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Purdue University

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Kauffman Campuses Initiative Essay

Fueling the Drivers of University Innovation and Entrepreneurship

France A. Córdova
President
Purdue University
West Lafayette, IN

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ESSAY

Fueling the Drivers of University Innovation and Entrepreneurship

France A. Córdova
President
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SUMMARY

The Kauffman Campuses Initiative is a good fit for Purdue. University innovation and entrepreneurship is highly valued at Purdue and the Kauffman Foundation's interest in facilitating entrepreneurship is shared by Purdue's faculty and students. With the support of the Kauffman Foundation, Purdue has created new avenues of success for entrepreneurial faculty and students. The selection of Purdue as a Kauffman Campus coincided with the creation of a University Strategic Plan. The concurrent development of a strategic plan that drives the goal of "catalyzing research-based economic development and entrepreneurship" and the goal of the Kauffman Foundation "to inspire higher education to make entrepreneurship available to entire student bodies and campus communities" was synergistic.

This synergy is reflected over the past five years in the evolution of entrepreneurial initiatives on the campus. Beginning with the Strategic Plan which has as one of its three goals, "Discovery with Delivery," Purdue has pursued an increased focus on entrepreneurship. "Innovative Purdue" is an initiative that was developed through a ten-year projection of the University's budget and revenue sources. Our analysis of revenue sources in the future crystallized a need for Purdue to bridge the gap between fundamental research and actualization into products. "Innovative Purdue" is designed to enhance and strengthen Purdue's entrepreneurship, commercialization, and industry engagement. Hence, the complementarities between Purdue's strategic plan and our selection as a Kauffman Campus provided a foundation for the Innovation and Commercialization Center.

The following essay describes Purdue's entrepreneurial momentum in programs and support structures for students and faculty in these areas: Entrepreneurship and Curricula; Entrepreneurship and Faculty; and Entrepreneurship and Infrastructure. Support from the Kauffman Foundation facilitated several new courses and activities to expand Purdue's entrepreneurial curricula. As a Kauffman Campus, Purdue was also able to provide new entrepreneurial educational and motivational programs for faculty. The entrepreneurial infrastructure at Purdue—an interdisciplinary entrepreneurship center, a long-standing business plan competition, the Alfred Mann Institute at Purdue, the Purdue Research Park and Purdue's

Office of Technology Commercialization—provided the foundation for Purdue to achieve the goals of the Kauffman Foundation.

Purdue's entrepreneurial undergraduate curricula offerings were enhanced. The Certificate in Entrepreneurship and Innovation, initiated in 2005, expanded the academic breadth and problem-solving capabilities of Purdue undergraduate students. In 2007, with the support from the Kauffman Foundation, a global component was added to the program charting new territories and valuable global experiences for our students. The entrepreneurial graduate curricula also benefitted significantly from the Kauffman Foundation support. The resources provided through the Kauffman Campuses award have been utilized by the Burton D. Morgan Center for Entrepreneurship to create a partnership with the Purdue Research Park and Purdue's Office of Technology Commercialization in two graduate curricular extensions. Additionally, support from the Kauffman Foundation allowed Purdue to create the Purdue Realization and Entrepreneurship Postdoctoral and Doctoral Program (PREPP). This program supports both doctoral students and postdoctoral fellows to reach their commercialization goals.

Support for entrepreneurship and faculty also benefitted from Purdue's selection as a Kauffman Campus allowing the development of the Entrepreneurial Leadership Academy (ELA). This interdisciplinary program aims to serve faculty who are interested in commercializing their discoveries or in leading large, interdisciplinary initiatives. This program encourages faculty to think entrepreneurially about their research, teaching, and strategic professional path.

An entrepreneurial infrastructure is the foundation for growth and integration of an entrepreneurial mindset across campus. Purdue was fortunate to have several elements of this infrastructure in place so that the increased Kauffman Campus activities could thrive and further integrate entrepreneurship into Purdue's culture.

