Newsletter of the IC² Institute

UPDATE

Innovation, Creativity & Capital at The University of Texas at Austin

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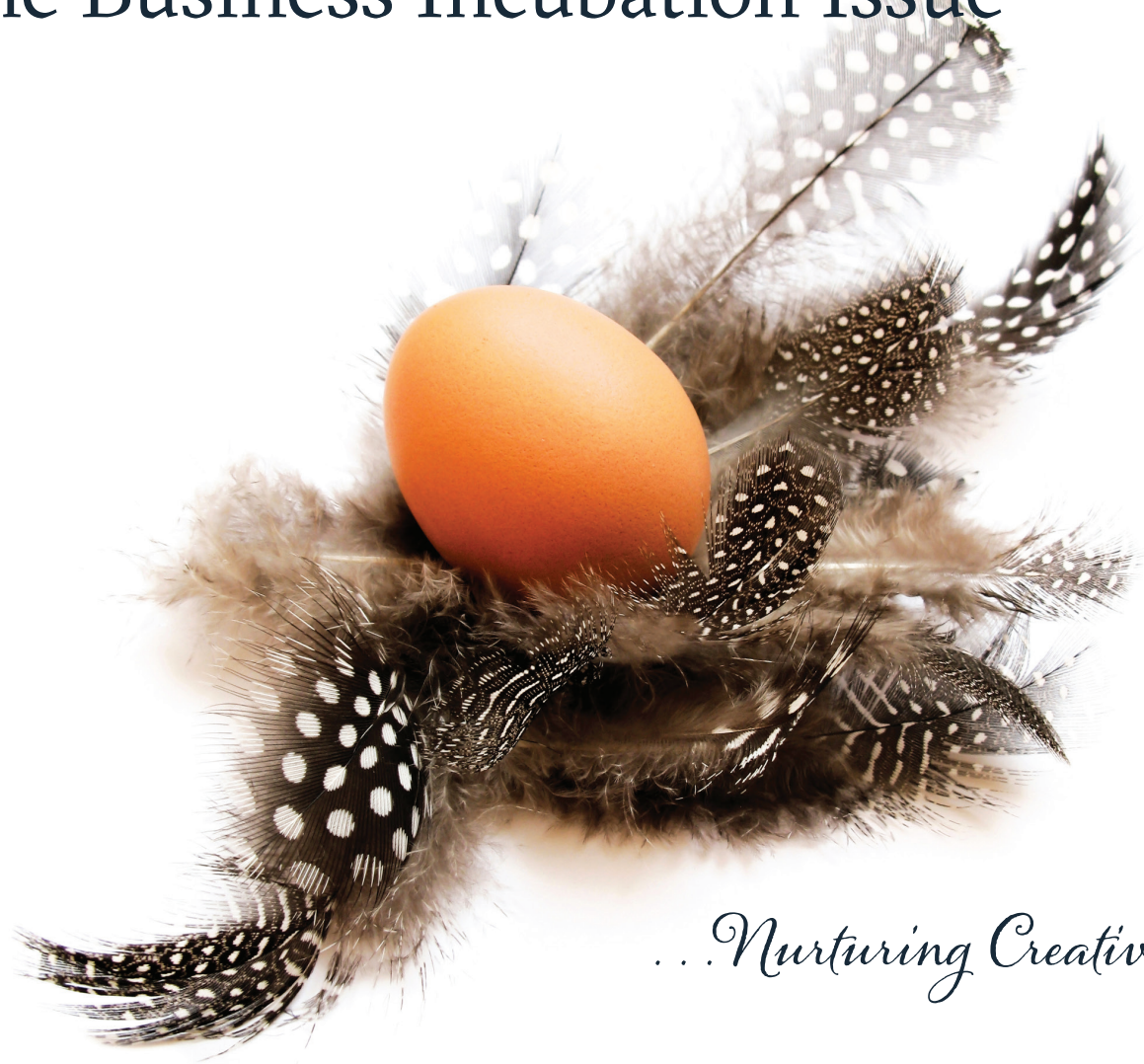
The Business Incubation Issue



. . . Nurturing Creativity

The University of Texas at Austin
IC² Institute
Office of the Vice President for Research

IC² Institute UPDATE

The UPDATE highlights only a few IC² Institute activities. For more information about the programs, activities, and history of the Institute, see www.ic2.utexas.edu.

The IC² Institute is an interdisciplinary research unit at The University of Texas at Austin that strives to increase the quality of human life through new technology applications, entrepreneurial growth, and regional economic acceleration. The Austin Technology Incubator, the Bureau of Business Research, and the Global Commercialization Group are part of the IC² Institute. Offices are located in Austin at 2815 San Gabriel Street (512.475.8900), 3925 W. Braker Lane (GCG: 512.305.0331), and at WeWork University Park, 3300 N. Interstate 35, 7th floor (ATI: 512.305.0000).

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Newsletter of the IC² Institute

UPDATE

Innovation, Creativity & Capital at The University of Texas at Austin

Dear Friends & Colleagues,

Greetings from the IC² Institute this holiday season! I hope you enjoy the unpacking of the various facets of business incubation in this UPDATE issue.

At the IC² Institute, we view the modern conception of business incubation as being started at the Technology Venturing Conferences held in Austin during 1984 and 1985. The learnings from these conferences were codified in two Institute publications (*Technology Venturing: American Innovation and Risk Taking* [1985], edited by Konecci and Kuhn, Praeger Publishers; and *The New Business Incubator: Linking Talent, Technology, Capital and Know-How* [1986] Ray Smilor, et al.). A new model of business incubation emerged in which value to companies was primarily mediated through the proximity afforded by incubators to service providers, talent, wisdom, and ultimately capital providers, and less tied to the traditional view of workspace access. This new model was put into practice in 1989 with the founding of the Austin Technology Incubator (ATI). ATI—at the vanguard of a revolution in business incubation—engages university, community, and corporate innovation through proximity-based services. The evolution of this model for business incubation in different geographic regions, for different types of companies, with different age entrepreneurs, and in different technology verticals, is explored in this UPDATE.

Related to business incubation is business acceleration. Studies conducted by the Bureau of Business Research of Texas Hispanic- and Black-owned businesses revealed that minority-owned businesses rapidly start but slowly grow beyond the sole proprietorship stage into the more impactful form of a "company with employees." This is most clearly observed when minority-owned companies are compared with other companies. *FAST*Forward was developed with the City of Austin to help women- and minority-owned companies develop market-driven strategies to accelerate company revenue creation and subsequent company growth and regional impact. The outcomes of the pilot program are very exciting and are shared within this UPDATE.

We are also celebrating the 90th anniversary of the Bureau of Business Research (BBR). The work of the BBR has helped legislatures, city leaders, and commercialization entities understand the economic impact of policy, market strategies, and innovation systems. I have already cited the important studies the BBR conducted on minority-owned business in Texas, but it is also important to note that the BBR conducted quantitative analysis of the impact of ATI's proximity incubation model from 2003-2012. This study revealed an economic impact of more than $880M in Central Texas and addition of more than 6,500 jobs during this period. These data provide convincing evidence for the enduring effectiveness and relevance of an incubation model born at the Institute over 30 years ago.

As a final note, please look at the upcoming events including our Fellows Meeting. We hope many will join us in the many initiatives of the Institute in 2017.

Best regards,

Gregory Pogue

Gregory Pogue
Interim Director, IC² Institute

The University of Texas at Austin
IC² Institute
Office of the Vice President for Research

Since 1989, the IC² Institute's Austin Technology Incubator (ATI) has presented a successful model for business incubators, and the Institute continues to help integrate that model into different regional contexts abroad.

As one of the first technology business incubators in the United States, ATI was selected by the US Department of Energy to establish the first US clean energy incubators. Its tag line, "We get you funded," could be considered braggadocious if it were not simply true...

But being "first" doesn't mean being "the only." Especially in Austin.

The Business Incubation Issue

It is a concept that has come of age. Business incubation does help entrepreneurs realize earlier and greater success. Incubators, accelerators, science parks, and co-working spaces show an increasing presence across the United States and around the globe.

Rich in entrepreneurial networks and both governmental and grassroots support systems, Austin and the Central Texas region provide multiple opportunities for burgeoning companies to gain access to business incubation and acceleration services.

IC² Institute researchers recently identified 39 business incubators, accelerators, and co-working spaces in the Austin area.[1] And while the technology startup is a favorite for business angels and capital investors, non-technology companies can also readily find local assistance. And while some companies need longterm, specialized industry support (i.e., biotech and life sciences), other entrepreneurs can increasingly find "boutique" business incubators that support a specific niche of non-technology companies or minority-owned businesses.

In addition to longterm incubation or acceleration services, many of these entities offer short programs, workshops, and business plan competitions that facilitate entrepreneurs simply to take their businesses to the next level, or take the next integral action. Some businesses climb their way from one of these mentoring experiences to another, in a ladder of assisted success that results in the formation of a robust company with international presence.

