelerin and Cliometrics Societies, National Bureau of Economic Research, American Law and Economics Association, and International Society for the New Institutional Economics.

**Gary D. Libecap**

**The Kauffman Center for Entrepreneurial Leadership** is the nation's largest organization focused solely on developing, supporting and encouraging entrepreneurship education and research. The Center's nationally recognized staff works with high-growth entrepreneurs, government policy makers, entrepreneurial support organizations and leaders in entrepreneurship education to develop and disseminate innovative, effective programs and informational resources that enhance entrepreneurial skills and abilities at all levels. The Center is fully funded by the Ewing Marion Kauffman Foundation and was founded by Ewing Marion Kauffman, a successful entrepreneur whose vision and values led to the creation of a \$1 billion pharmaceutical company from a start-up operation in the basement of his home. For more information, visit the Center's web site at [www.entreworld.org](http://www.entreworld.org).

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