Through the programs afforded by the Kauffman Campuses Initiative the University has made significant strides in facilitating entrepreneurship and innovation and creating a culture on campus where students and faculty are encouraged to pursue new ventures and take risks. That enhanced entrepreneurial culture will remain a key ingredient not only to the success of our students and faculty, but the future endeavors of Purdue.

Introduction

I was thrilled to learn that Purdue had been selected as a Kauffman Campus when I became Purdue's 11th President in July 2007. The Kauffman Foundation's Kauffman Campuses Initiative is a good fit for Purdue. University innovation and entrepreneurship is highly valued at Purdue and the Kauffman Foundation's interest in facilitating entrepreneurship is shared by Purdue's faculty and students.

One of my first initiatives at Purdue was the creation of a University Strategic Plan. The plan, approved by the Board of Trustees in June 2008, was based on the input of eight working groups that included faculty, staff, and students. Purdue's "New Synergies" Strategic Plan, which has guided the campus throughout my presidency, has three major goals, "the promotion of discovery with delivery," "launching tomorrow's leaders," and "addressing global challenges." (http://www.purdue.edu/strategic_plan/). The programs enabled through the Kauffman Campuses Initiative award have complemented and enhanced Purdue's activities to reach Purdue's strategic plan goals, particularly that of "catalyzing research-based economic development and entrepreneurship." Through the integration of entrepreneurship into Purdue's culture with Kauffman Foundation supported programs, we are now moving beyond the entrepreneurial goals of the strategic plan with plans for an Innovation and Commercialization Center (see page 18).

With the support of the Kauffman Foundation, Purdue has created new avenues of success for entrepreneurial faculty and students. As a Kauffman Campus, Purdue University has generated more than $7.5 million in matching funds and Kauffman direct support to promote and expand entrepreneurial education. I am pleased to write this essay describing the nature and scope of the changes that have occurred over the period of the grant.

On the Kauffman Foundation website, former President Carl Schramm observes that entrepreneurship provides strategic tools "so that more people are more able to create the futures they envision for themselves" (http://www.kauffman.org/about-foundation/from-the-president.aspx, November 2011). Together, the partnership between Purdue University and the Kauffman Foundation has resulted in new educational tools and new opportunities for faculty and student entrepreneurs. Today, more and more Purdue entrepreneurs are building a future with new ideas, new technologies, and new companies.

Purdue's overarching goal for the Kauffman Campuses Initiative award was to change the culture on campus so that entrepreneurship is valued, promoted, and facilitated. As I talk with Purdue students and faculty entrepreneurs across our campuses, it becomes very clear that our students and faculty are the driving entrepreneurial force for the University. These entrepreneurial drivers are being educated and supported for innovations and new ventures with the assistance of the Kauffman Campus Initiative award.

To create an entrepreneurial culture, a University must encourage entrepreneurship. Purdue is utilizing Kauffman support to enhance curricular offerings in entrepreneurship, facilitate faculty

entrepreneurship, strengthen the entrepreneurial infrastructure on campus and provide opportunities to interact with global entrepreneurs through the Global Entrepreneurship and Innovation Study Abroad Program.

Entrepreneurship and Curricula

An important component of a university's culture is derived from a unique blend of colleges, disciplines, and majors; the academic strengths of Purdue have long made it an opportune environment to teach young entrepreneurs. Purdue's strengths in science, technology, engineering and mathematics (STEM) disciplines, as well as agriculture, pharmacy, and veterinary medicine, contribute to the development of courses which focus on specific problems and resolutions. Purdue students are broadly educated problem-solvers.

In 2005, Purdue began an interdisciplinary undergraduate Certificate in Entrepreneurship and Innovation Program expanding the academic breadth and the problem-solving capabilities of our students. In 2007, with the support from the Kauffman Foundation, a global component was added to the program charting new territories and valuable global experiences for our students. Later, graduate level interdisciplinary courses and training in entrepreneurship were added bringing new energy to the graduate student experience, once again with the support from the Kauffman Campuses Initiative.