ATI continues to test new concepts to engage entrepreneurs, readily partnering with local incubators to enhance its programs and events. Case in point, ATI moved its staff to the University Park WeWork co-working space in May this year. One of the reasons for this move is to more readily connect with students simply by its proximity to the main campus. This increased proximity is particularly salient this year as ATI has been awarded several new funding avenues to connect their programs with undergraduate students, and increase their student outreach overall.

In April, the Kauffman Foundation provided a grant to expand the Student Entrepreneur Acceleration and Launch (SEAL) Program. In June, the Blackstone Charitable Program awarded ATI a grant to create a Student Launchpad to assist undergraduate entrepreneurs.

Meanwhile, since the last UPDATE, IC²'s Global Commercialization Group (GCG) has established a new business incubator in Tirupati, India: XLR8 Andhra Pradesh.

We therefore dedicate this issue to taking a closer look at business incubation, the creative process, and the IC² Institute's role in supporting entrepreneurs with the vision for regional development.

— M. Cotrofeld

1. "Austin Innovation and Collaboration Spaces" working paper by J. Spence and D. Gibson, June 2016.

IC² Institute Director of Faculty Research Dr. Art Markman (left) and Dr. Bob Duke caught in a moment of humor during a live taping of KUT's short radio feature "Two Guys on Your Head." Markman is also director of the Human Dimensions of Organizations degree program at UT Austin. *Photo courtesy of Rebecca McInroy and KUT Radio.*

"Two Guys on Your Head" Talk about the Psychology of

Creativity & Business Incubation

Rebecca McInroy produces KUT's short radio feature *Two Guys on Your Head,* in which Dr. Art Markman and Dr. Bob Duke discuss how the human brain's "hardwired" responses affect daily interactions in current society.

To introduce this UPDATE focused on business incubation, IC² Institute asked professors Markman and Duke to discuss business incubation in relation to psychology's four stages of creativity:

· *preparation* — an idea or plan of action is conceived

· *incubation* — the idea is set aside for sleep and other unrelated activities, while the subconscious mind re-calculates the plan against the bank of personal experience and new sensory input

· *illumination* — new answers appear spontaneously as new mental connections are established, resulting in an enriched, more viable plan

· *verification* — the improved plan is put into action and is realized externally.

For this discussion, the *preparation* phase is proposed as parallel to establishing a business, while the *incubation* and *illumination* stages are considered iterative internal processes, such as occur during the business incubation phase; and *verification* is considered to be an external phase in which a business exits the incubator to seek success in the larger business realm.

This exclusive "off-the-air" discussion on business incubation and the creative process follows...

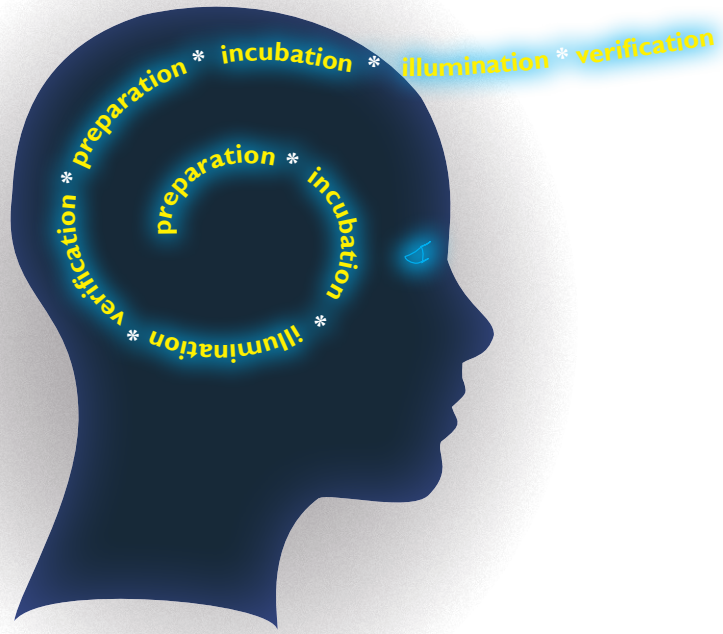
The Interview

IC² Institute: Thank you for giving us this opportunity to talk with you today. Business incubation and the creative process are two things that you are both very familiar with. What are your thoughts on the stages of creativity and how they compare to (and are involved in) the business incubation process?

Markman: I think one thing to say up front is that when a lot of people think about innovation and the creativity that goes into creating a new company, they're focused primarily on the development of whatever *technology* or *services* or the *product* that the company has.

But a company's *process* also needs some amount of innovation, and development of *culture* also needs some amount of innovation in order for that company to develop both procedures and a culture that are ultimately healthy. I think the community underestimates the importance of that.

I know that the folks at the Austin Technology Incubator are well aware of the fact that a large proportion of the success of a new venture is the team, and the ability of that team to gel, and the ability of that team to find a way to create the right human interface to the market. And that takes time.



> Many new companies have a technology and an idea about how they're going to approach the market that is not, ultimately, the one that's going to be successful.... Part of the problem with being creative is that for large swathes of time, it doesn't look like you're getting anything done.
>
> — *Art Markman*

Duke: Not to dwell too long on the vision thing, but I think when Art's talking about imagining the services or the technology, it's worth taking time to imagine what everything would look like if it was up and running great. What would that look like?

Not just what jobs are people doing, but how do they interact with each other? How do they communicate with each other? How do you form a team that works in a way that benefits the goals of the company?

Markman: One of the important things about the theory of business incubation is the recognition that there's time required, and that a company needs to be protected so that it minimizes the amount of money that it's burning through, so the company can survive to the point where it really is mature enough to bring a product effectively to a market.

And you might say, Why does it require all this time? But part of what you need to do is have the time to search through the space of ideas that will ultimately lead to the right gel of the product with the team and the market.

Another part of it is also giving you the time to lose your love affair with some of the initial ideas you had. Many new companies have a technology and an idea about how they're going to approach the market that is not, ultimately, the one that's going to be successful. But while you may be able to fall in love overnight, it's hard to fall *out* of love overnight.

A lot of times, companies need a while to figure this out, and to listen to the advice which says you may need to re-think your overall strategy. So, putting yourself in a protective environment (in which you will both get that advice and be given the time to realize that, maybe, you weren't 100% right to start with), that's important.

Duke: And that requires creating a hierarchy of which features are central to the company. What are the defining features of who we are and what we do? And then, what other things elaborate those central features?

So, you've got this central idea which, without that, there is no company. But then there are these other surrounding things that support that idea, and those are the ones things that are the most amenable to either discarding or modifying in some way.

You've got to think about the whole thing. When Art says you can't be too in love with your ideas and you need to let some ideas go, it's because the path (from the first thought of all this, to a mature company) is not linear. It's a mess in many ways.

And if you see every one of the diversions or digressions—when you have to back up and start again in this little part of what you're doing—if you see every one of those as a catastrophe, you're never going to get anywhere. Because those are going to happen all the time.

When companies succeed, or any organization succeeds, it's because they're able to manage what happens at those times when, as a team, you realize, "We've been pursuing this path, but in actuality we now see that it's a not good way to go." And you come back and reset the goal.

Markman: And another parallel between creativity and business incubation is that, if you're going to have creativity in an organization, it needs to be protected.

Part of the problem with being creative is that for large swathes of time, it doesn't look like you're getting anything done. Suddenly you have this idea and you go great guns on it, and then: *Oh, it doesn't work.* Now you're back to the drawing board.

And so you have to allow people who are engaged in creative pursuits to go through that horrible non-linear process, as

Bob's calling it. I think that's a parallel with what's happening with companies in the incubation phase. It would be easy if you could just give people a checklist. Something like: *Have an idea* (check); *Find someone with business expertise* (check); *Determine the market value* (check). It isn't like that. I mean, people try to create these lists, but it doesn't really work like that. There's lots of fits and starts.

Sometimes the best thing that comes out of that exercise is a better idea of how to organize your team the next time you have a good idea. And that's not a failure, necessarily.

I think the strongest entrepreneurial communities recognize that just because a particular venture failed doesn't mean that you're a failure. One of the reasons that Silicon Valley has been so successful (where many other areas haven't) is in giving people the chance to learn from companies they were involved with that didn't succeed. That makes them stronger the next time. Austin has done that effectively as well.

IC² Institute: Thus developing the serial entrepreneur...

Markman: ...Who does not have only hits. And that's true of creative people as well. As Bob likes to point out, the people who have the best ideas are the ones who have the most ideas, and a lot of those ideas are not so good.

Rebecca and I were talking about Leonard Cohen, and Rebecca knows a lot of people who played with him. The thing is that I love Leonard Cohen, but he's got some garbage. There are whole albums that are garbage. (*Jazz Police*? Really? I'll forgive him, dear Heather, because he was just getting back into it!)

But he had *a lot of ideas,* and a lot of them were, of course, brilliant.

I think that's true for creativity, but it's also true for entrepreneurship. That's why people need this protected space to do that in, and communities to do that in. It's not just incubating in some region that has no entrepreneurial community.

It's allowing those people to get involved in businesses, to then recycle themselves into the community, and make a contribution, even after a company fails or gets sold or reorganized.