Entrepreneurial Undergraduate Curricula

Purdue's Certificate in Entrepreneurship and Innovation is available to every Purdue undergraduate and provides experiential courses which enhance student skills in any major. Launched as an interdisciplinary program through Purdue's Burton D. Morgan Center for Entrepreneurship, the interdisciplinary curricular approach was novel for both students and faculty. Few campus-wide, undergraduate programs existed which could serve as a model. With the beginnings of a heightened entrepreneurial focus in 2007 via the Kauffman Campuses Initiative and Purdue's new Strategic Plan focusing on "Discovery with Delivery," enrollment in the Certificate program increased dramatically and has continued to increase every year. Undergraduate enrollment in the Certificate Program grew from 41 students in 2005 to over 2800 students by 2010-11. Beginning in 2007, with Kauffman grant support, Purdue focused considerable attention on publicizing entrepreneurial activities to a wide audience. This visibility helped fuel a campus awareness for entrepreneurship and is considered a major contributor to the growth of the program.

One of the specific activities that the Kauffman Campuses Initiative made possible for the Certificate Program is the Global Entrepreneurship and Innovation Study Abroad Program. Prior to this addition, various certificate courses included lectures and discussions on the global market and global opportunities. Now the Global Entrepreneurship and Innovation Study Abroad Program makes it possible for Purdue undergraduates to visit global markets and interact with global entrepreneurs. Each

year, the Global Entrepreneurship and Innovation study-abroad opportunity educates participants on entrepreneurship, innovation, and product development in foreign markets for new products and services. Participants interact with students and faculty from prestigious educational institutions and also visit companies and business-related government organizations. The experience fulfills one 3-credit option or capstone course requirement for the Certificate in Entrepreneurship and Innovation Program. It is preceded by several pre-departure seminars. Since 2007, Purdue Certificate Program students have traveled to: Beijing and Hong Kong (May 2011); Beijing and Shanghai (May 2010); Beijing and Shanghai (May 2009); Beijing (May 2008); and Seoul (May 2007). The entrepreneurial futures for participating students now include knowledge of and experience with entrepreneurs across the world.

The outcomes of the Global Entrepreneurship and Innovation Study Abroad Program have helped Purdue achieve the goals of the Kauffman Foundation as well as Purdue's own entrepreneurial objectives. These international experiences enable students to envision and create a future that may include starting companies and creating jobs globally. As one student said after the 2011 trip,

> "The global entrepreneurship program did a great job introducing me to eastern culture and wholly provided me the tools to grow a business overseas. Through my attendance in the program, I was able to network with like-minded students and connect with business executives which will aid me in expanding my business ideas in the future."

Purdue's Certificate Program includes three overarching program objectives:

- Provide students with the tools and knowledge required to assess new venture opportunities;
- Develop leadership and communication skills necessary to advocate for these enterprises; and
- Make entrepreneurship an accessible career choice for students—now or in the future.

(http://www.purdue.edu/discoverypark/entr/index.php)

Purdue students who participate in the Global Entrepreneurship and Innovation Study Abroad Program are not only armed with new skills and tools, they can envision a broader professional path. Another student said,

> "If a student is looking for a life changing experience that will teach them about life and business halfway around the world, this is the program for them."

The Global Entrepreneurship and Innovation Study Abroad Program, made possible because of the Kauffman Campuses Initiative award, helps Purdue to better prepare our students to shape a new future path that can take them around the world.