Conclusions

In reflection, an important role of the business incubator is to provide sanctuary for the entrepreneurial team to "dream" if you will, and re-imagine the *product*, the *roles of the team members,* and both the internal and external *"human interface"* that will serve the market (and thus the company) best.

Accordingly, the task of the entrepreneur is to process new advice and new inputs against the original vision, and re-articulate the product so it is more meaningful to the market.

Writer, poet, and songwriter Leonard Cohen, said, "My ordinary state of mind is very much like the waiting room at the DMV... So to penetrate this chattering and this meaningless debate that is occupying most of my attention, I have to come up with something that really speaks to my deepest interests. Otherwise I nod off in one way or another. So to find that song, that urgent song, takes a lot of versions and a lot of work and a lot of sweat."

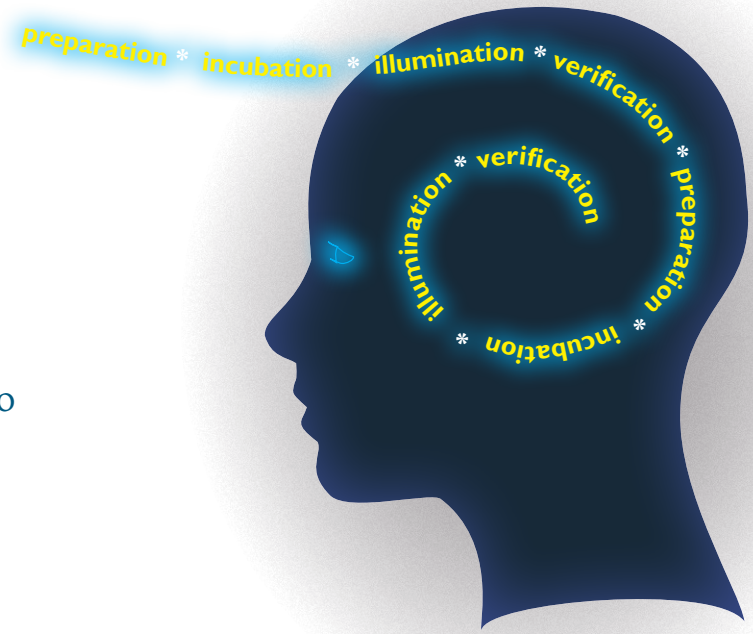
The search for simple truths—stripping away the superfluous to find the essential—is a difficult task that, once accomplished, seems effortlessly apparent.

The business incubator provides the environment to help entrepreneurs focus on the essential questions as they creatively build a business case and an opportunity that speaks to the core of market need, but also inspires a team of people to pursue it to the end. This is a "lot of sweat."

— A. Markman & B. Duke with G. Pogue & M. Cotrofeld

And if you see every one of the diversions or digressions—when you have to back up and start again in this little part of what you're doing—if you see every one of those as a catastrophe, you're never going to get anywhere. Because those are going to happen all the time.

— Bob Duke



ATI Nets Funding to Provide More Students with

Several founders of successful high tech companies (including Michael Dell) did not attain a university degree before they started their business. In Dell's case, during his last semester in his senior year at The University of Texas at Austin, he was faced with a fleeting business opportunity that, unfortunately, could not have been pursued in tandem with his goals in the university setting.

We think students shouldn't have to choose. They should be able to do both.

The Austin Technology Incubator (ATI) continually seeks funds to serve

more students,

from more universities,

earlier in their academic careers,

across more university disciplines,

within the university setting.

ATI SEAL Program to Extend Its Reach to More Universities with Grants from Kauffman Foundation and Blackstone

The Austin Technology Incubator's Student Entrepreneur Acceleration and Launch (SEAL) program is The University of Texas at Austin's selective nine-week summer program designed to help student teams tackle the most difficult, deal-killing questions of their new ventures.

Most entrepreneurial programs focus on promotion or proliferation of startup creation in a student environment. SEAL challenges students to grapple with market interest, technology fit and function and ultimately the ability to create and support a differentiated value proposition, which will support successful commercialization. SEAL provides a mentor-driven approach to assist student-led enterprises:

1. Identify key challenges that stand between their vision and market success

2. Test business and technology claims in the marketplace

3. Define their value propositions

4. Communicate their decision to launch, pivot or change strategy or stop development to key market stakeholders.

Company Decision Day is the culmination of the SEAL program, with each team delivering their outcome in the form of a formal pitch supporting one of the following decisions:

- *Go forward* with original business strategy
- *Go forward* with pivoted or significantly altered business strategy
- *No Go* – insufficient data to support a Go decision.

The SEAL program has been in operation since 2009. It originated as the "capstone" strategy for the over 150 ventures that are contemplated or launched each year at UT Austin. Through SEAL, ATI invites approximately 10 of these teams each year into an intensive, mentor-driven program designed to accelerate the ventures and drive a go/no-go decision from the student founders. Two-thirds of SEAL graduates successfully raised capital or bootstrapped the company to market. Previous SEAL teams include: Ordoro, M87, Lynx Labs, AdBm Technologies, Beyonic Technologies, Favor, Accordion Health, and more. Through generous support from the Kauffman and Blackstone Foundations, the SEAL program has been extended to six additional institutions. In total, SEAL outcomes since 2009 include:

- 6 universities and 1 national laboratory engaged
- ~115 student participants in 69 student-led companies
- ~$40 million raised
- ~100 Texas-based mentors mobilized.

— G. Pogue and R. Field

Incubation Opportunities

Blackstone Awards ATI $1M Grant for Student LaunchPad

In June, Blackstone Charitable Foundation added three Texas universities to its global entrepreneurial platform.

The three-year $3 million Blackstone LaunchPad program will introduce entrepreneurship as a viable option to 130,000 students at The University of Texas at Austin, the University of Texas at Dallas, and Texas A&M.

Spanning Disciplines

Whether students are just getting started, already have a company, or are merely curious, the Blackstone LaunchPad program helps them develop executable milestones, overcome obstacles, and find mentors, community, resources, and more. "This is really for the student who hadn't thought about it before," said Amy Stursberg, executive director at Blackstone Charitable Foundation.

The Austin Technology Incubator will oversee the UT Austin's LaunchPad. ATI Director Isaac Barchas noted that the program's aim is to increase awareness of entrepreneurship across campus and expand migration from all disciplines and colleges toward new entrepreneurial pathways. "They want to make entrepreneurship part of the visible fabric of student life, which I think will have a good effect."

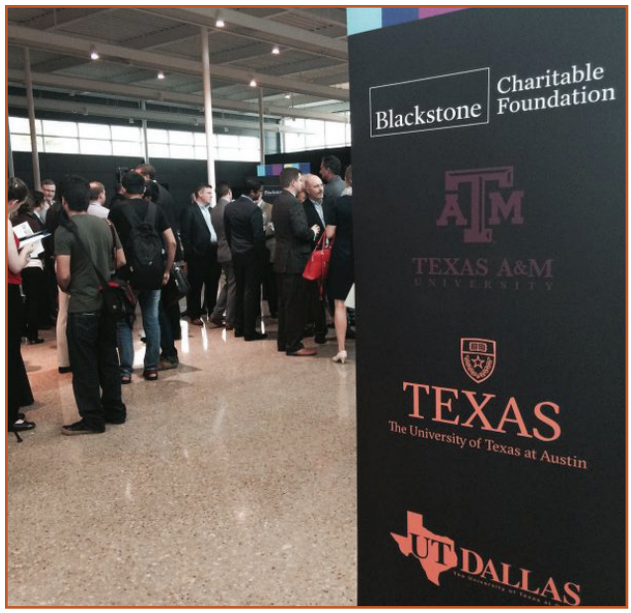
Extended Benefits

The larger goal is to create new companies and jobs across the state. The potential impact across Texas is estimated at 3,900 new businesses and 9,000 new jobs over the next three years. "Texas has a strong business environment and is a hub for entrepreneurship and innovation," said Stephen Schwarzman, Blackstone's chairman, CEO, and co-founder.

The program will also connect the university campuses, the business communities, and local entrepreneurs to Blackstone LaunchPad's global technology platform, a positive for both sides of that equation.

The Institute has hired Luz Cristal Glangchai to oversee the UT Launchpad. Glangchai holds a PhD from UT Austin and is the founder and CEO of VentureLab, a K-12 STEM program that has spread to more than 30 schools in the United States.

UT Austin President Gregory Fenves said, "We welcome this opportunity to connect with an even broader network of innovators throughout Texas and the partner universities globally."



Blackstone LaunchPad
TEXAS
The University of Texas at Austin

Top: Blackstone announced the grants in a June press conference held at the UT Dallas Visitor Center Atrium. **Middle**: Stephen Schwarzman, Blackstone's chairman, CEO, and co-founder (right) discusses the grant with ATI Director Isaac Barchas (left). *Photos courtesy of Blackstone Charitable Foundation.*

The first XLr8 AP cohort. *Photo courtesy of XLr8 AP.*

XLr8 Andhra Pradesh: Business Accelerator Launched by IC² Institute's Glenn Robinson in Tiupati, India

In September, Glenn Robinson (IC² Institute Assistant Director with the Global Commercialization Group) departed Austin for India with the goal to establish the XLr8 Andhra Pradesh business accelerator in Tirupati. Since then, the Institute has received a constant stream of positive news as milestones have been met by the accelerator program.

Robinson explains that the decision regarding location was made by the Andhra Pradesh government. "However, as we began to understand the dynamics of the developing ecosystem in Tirupati, it became clear that there are many similarities between where Austin was 40 years ago when the Institute was formed, and where Tirupati is now: provincial economy; solid universities producing well-trained graduates —most of whom leave the state to find jobs causing 'brain drain,' which also plagued Austin in the mid 70s; a state government inclined to invest in attracting new entrepreneurial ventures; and available land for growth and development. We see a clear opportunity to import proven business processes, along with lessons learned over time in Austin, to the accelerator in Tirupati."

More than 400 entrepreneurs applied from across India, to join the first cohort of 33 companies to receive four months of mentoring in:

- Innovation Readiness Series
- Scientist's Role in Technology Commercialization
- Pitching Your Technology
- Entrepreneurship Training
- Developing Young Entrepreneurs
- Subject Matter Expert Series
- Tech To Market

The overarching goals of the program are to:

1) *Identify disruptive technologies* in India that address unstructured societal challenges;

2) *Transfer the IC² Institute methodology,* which has proven effective in generating jobs, wealth, and high-impact technology business ventures in 26 countries around the world to date, to entrepreneurs in India, with a view to shortening the runway to market entry and success;

3) *Educate university students* regarding the finer points of

innovation and entrepreneurship, and launch of a successful technology business venture;

4) *Provide a world-class incubation model* in the state of Andhra Pradesh. Eight of the 33 companies will be selected to make a presentation to a bi-national panel of senior executives and venture capitalists. Four will be selected for intensive business development, working to pursue and execute business engagements with interested parties, toward the overall goal of measurable economic development.

In parallel, university students and representatives from select academic institutions will engage in workshops, bootcamps, and other events designed to increase the consciousness level regarding entrepreneurship and innovation. This aspect of the program is tightly aligned with the stated objective of the Government of Andhra Pradesh to encourage "one entrepreneur per family"—our program will help empower that process.

The First Cohort

The first cohort of companies represents a range of industries including renewable energy, cyber security, biosciences, agriculture, automotive, healthcare, manufacturing process management, and IT. The XLr8 AP portfolio companies include:

- MasterKube Software Products & Svcs PVT LTD, www.masterkube.com
- Ecopots, www.neuecotechs.com
- Janani's Integrated HortiProcessing Project, www.jananigroup.com
- Imaginate, www.imaginate.in
- Exafluence PVT LTD, www.exafluence.com
- Learnitude Technologies PVT LTD, www.learntechx.com
- S.L.S. Cell Cure Technologies PVT LTD, www.slscellcure.in
- XCyton Diagnostics PVT LTD, www.xcyton.com
- ExCel Matrix Biological Devices PVT LTD, www.exafluence.com
- Phyto Specialties PVT LTD, www.phytospecialities.ne
- VMukti Solutions PVT LTD, www.vmukti.com
- Olive Touch Health Care Services LTD, www.idecidemycare.in
- eFresh Agribusiness Solutions PVT LTD, www.efreshglobal.com
- Octapace Engineering Solutions PVT LTD, www.octaengineering.com
- Reckon Green Innovations PVT LTD,www.reckongreen.com
- SriHaridham, A Divine World, www.sriharidham.com
- Tycheejuno Specialty Tyre PVT LTD, www.tycheejuno.com
- Indian Institute of Public Health, Hi Rapid Lab, www.phfi.org
- Dass Oilfield Technologies PVT LTD, www.dasswell.com
- SustainEarth, Gau Gas, www.sustainearth.in
- Agro Biogenics, https://zerowastezerocarbon.wordpress
- Megasoft, www.megasoft.com
- Oriental Aquamarine Biotech India PVT LTD, www.nitrifying-bioreactor.com
- Electric Mobility
- Aarshadhaatu Green Nanotechnologies India PVT LTD, www.aarshadhaatu.com
- Romin Guard: www.rominguard.com
- Banana Fiber spinning machine, www.bananaropemdu.com.

XLr8 AP is funded by the Andrha Pradesh government, and the work is being performed in partnership with the Innovation Society of the government. Another local partner is the Federation of Indian Chambers of Commerce & Industry (FICCI), who has also been a longstanding partner with the IC² Institute in the India Innovation Growth Programme (IIGP) that has provided an estimated financial impact of more than $814 million from 2007 to 2015, according to an independent analysis performed and published by Ernst & Young.

—*Content provided by Glenn Robinson*

IC² Institute Assistant Director Glenn Robinson addresses the XLr8 Andhra Pradesh cohort in Tirupati. *Photo courtesy of XLr8 AP.*

Interim Director of the IC² Institute Greg Pogue addresses the *FAST*Forward group in the IC² Institute Global Classroom. *Photo by C. Franke.*

*FAST*Forward Accelerates Job Creation

IC² Institute Provides Business Acceleration for City of Austin

In addition to business incubation programs set in motion by ATI and GCG, the IC² Institute has also been at work helping local small businesses accelerate their trajectory for success.

*Aimed at women- and minority-owned businesses, the FAST*Forward *program was designed to help create synergy with existing business development programs available in Austin.*

IC² Institute Interim Director Greg Pogue has led the 12-week *FAST*Forward program that was 80% funded by the City of Austin. Several chambers of commerce in the Austin area also played key roles in the program, identifying mentors and more.

Pogue describes the program model as being reminiscent of the 1980s when the Institute worked with the chambers of commerce, the City of Austin, and community leaders to pursue coordinated efforts toward developing high tech industries. "It involved reaching out to the generosity of the people of Austin to help provide an environment to grow a new type of business. This is what these mentors have done with this program."

Creating Jobs

At a basic level, *FAST*Forward is a job creation program, inasmuch as it focuses on sole proprietorships with the goal to help these businesses scale to become employers.

These companies are not in the high technology arena; rather, they are typical of small businesses across Austin and the United States, and the success of these companies would indicate effectiveness of the *FAST*Forward methodology for creating jobs across the nation, particularly in regions that do not have the resources for widespread high technology company development.

Kevin Johns, director of economic development for the City of Austin said, "...we think that other places around the country are going to want to replicate [the program]."

Attacking the Gap

Interviews with failed Austin startups have revealed that *funding issues* top the list of why these businesses were not successful. Specifically targeting this gap, the *FAST*Forward program was designed to help entrepreneurs:

- *Identify* new business opportunities and revenue streams
- *Differentiate* their message, product, and delivery strategy to reach the marketplace more effectively
- *Develop* financial models to enhance partnerships and funding opportunities
- *Increase* the scale of their business.

"The program has set the platform for our business to expand, " said Mario Alvarez, who presented the pitch for It's Cleaning Time, an eco-friendly cleaning business. "We learned that our business is based on relationships with our customers and mentors, as well as other members in the community." He went on to describe how the company has used eco-friendly products for more than ten years, but had not leveraged this selling point to help differentiate their business in reaching the marketplace, which is the sort of specific help that can position a business for new success.

Beyond Graduation Day

Kevin Johns voiced broad support on behalf of the City for the businesses that have gone through the program. "We're going to work hard to support you as entrepreneurs and businesses—with low-interest loans, with technical assistance, with connections.... We [the City of Austin] want to make sure that you are successful; and it is our hope that some of you go on to be multi-nationals."

On November 30, eleven companies presented business pitches at Austin City Hall, describing who they are, where they are going, and what they need to get there:

- **mmmpanadas**, Kristen Fields
- **Pro Lawn Cut,** Mynor Alvarado
- **BassBoss**, Lian Amber, David Lee
- **Crudo Terre**, Irene Mwathi
- **ReRoute Music Group,** SaulPaul, Bianca Neal
- **Austin EcoNetwork**, Amy Stansbury
- **Austin Art Services,** Kirk Anders, Jeremy Burks
- **Li'l Mama's,** Heather Biagas
- **It's Cleaning Time**, Eloisa Alvarez, Mario Alvarez
- **Concept 2 Conception**, Sam Alexander
- **Treasured Earth Foods,** Ruth Noel.

IC² will also provide these companies with follow-up sessions in the new year, to help the business owners pursue the path they have outlined for growth.

— M. Cotrofeld

...the success of these companies would indicate effectiveness of the *FAST*Forward methodology for creating jobs across the nation, particularly in regions that do not have the resources for widespread high technology company development.

Participants in the *FAST*Forward program presented their business pitches to an audience at Austin City Hall for graduation on November 30. *Photo by City of Austin Staff.*

ATI Graduates 19 Companies

In September, the Austin Technology Incubator (ATI) celebrated the 19 "graduate" companies that have successfully completed its clean energy, IT/wireless, and biosciences programs. The 19 companies comprising the 2016 graduating class have collectively raised more than $220 million and have already recorded one IPO and two eight-figure mergers and acquisitions. Austin Mayor Steve Adler provided the evening's keynote address, in which he stressed the importance of technology companies to Austin's economic landscape.