The curriculum for the Certificate in Entrepreneurship and Innovation is entrepreneurial and interdisciplinary. Students begin with foundational courses, courses within their discipline, and end with individually selected courses or experiences like the Global Entrepreneurship and Innovation Study Abroad Program. Purdue encourages interdisciplinary interaction in many areas including coursework for undergraduate students. By leveraging Purdue's assets and strengths, the course of study also brings together students majoring in the liberal arts, for example, with students majoring in engineering to engage in discussions about the leadership skills required for new businesses and understanding global markets. One of the lessons learned at Purdue, both in this program and in other areas, is that interdisciplinary work cannot exist without strong disciplines—courses and curricula, and interdisciplinary work enhances those disciplines. Purdue's Certificate Program provides foundational courses and then leverages the courses offered within disciplines to build a robust and accessible program. Students experience the integration of entrepreneurship with their chosen major because some of the courses required for the Certificate program are in their major area. The interdisciplinary mix of students in all courses encourages students to value skill sets of other students and their majors, to experience the benefits of integrated teams, and to share perspectives. The global component added through the Global Entrepreneurship and Innovation Study Abroad Program makes this interdisciplinary perspective—as our students would say—"Viral."

The Certificate in Entrepreneurship and Innovation is a success by any measure. Student enrollments continue to rise. The Certificate program has awarded more than 750 certificates, and students and alums are creating a new future for themselves.

Undergraduate and Graduate Cross Enrollment Curricula

As a complement to the Certificate in Entrepreneurship and Innovation Program, the Burton D. Morgan Center for Entrepreneurship offers The Student Managed Venture Fund in partnership with Purdue's Krannert School of Management and Purdue's Office of Technology Commercialization at the Purdue Research Foundation. This course is a three credit hour experiential learning opportunity for Krannert undergraduate and graduate students. Taught by the director of the Burton D. Morgan Center for Entrepreneurship, the course provides an integration of management concepts and principles with the commercialization activities and knowledge gained from the Office of Technology Commercialization. The support for this course—the funds that are available to be invested through convertible warrants in a company—derive from the Emerging Innovation Fund at the Purdue Research Park.

The Student Managed Venture Fund provides students with entry into the investment world and entrepreneurship that is not typically available to students. They analyze the strengths and weaknesses of real start-up companies in order to market exciting new products. They interact with the CEOs and scientists in companies who are struggling to make a new company successful, and they meet with professional investors who provide feedback on their presentations and the companies they have analyzed. Ultimately, the students write reports with investment recommendations for real money before an investment board. The experience is unique and value-added. The start-up company

entrepreneurs enjoy the in-depth attention and analysis, and the students walk away with a new understanding and appreciation for the investment process.

One of the unforeseen benefits of the course is the enthusiasm that the members of the investment board have for the student presentations. Investors view these presentations as a tool to inject entrepreneurship and questions into student learning. The results leverage several assets—student expertise, company strengths—with investor experience and knowledge.

Graduate Curricula

Inserting interdisciplinary entrepreneurial education and opportunities into the graduate curricula is challenging—or rather offering such courses is easy, but making them complementary to a graduate plan of study is more difficult. Purdue faculty members carefully and thoughtfully approve a rigorous plan of study for each graduate student which does not allow much elective time. Even master's degree students have little room to explore new perspectives or take elective coursework. Nonetheless, the Kauffman Campuses Initiative award has provided Purdue with effective curricular mechanisms to reach graduate students. The resources provided through this award have been utilized by the Burton D. Morgan Center for Entrepreneurship to create a partnership with the Purdue Research Park and Purdue's Office of Technology Commercialization in two graduate curricular extensions. Purdue commercialization experts teach graduate-level, interdisciplinary courses in entrepreneurship that are open to any graduate student. These courses are offered as electives for two credits and are cross-listed in addition to a non-departmental listing. One course is offered in the fall semester with the second offered in the spring semester.

The fall course provides an orientation to "Issues and Topics in Commercialization." Experts discuss a range of topics including patents, venture formation, capitalizing a new venture, market assessment, licensing a technology, and product life cycle management. Students walk through start-up company scenarios that follow various financing strategies to discuss challenges, outcomes, and opportunities. Both master's and doctoral students representing the Purdue disciplinary landscape enroll in the course. The discussions among engineering, science, and M.B.A. students, for example, are enlightening for all participants.