ATI has a 27-year track record of helping early stage technology companies achieve success in the capital markets. Over the past decade, ATI companies have added nearly $1 billion in economic value to the Austin area, creating approximately 7,000 jobs and generating more than $20 million in local tax revenue. The 2016 graduating class includes:

- Admittance Technologies
- Aeglea BioTherapeutics
- Alafair Biosciences
- AptamiR Therapeutics
- Bractlet
- Circle Media
- Curtana Pharmaceuticals
- Cyfeon
- EyeQ
- InXero
- JR Thermal
- Lumos Pharma
- Lynx Laboratories
- Macrolynk
- The Magazine Channel
- Ridescout
- Riskpulse
- Seismos
- Structured Polymers

George Georgiou is a UT professor and CEO of Aeglea BioTherapeutics, ATI 2016 graduate company. Aeglea completed its initial public offering in March (NASDAQ: AGLE). *Photo courtesy of Austin American-Statesman.*

Civic Entrepreneurship Award

The event also included presentation of the Laura J. Kilcrease Award for Civic Entrepreneurship, given to Dr. Matt Winkler for his efforts in conservation. Previously an associate professor of zoology at The University of Texas at Austin, Winkler founded Ambion in 1988, and sold its research products division to Applied Biosystems in 2005. Winkler works with the Nature Conservancy to increase biodiversity.

— A. Mosley

US Department of Commerce Awards ATI Grant for Texas Smart Water

The Austin Technology Incubator has received $500,000 to build out the Texas Smart Water Innovation Cluster from the US Department of Commerce. Earlier this year ATI launched a vertical to accelerate the development of innovative water technologies (ATI Water). ATI Water is building a Texas-wide network of entrepreneurs and university-based water researchers to test and commercialize technology.

Through the Texas Smart Water Innovation cluster, ATI plans to advance those efforts, said Isaac Barchas, ATI's executive director.

"The neat thing about water is there isn't any place in America that owns water technology, and Austin is really well positioned to do that," Barchas said. "This could end up planting a flag for a new technology area in Austin that would be interesting and important."

"Through the grant and ATI's efforts, Barchas said, "We expect dozens of companies to be created, at least 100 clean water technology jobs, and millions of dollars in economic activity."

Abridged from Lori Hawkins "Two Austin groups score U.S. Department of Commerce innovation grants," Austin American Statesman, *November 15, 2016. Photo courtesy L. Hawkins, AAS.*

3 Day Startup CEO Cam Houser (left) kicks off the Cleantech 3DS, hosted by ATI at WeWork–University Park in Austin. *Photo by K. Baireuther.*

ATI Clean Energy Hosts 3 Day Startup Event

In June the Austin cleantech community hosted a Cleantech 3 Day Startup (3DS), an immersive learning-by-doing entrepreneurship event. Over 65 aspiring Texan entrepreneurs applied, and a diverse mix of 40 participants ranging in age from 19-55 were selected to spend their weekend pitching ideas, forming teams, and crafting innovative cleantech startups.

3DS was created to help entrepreneurs gain traction in 72 hours. Participants receive training in core entrepreneurship skills such as brainstorming, collaboration, customer discovery, rapid prototyping, mentor engagement, and investor pitching.

First, entrepreneurs commit to shutting down competing activities and focus on "this one thing" for three days. Second, they commit to teaming with two entrepreneurs who they've not yet met, selected on the criteria of *similar* business interests but *complementary* (different) business strengths. Each participant brings a business idea, and when teams meet for the first time, their first task is to agree on which business idea is best suited for collaboration in the workshop context. If that sounds hard on two out of three entrepreneurs, it might be: but 3DS sessions work.

Austin Technology Incubator (ATI) led the event with support from its partners in the Southwest Regional Clean Energy Incubation Initiative (SRCEII) network.[1]

On Day 1 of the event, 27 different ideas were pitched by participants. After the votes were tallied, 6 teams formed around themes as diverse as an e-bike retrofit kit, a microgrid in a box, a smart shower head for hotels, a mobile app to prevent food waste, energy generation from industrial wastewater, and smart trash cans paired with education programs to sort waste and prevent littering.

On Day 2, the teams went into the community to conduct customer interviews in the morning, and in the afternoon worked with industry-matched mentors. For the 3DS event, 17 on-call experts made themselves available for 38 hours of interviews, and 24 mentors were on-site for a combined 78 hours of mentoring, illustrating high support for startups among the cleantech community in Austin.

On Day 3, the teams scrambled to finalize their business models and pitches with even more mentor support. Each team then had the opportunity to pitch the business idea to a panel of esteemed judges from the community with a live audience of other participants, mentors, and community members.

Although 3DS does not announce "winners," the event was a clear success. Entrepreneurs were both challenged and inspired by their immersive experience. This event was made possible by the support of DLA Piper NEST and ATI's hosts at WeWork University Park.

— K. Baireuther

1.The SRCEII network includes Pecan Street, Inc., the Research Valley Innovation Center (TAMU), the Hub of Human Innovation at UT El Paso, and the Center for Innovation, Technology & Entrepreneurship at UT San Antonio.

Celebrating 90 years: Bureau of Business Research

BBR

Helping Texas re-imagine its economic future since 1926

For ninety years, the Bureau of Business Research has helped Texas to step into high cotton, wrangle its cattle, cap its gushers, launch its rockets, fabricate its microchips, film its movies, launch its games, produce its clean energy, and... What is next, Texas?

Business & Research, Then & Now

Over the past 90 years, the concepts of both business and research have transformed, and the Bureau of Business Research (BBR) provides a unique window into that shift.

When the BBR was founded in 1926, the Texas cattle industry boom had passed. Cotton and lumber both remained very strong, and oil was just coming into its own. The national GDP was $19.1 billion.

Early BBR research focused on improving the cotton industry and mapping the state's geological regions (which was vital when searching for oil), while the *Texas Business Review* published the statistics that sketched the State's economic portrait (largely concerned with agriculture).

Today's industries are no longer measured in "booms," and in 2014 the State's GDP was in excess of $1.6 trillion. If Texas were an independent nation it would have the 12th largest economy in the world that, today, relies largely on information technology, oil and natural gas, aerospace, defense, biomedical research, fuel processing, electric power, agriculture, and manufacturing.

Today's BBR

In its 90th year, the Bureau of Business Research focuses its studies on issues related to entrepreneurship, high technology, and international trade and continues to break new ground.

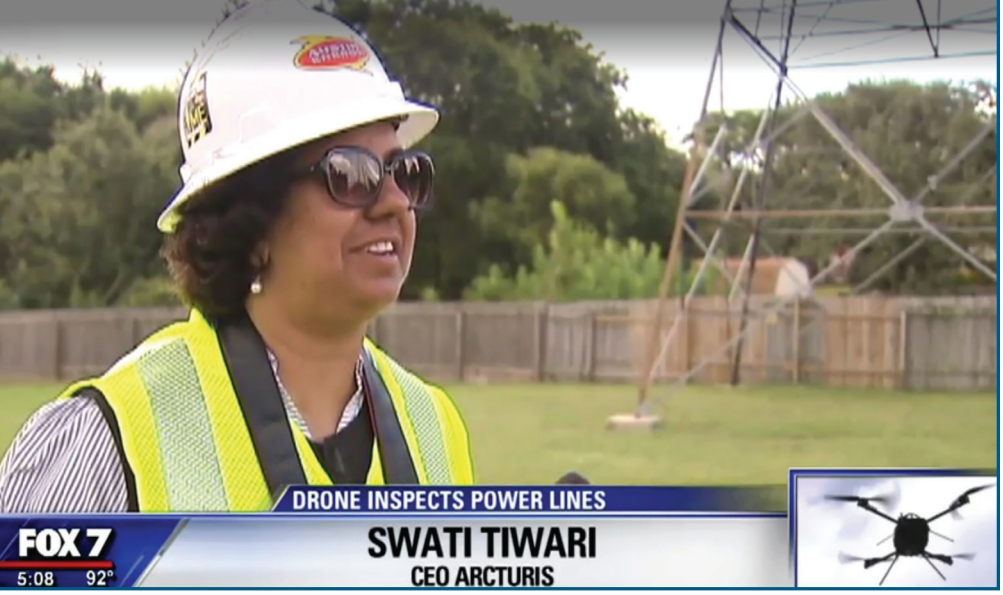
The BBR has developed an innovative partnership with the Institute on Domestic Violence and Sexual Assault in the UT Austin School of Social Work to add an economic impact lens to its portfolio of work around human trafficking and campus sexual assault. Recently, it undertook statewide studies that examined barriers to growth among Texas minority-owned small businesses, surveyed Millennials about their entrepreneurial intentions, and analyzed the national economic impact of the direct selling industry.

BBR Director Bruce Kellison this year is president of the Association for University Business and Economic Research, a national group of applied economic research units that focuses on regional economic competitiveness. Senior Research Scientist Jim Jarrett and Research Scientist Matt Kammer-Kerwick continue to present their work at regional and national conferences, publish their research in peer-reviewed journals, and perform research on grants with a variety of public and private sponsors at the state and federal level.