In the spring semester, enrolled students divide into teams to create business plans for a specific technology. The interdisciplinary teams are provided guidance both by the instructor and other staff members in Purdue's Office of Technology Commercialization. In some cases, the plans move to reality, and teams form a company or license a technology. Graduate students are highly enthusiastic about these courses and enrollment continues to rise. In the fall 2011 semester, 40 students enrolled in the course.

M.B.A. students relish the opportunity to implement their coursework. One M.B.A. student said,

> "Through helping these Ph.D. students to think through the commercialization of their research, I was able to utilize my M.B.A. coursework in new and exciting ways. The technologies they are developing can truly impact the world in great ways over the next ten years from curing osteoarthritis in the knee to enhancing the detection/treatment of cancer through better MRI images, to cheaper and better wound care, and I am honored to have been a part of their development. I am excited for my work and the work of the Burton D. Morgan Center for Entrepreneurship in general and I am constantly amazed by the flow of ideas and possibilities, as well as the entrepreneurial drive being kindled at the Burton D. Morgan Center for Entrepreneurship."

In fact, a number of graduate student innovators start a company or, at least, create a business plan while completing their graduate degree program. The Kauffman Campuses Initiative award affords Purdue with the opportunity to seek out these highly motivated students and assist them.

Another program, now in its third year, called the Purdue Realization and Entrepreneurship Postdoctoral and Doctoral Program (PREPP), supports both doctoral students and postdoctoral fellows to reach their commercialization goals. The program requires a budget for stipends. Currently, we pay postdoctoral fellows $40,000 plus benefits for one year and graduate students $10,000 as an add-on to their graduate appointments or for supply and expense funds. We believe these investments are paying dividends.

Two postdoctoral fellows were supported the first year of the program (2008-2009). Both of these individuals are now officers with their start-up companies and the companies reside in the Purdue Research Park. In the second year of the program, we added a component for doctoral students. Participation in the program requires the approval of the major professor. Doctoral students are asked to dedicate approximately ten hours per week to learning about technology commercialization and working to develop a plan for a particular business idea or technology. The PREPP Fellows meet weekly with commercialization experts to guide them through the commercialization process. Each fellow applies what they learn to develop a specific new venture plan. Following is feedback from one of last year's doctoral PREPP fellows,

> "Being a part of the PREPP program has offered me a great experience. As a biomedical engineer with seven years of scientific research experience, the PREPP program has provided me with a different perspective regarding the business aspect on commercializing biomedical research. In this past year, I have been able to articulate my scientific research into business language. In addition, through the PREPP program, I have been able to create a network consisting of both business and technical expertise, learn the different aspects of commercialization through academia, and experience a business ventures competition."

We added the doctoral component to the program without knowing what results to expect and whether an understanding of commercialization could be achieved without impeding progress to degree. Thus far, this entrepreneurial partnership with departments and schools is a success. Doctoral students are

graduating on time and report that the experience and knowledge will assist their professional goals whether these goals are in academia, industry, or in the world of start-ups. Two doctoral students were supported in the second year of the program. Another doctoral student commented,

> "I strongly think that graduate students, especially those in fields as entrepreneurial as engineering should be exposed to this school of thought. I think as graduate students, it is critical to understand that the impact of a Ph.D. goes far beyond a thesis and a dissertation and I am very glad I got the opportunity to explore entrepreneurship. After graduating, I hope to work as an entrepreneur at a start-up venture."

A limited number of graduate students participate in this opportunity. Those who do greatly benefit from entrepreneurial education integrated with their degree programs.

Offering fellowship as a postdoctoral award seemed less risky to us from the start and more attractive as an investment. Indeed, all three individuals who were awarded full-time PREPP postdoctoral fellowships have launched a company and remain affiliated with that company. Last year's postdoctoral recipient summed up his experience this way,

> "I can absolutely see myself involved with the commercialization of more ideas. While there are obviously more things to learn and new challenges to be met, I am confident that in the future, I will have a better perspective on how to approach new ideas and follow their execution."