As a unit of the IC2 Institute, the BBR helps integrate the Institute into The University of Texas at Austin by collaborating on research and teaching. Its research focuses Institute studies and programs around the economic value of incubation and technology commercialization.

Looking back in this milestone anniversary year, the Bureau has achieved an enviable record of service and accomplishment over its 90-year history. And as good "stewards" of this legacy, current BBR staff members are looking ahead for new ways of helping the Texas economy thrive and individual firms compete in the global economy.

— M. Cotrofeld & B. Kellison



Fox 7 News coverage of the Arcturus pilot test with Austin Energy included a brief interview of CEO Swati Tiwari of India, in which she encouraged young women to pursue technology careers. Arcturus Business Solutions is a participant in the India Innovation Growth Program (IIGP). *Photo taken from Fox 7 News coverage.*

Local Partners Help Meet International Market Challenges

The following article discusses two award-winning technologies from the IC² Institute Global Commercialization Group's India Innovation Growth Program (IIGP), to describe the sort of local and regional partnerships that often occur when exploring how to bring new technologies to market.

Arcturus Business Solutions

Arcturus Business Solutions in India, an IIGP company, is developing a drone-based process for identifying defects in power transmission lines and towers. The drones capture live data (images, heat, electromagnetic radiation, and position) to identify damaged tower components, hot spots, and coronas. Using a comparison technology similar to face-recognition software, the drones analyze incoming data against a repository of "healthy state" components, reducing the need to manually review images and data.

While the technology is of high caliber, the challenges to enter the US market are real. First, US transmission lines are highly variable, often within the bounds of a single utility company or region, which increases the need for "healthy" comparison data beyond the reasonable. However, high voltage and ultra-high voltage transmission lines in the US are more standardized, presenting a niche-market opportunity.

Even so, pursuit of this niche presents a new challenge inasmuch as the high voltage of these transmission lines often disrupts the drone's stabilization, directional, and location systems—which increases the need to incorporate highly skilled pilots, transferring what might have previously been considered a technology *product*, into the realm of a technology *service*.

This challenge for Arcturus can be met, in part, by Fly4.Me, a company that provides FAA-licensed UAV pilots who are experienced in flying safe and effective flight patterns around various types of transmission towers. The problem is that, while Fly4.Me contracts 1,200 pilots nationwide, these pilots are typically based in sole proprietorships with uneven access to local utility companies, which presents a new barrier to market saturation.

To help mitigate this challenge, the IC² Institute identified Techline, a regional distributor of electrical transmission and distribution products for the electric utility industry in Texas, Louisiana, New Mexico, Kansas, and Arkansas. The addition of piloted Arcturus technology would increase Techline's capacity to identify defects along high and ultra-high voltage transmission lines. Yet utility companies are typically conservative and uninterested in trying any new approach before it is adopted by an industry leader. A test of the Arcturus technology on US soil is needed but potential partners are unlikely.

Enter Austin Magic

As it so often does, Austin's savvy technology community provided a solution. Austin energy is one of only six public utility companies (out of 2,000) to achieve the Diamond Level of American Public Power Association's highest designation for demonstrating high proficiency in reliable, safe work force development and system improvement. An endorsement by Austin Energy could accelerate the adoption of Arcturus across the US utility market.

When IC² Institute Program Manager James Vance approached Austin Energy with the need for field testing a new technology, they agreed to conduct two pilots, providing a senior supervisor, several tower engineers, and a public relations director. If the pilot is successful, Austin Energy, Arcturus, and Techline will discuss terms for the implementation and use of the Arcturus technology. The first pilot was conducted in October and three local news stations reported on the event: KXAN, KVUE, and Fox 7.

OrthoHeal

Another IIGP company, OrthoHeal, provides a new technology that will impress anyone who has ever had to wear a cast after suffering a bone fracture. OrthoHeal's founder, Dr. Pankajkumar Chatrala, is a physician and medical technologist. OrthoHeal's silicon cast was a Gold Medalist winner at this year's IIGP event. OrthoHeal's new technology provides a cast that is:

- *42% open* (increased circulation and easy observation of the wound)
- *water-repellent* (shower-friendly)
- *easy to apply* (zip the arm into a soft sleeve-like net and expose the cast to UV light ~2 minutes)
- *comfortable* (soft silicon foam contacts the patient's skin, while the

Austin Entrepreneurship Study Moves Ahead

The Ewing Marion Kauffman Foundation is funding a 1½ year study to document the evolution of Austin's entrepreneurial ecosystem. Dr. Elsie Echeverri-Carroll, IC² Institute Senior Research Scientist, is Principal Investigator. She and a team of six graduate students have conducted the following activities since May:

· Licensed and analyzed National Establishments Time Series (NETS) data that includes every entrepreneurial firm in Austin from 1990 to 2012

· Retrieved and analyzed Texas Secretary of State data on registrations in Austin and Delaware from 1965 to 2016

· Organized two research symposia at the IC² Institute and Capital Factory to present preliminary results of the research to the local entrepreneurial community

· Participated in a panel of the evolution of the high-technology industry at the 50th anniversary of UT Austin's Computer Science Department

· Conducted 45 face-to-face interviews with local startup founders, venture capital investors, angel investors, and representatives of local institutions

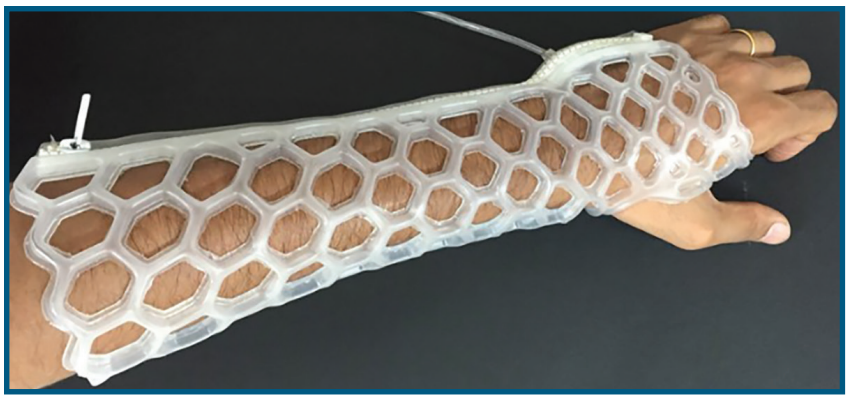
· Presented preliminary results of the research at the 2016 Mayors Conference on Entrepreneurship in St. Petersburg, Florida, organized by the Kauffman Foundation

· Submitted three reports to the Kauffman Foundation: *Comparing Austin and the Research Triangle; Evolution of Austin's Entrepreneurial Ecosystem;* and *Comparing NETS and SOS Databases to Measure Entrepreneurial Activity*

· Organized two Austin visits for IC² Institute Fellow Maryann Feldman from UNC/NSF.

Please find more detailed information about this research project at the following link: http://ic2.utexas.edu/research/austin-entrepreneurial-ecosystem.

— E. Echeverri-Carroll



epoxy-hardened mesh stabilizes the position of the limb)

· *easy to remove* (you unzip it and slip the arm free, eliminating the terror of the plaster saw, followed by pliers, followed by scissors).

The University of Texas Health Science Center at San Antonio's department of Orthopedics (UTHSCSA) is working with OrthoHeal to determine the effectiveness of this alternative to the plaster cast, as well as assisting in providing data for regulatory approvals, etc. If OrthoHeal's cast meets or exceeds the criteria for an improved cast, it may soon become a preferable alternative to plaster and fiberglass casts.

A phased approach is being pursued to bring the new cast technology to the US healthcare market.

Phase 1 – Complete prototype development: OrthoHeal is completing design modifications to enhance fracture stabilization.

Phase 2 – Obtain approvals for UTHSCSA clinical trial pilot: Seek the Office of Sponsored Programs approval of a small clinical pilot.

Phase 3 – Clinical trial pilot: UTHSCSA will design and execute a small pilot to test the feasibility of using OrthoHeal's cast.

Phase 4 – Funding: UTHSCSA will apply to various grants and funds to support clinical trial.

Phase 5 – Clinical trial: Led by Dr. John Faust, Assistant Professor, Pediatric Orthopedic Surgery, will establish test criteria, patient selection, surveys, data collection and analysis, test controls, and safety protocols.

Phase 6 – Analysis and findings: UTHSCSA intends to submit their findings to various national and international medical journals.

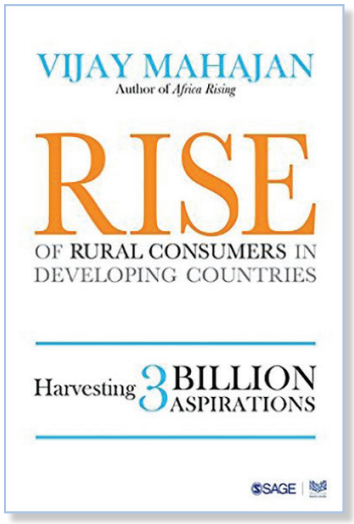
The IC² Institute India Innovation Growth Program (IIGP) is funded by Lockheed Martin Aeronautics Company, the Government of India's Department of Science and Technology (DST), and the Indo-US Science and Technology Forum (IUSSTF). The IC² Institute has partnered with the Federation of Indian Chambers of Commerce and Industry (FICCI) to deliver the IIGP program since 2007.

The University of Texas Health Science Center at San Antonio (UTHSCSA) is a chief catalyst for the $30.6 billion biosciences and health care industry in San Antonio and supports 1.2 million patient visits yearly. The Pediatric Orthopedics Team trains doctors around the world in best techniques for pediatric orthopedic surgery.

Austin Energy is a long term supporting partner of the IC² Institute's Austin Technology Incubator. Their cooperation in the pilot testing of the Arcturus product shows yet another facet of the company's progressive support to the Austin community, new energy solutions for its customers, and the safety of its employees.

— J. Vance, M. Cotrofeld

Vijay Mahajan (right) with a rural consumer in a Chinese village with a tobacco-centered economy. *Photo courtesy of V. Mahajan.*



Mahajan realized he was observing an emerging global middle class of vast proportions as he collected current data on how to access the rural consumers of Asia and Africa.

RISE of Rural Consumers in Developing Countries: Harvesting 3 Billion Aspirations

by Vijay Mahajan

When Professor and IC² Institute Fellow Vijay Mahajan decided to describe the large number of rural consumers in Asia and Africa, in countries with GDP per capita of less than $10,000, he conducted on-the-ground research in Bangladesh, Bhutan, China, Egypt, Ethiopia, India, Indonesia, Myanmar, Nigeria, Pakistan, the Philippines, Thailand, and Vietnam.

Mahajan realized he was observing an emerging global middle class of vast proportions as he collected current data on how to access the rural consumers of Asia and Africa. While these markets are scattered and difficult to access, their needs and desires are much like our own."A mother's passion about her baby in Austin is like the passion of a mother for her baby in Ethiopia," he explains. Roads, infrastructure, and retail outlets may be lacking, yet companies who overcome these challenges and obstacles to connect to these markets are serving a customer base that should become more accessible (and probably more prosperous) over time.

This is the first comprehensive book highlighting the expanding consumer power of rural markets in developing countries. It takes a close look at one of the key stories in emerging markets: the untapped potential of the world's 3.4 billion rural consumers—90 percent of whom live in Asia and Africa. The sheer number of rural consumers can provide a massive customer base for innovative companies that figure out how to reach them. The book provides a profile of the rural developing world and examines the forces that are increasing rural prosperity, including billions of dollars in remittances from migrant workers. The book provides several examples of innovations and best practices that are allowing companies to tap into this opportunity.

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Fenves Taps Daniel Jaffe as VP for Research

President Gregory Fenves appointed Professor of Astronomy Daniel Jaffe as vice president for research at The University of Texas at Austin. Dr. Jaffe assumed his new role in January 2016.

Jaffe has been a faculty member in UT Austin's College of Natural Sciences since 1986 and is the immediate past chair of the Department of Astronomy. He played a leading role in establishing the university's partnership in the Giant Magellan Telescope in Chile and served on the board of directors of the Gemini Observatory, twin telescopes located in Hawaii and Chile.

"Expanding our research capabilities and pursuing many opportunities for interdisciplinary collaboration across the campus is a high priority," said Fenves. "UT is poised to take a significant step forward in increasing the impact of the research by faculty, students, and research scientists. Dan has the skills as a team builder, fund raiser, and collaborator with research sponsors to take on these ambitious goals for our research mission."

Fenves and Jaffe aim to increase the amount and impact of basic and applied research conducted across disciplines and build new partnerships that break down the traditional barriers among academic disciplines.

"I want to find ways of collaboration that will create new knowledge and an excitement that will be self-renewing," said Jaffe. "The most exciting opportunity right now is the Dell Medical School, which will enroll its first class of students next year. To re-imagine and build a medical school from the ground up and conduct both basic and clinical research at a world-class university that has leading scholars from multiple academic fields is going to be a huge boon for Central Texas and health care in general."

—*excerpt from* UT News
October 6, 2016

VP for Research Daniel Jaffe Visits Korea with IC² Global Commercialization Group

In October 2016, VP for Research Daniel Jaffe visited the Daejeon Business Agency with Salvador Alanis and John O'Neill of the IC² Institute Global Commercialization Group (GCG). GCG completed the eighth year of technology commercialization programs for the Gyeonggi Small & Medium Business Center (GSBC) funded by the Korea Advanced Institute of Science & Technology (KAIST), a public university in Daejeon. Each program year has included training of innovators and entrepreneurs, research into the market potential of Korean innovation in the United States, US business development support, and business engagement agreements between Korean innovators and international partners.

Jaffe Names Pogue as Interim IC² Institute Director

In January this year, Daniel Jaffe began service as the Vice President for Research, which oversees the IC² Institute. In July, Dr. Jaffe released the following letter to IC² Fellows and staff:

Dear IC² Institute Fellows and staff,

I am writing to let you know that Dr. Robert Peterson has stepped down as Director of the IC² Institute. He will remain as an active member of the Institute research staff throughout the summer and then return to his long-time position as a member of the faculty at UT's McCombs School of Business. Dr. Peterson's history with IC² goes all the way back to 1977 when he was named a fellow of the nascent institute. He played a leading role in many of the significant achievements of IC² and has served as director of the Bureau of Business Research for over a decade, and as IC²'s director since 2013.

A primary goal for IC² will be to integrate more closely with strong and diverse portfolio of research, entrepreneurship, and innovation activities on the UT campus while maintaining its strengths in external programs. As we begin a broad-based search for a new Director, Dr. Gregory Pogue, the IC² Associate Director, will serve as Interim Director. Dr. Pogue will work closely with the senior IC² leadership and with me to maintain the excellence of the existing programs and to seek out new opportunities that will broaden IC²'s service to the university, the community, and society, and to the creation of new knowledge. I look forward to working with all of you toward these goals and thank Dr. Peterson for his long-standing service to the Institute.

Sincerely,

Daniel Jaffe
Vice President for Research

Dr. Jaffe plans to appoint a panel to help seek out a director for the Institute with an eye for the long term. "We'd like someone who has time to develop a vision and carry it out," he said.

Interim Director Pogue is leading the associate directors of the Institute in a team-based approach that moves the Institute's historical values forward while maximizing the existing capacity of the Institute's current leadership. The Institute has long served as a bridge between academia, government, and industry. This core value is expected to continue, with particular focus on linking UT faculty and students to IC² "Think and Do" research. Pogue says of the search for the next IC² Director, "We want a faculty member who links us to the heart of the university."

The Institute recognizes Dr. Peterson's many achievements and contributions to the IC² Institute, its staff, its fellows, and the success of its programs. Dr. Peterson has expressed, "I have enjoyed my four-decade association with the Institute, and I wish it well in the future." The staff, advisory board, and fellows of the Institute reflect good wishes toward Dr. Peterson and his future endeavors at The University of Texas at Austin.

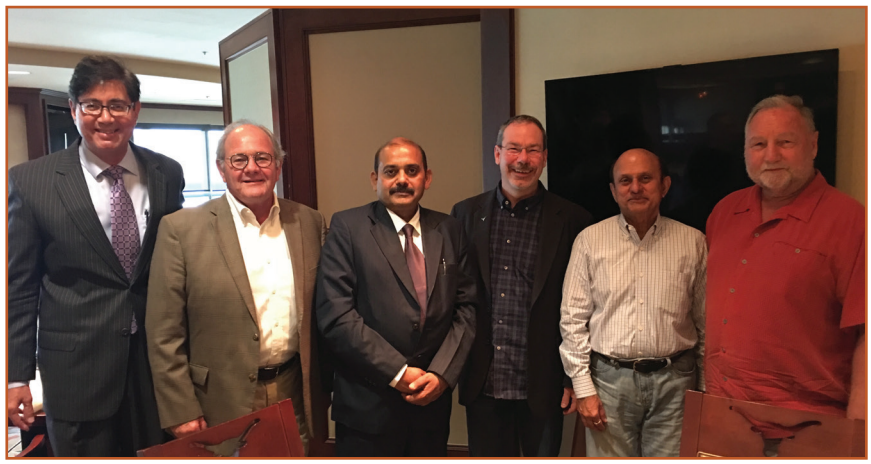
Nirankar Saxena of India Named IC² Institute Fellow

Nirankar Saxena, senior director of the Federation of Indian Chambers of Commerce and Industry (FICCI), has been named the newest IC² Institute Fellow. Saxena heads FICCI's Centre for Innovation and Technology Commercialization/Science and Technology. The Centre has recruits, assesses, and commercializes innovative Indian technologies.

The Indian Innovation Growth Program (IIGP)—a joint initiative of FICCI with the IC² Institute (sponsored by Lockheed Martin and India's Department of Science and Technology) —has provided India with a financial impact of $224M, plus employment of 3,422, according to a study performed by Ernst & Young.

Saxena led FICCI to become a founding partner of the Millennium Alliance. Under the leadership of FICCI and USAID, the Alliance brings together stakeholders within India to provide innovators with needed resources and services, who in turn have uplifted numerous citizens in countries traditionally overlooked by innovative companies. Saxena is co-chair of United Nations International Strategy for Disaster Risk Reduction and a member of India's National Committee for setting up Innovation Hubs in Science Centers and Organizations, as well as a member of several other committees established by the Government of India.

(Left to right) Jim Vance (IC² Institute Program Manager of IIGP), Sid Burback (IC² Institute Associate Director), Nirankar Saxena (named new IC² Institute fellow), Gregory Pogue (Interim Director of IC² Institute), Vijay Mahajan (IC² Institute Fellow), and David Gibson (IC² Institute Fellow and Associate Director). *Photo by Texas Union staff.*



Bruce Kellison (center) serves as president of the Association for University Business and Economic Research (AUBER), shown here on a panel of the Texas-China Investment Summit in Austin. *Photo courtesy of TCIS.*

Staff & Fellows NOTES & QUOTES

Bruce Kellison has been named president of the Association for University Business and Economic Research (AUBER). AUBER units conduct applied economic research on economic impact, economic development, economic forecasting and modeling, fiscal impact, feasibility studies, firm-specific studies, global business, industry studies, market research, labor market analyses, population/demographic analyses, population projections, public policy research, real estate market analyses, regional economic analysis, tourism research, and venture capital.

Andrew Whinston, IC² Institute fellow since 1988, has received the Co-Op Career Research Excellence Award, the highest UT honor for his prolific academic career. Whinston, in his 54 years at UT, has published more than 350 peer-reviewed articles across a variety of subjects including artificial intelligence, water allocation, and content-sharing on Twitter.

Corey Carbonara, IC² Institute fellow since 1994, was named Master Teacher at Baylor University in August. A pioneer in the field of high-definition television, Carbonara teaches in the department of film and digital media and serves as director of the Digital Communication Technologies Project that researches augmented reality and new immersive visual 3D environments.

Transitions

Gregory Pogue is serving the IC² Institute as Interim Director while the search for a Director is underway.

Robert Peterson has resumed his role as professor of marketing at the McCombs School of Business.

Kathleen Baireuther has left ATI Clean Energy. She will remain in the Austin area pursuing other opportunities in the clean tech industry sector.

Marten Davies has left the Global Commercialization Group.

Luz Cristal Glangchai has joined the Austin Technology Incubator to lead the Blackstone Launchpad project.

Amy Mosley has left the Austin Technology Incubator to work with the Texas Legislative Council.

Esther Orsborn has left the IC² Institute Central offices and taken the position of Administrative Associate with the Cockrell School of Engineering here at UT Austin.

Debra Amidon passed away February 7, 2016. Debra was an active research fellow of the IC² Institute since her induction in 1988. An online memorial site in her honor can be found at http://www.debra-mae-amidon.bostonglobe.lastingmemories.com/memorial/debra-mae-amidon.

Visiting Scholars 2016

May through December

The Institute hosted its seventh group of visiting scholars from LS Industrial Systems in Korea this fall. **Jay Lee, Guenho Cho, Sanghun Kim,** and **Bon Young Koo** took intensive English classes, audited engineering and business courses, and worked on independent study projects with program directors Marco Bravo and Bruce Kellison. In addition, because LS is focused on building electrical components for the utility sector, the visiting scholars traveled to Houston to visit with NRG executives and, closer to home, to the offices of Austin Energy. Once again, the LS visiting scholars return home having obtained a good taste of Texas culture and an understanding of the Institute's role in the Austin business ecosystem.

—B. Kellison

The Interchange: Innovation Networking

***Visitors & official delegations to The University of Texas at Austin involving the IC² Institute** (May thru December)*

Arcturus Business Solutions, India
City of Kristiensand & Vest Agder County Municipality, Norway
CRDF Global
Eindhoven University of Technology & StellaLex, The Netherlands
Girl Scouts USA
Gyeonggi Provincial Office, South Korea
IDEPA, Economic Development Agency of Asturias, Spain
MBA Class from Porto University, Portugal
Ministry of Andhra Pradesh, India
Ministry of Higher Education, Portugal
Plan 9 Incubator, Pakistan
Punjab Information Technology Board, India
Reto Zapopan, Municipal Government of Zapopan, Jalisco, Mexico
Rotterdam University of Applied Sciences School of Commercial Management Studies, Netherlands
RWTH Aachen University, Germany
Ulsan National Institute of Science and Technology, South Korea
University of North Carolina
US Department of State
US Embassy to Portugal
Walton Foundation
World Academy of Productivity Sciences
Xiamen Technical University, China

Top: Eva Pando, Managing Director of IDEPA Economic Development Agency of Asturias, Spain, visited IC² Institute Interim Director Gregory Pogue in September. *Photo by C. Franke.*

Center: US Ambassador to Portugal Robert Sherman visited the Institute in May. *Photo by C. Franke.*

Bottom Left: Portugal's Minister of Higher Education, Manuel Heitor, visited in June. *Photo by M. Cotrofeld.*

Bottom Right: Thomas Tuttle (left), president of the World Academy of Productivity Science (WAPS), visited the Institute in October to award David Gibson (IC² Institute Associate Director) the medal and certificate for being named a WAPS fellow for significant and long lasting contribution to the improvement of productivity, quality of work, quality of worklife and quality of life. *Photo by M. Cotrofeld.*

Top: Porto University's MBA cohort visited the Institute in December. **Below Left:** Nareem Qadeer, Program Manager with Plan 9 Incubator in Pakistan visited in October. **Below Right:** Reto Zapopan business accelerator of the Municipal Government of Zapopan, Jalisco, Mexico visited the Institute in August. *Photos by C. Franke*

The Center for Global Innovation and Entrepreneurship in Monterrey, Mexico welcomed three international groups on December 1. **Top Left:** Carlos Ross with a group from France; **Above:** A group from the Greater Austin Hispanic Chamber of Commerce; **Left:** Colombia. *Photos courtesy of CGIE staff.*

Take Note

IC² Institute Fellows: SAVE THE DATE for 2017 FELLOWS MEETING
April 27-29, 2017 | AT&T Executive Education and Conference Center
contact coral@ic2.utexas.edu

Mark Your Calendar

Follow the IC² Institute on Twitter!
twitter.com/ic2institute

December 4 - 6, 2016 | Orlando, Florida
Society for Design and Process Science 21st International Conference
The 21st International Conference of the Society for Design and Process Science will have a focus on "Emerging trends and technologies in designing healthcare systems."

February 21 - March 2, 2017 | Austin, Texas *(Online training begins January)*
Converting Technology to Wealth
CTW combines an intensive on-site training experience in Austin (February 21 - March 2, 2017) with pre-Austin online training (January-February, 2017). It prepares technology transfer specialists, incubator managers, scientists and researchers with practical skills and methodologies to commercialize R&D from their organizations.

September 27-29, 2017 | Taipei City, Organized and Hosted by Yuan Ze University
International Conferences on Technology Policy and Innovation
ICTPI is accepting abstract submissions for 2017. Abstracts are encouraged from: technology policy and innovation researchers, officials and staff from national ministries of science and technology, economic development officials, technology entrepreneurship educators, and students in these fields. www.cm.yzu.edu.tw/2017ictpi/ictpi/index.php.

IC² Institute Research Publications Overview 2015-2016

Since January 2015, the IC² Institute has produced 78 research publications. The focus of these publications includes entrepreneurial education (23%), regional development & emerging regions (22%), environmental sustainability (17%), technology (14%), innovation (10%), and policy & society (11%), as seen in Figure 1 below. This topical array illustrates cutting-edge relevance to today's technologies and economic concerns, even while it continues to reflect the original mission and goals of the IC² Institute.

Forty-two percent of these publications appear as refereed journal articles, 19% are conference proceedings, and 17% are published as book chapters, while another 13% are monographs or technical reports and 9% are books (Figure 2).

These data include works that are authored or co-authored by IC² staff (82%) or visiting scholars, and works that received financial support from the Institute. Co-authors are drawn from IC² fellows, students, and faculty from The University of Texas at Austin, and other institutions around the world. Many of these same authors are prolific in other academic fields, as well as providing opinion pieces to leading publications such as *The New York Times*. These publications are not included in this analysis.

Figure 1. Publications by Topic (78 Total)

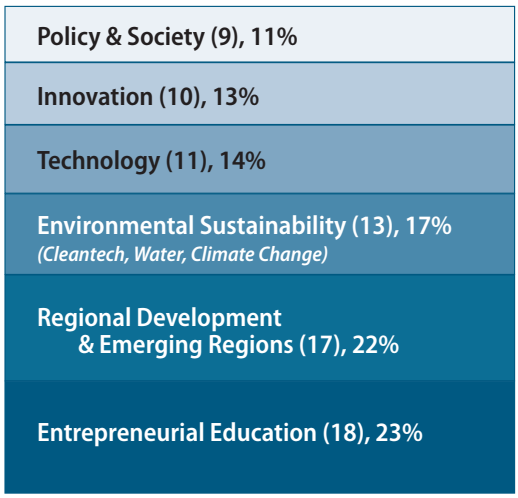


Figure 2. Publications by Type (78 total)