In this current year, which is the third year of the program, we are supporting one postdoctoral fellow who has formed a company through research from his advisor's laboratory, and three doctoral students who have ideas for a new technology or business venture. One of these doctoral students is finishing his doctoral degree in philosophy. He has developed a Bioethics Lecture Series through his department, and the PREPP Fellowship is assisting him with contemplating larger platforms for the series. The Kauffman support spurred Purdue to provide the means to reach this entrepreneurial student and help him advance his thinking.

Many Purdue faculty are themselves committed entrepreneurs and identify entrepreneurial methods to weave new ideas and topics into their graduate courses. In particular, a faculty member from the School of Biomedical Engineering who participated in another program supported through the Kauffman Campuses Initiative, the Entrepreneurial Leadership Academy (see below), developed a doctoral course on Advanced Tissue Engineering which incorporates questions and considerations about commercialization in the design process. Her course goal reads as follows,

> "This course is designed to explore advanced topics in contemporary tissue engineering principles, systems and issues, and to introduce the students to the intricacies of translation

> from the university setting to small companies. In addition, the ramification of early design decisions on economically feasible product development will be explored."

Different models for teaching entrepreneurship are needed in different disciplines. This model has worked exceptionally well for this professor in biomedical engineering. Purdue's strategic focus on the translation and delivery of knowledge serves to encourage faculty members in other disciplines to consider innovative curricular strategies for their students as well.

Entrepreneurship and Faculty

Purdue faculty members are excellent teachers, pursue innovative research programs, lead inter-institutional research grants, create global partnerships, and provide expertise and opportunities locally. Increasingly, Purdue faculty are also interested in the entrepreneurial and commercialization process and wish to translate their research findings into new products, new technologies, new services, and new companies. Even those who do not wish to be actively involved in new ventures are researching commercialization as a complement to their research and teaching portfolio. Purdue administrators recognize the challenge of the integration of entrepreneurship into the promotion and tenure process. The models established at Purdue by several distinguished professors for both successful commercialization and effective teaching and research programs are setting the agenda for exploring the integration of entrepreneurship into the faculty experience. These questions are critical to the future of research universities and for our contributions to innovation. At Purdue many successful entrepreneurial faculty are creatively interweaving either entrepreneurship and teaching or entrepreneurship and discovery through scholarship.

Purdue has identified the point of passage between assistant to associate as a prime spot to offer entrepreneurial programs to faculty. With the support of the Kauffman Campuses Initiative award, Purdue developed the Entrepreneurial Leadership Academy (ELA). The program, again interdisciplinary and open to faculty members in all disciplines, aims to serve faculty who are interested in commercializing their discoveries or in leading large, interdisciplinary initiatives. Up to the point of promotion and tenure, most faculty have had little time to think about new ventures and lack the time to gain the skills requisite for the challenges of such ventures. In contrast, we find that mid-career faculty are often searching for a new vision, new big idea, or new direction in their professional future.

> With a small amount of seed funding for enticement ($5,000 per participant), the ELA supports ten faculty fellows each year. A slightly larger amount ($15,000) is provided to a returning faculty scholar to help guide the program. To participate, faculty members must be nominated by their department head with an endorsement from their dean. The program is open to anyone, and has even attracted a few senior faculty who are looking to reinvent their careers. Participants meet on average twice a month to hear from a variety of experts—administrators, technology commercialization staff, faculty leaders, faculty

entrepreneurs, IP lawyers, investors—the list varies contingent upon participant interests. The small monetary awards are provided so that each faculty member can pursue a project that will complement their research and teaching agenda, but allow them to pursue a new direction without risk. At the end of the year, each faculty member submits a report to their dean and department head. The projects are intended to inspire ways to think in new directions without risk. Faculty projects typically lead to new activities that guide new research projects and new courses. Following are examples from the Entrepreneurial Leadership Academy Impact Statement. (http://www.purdue.edu/discoverypark/main/assets/pdfs/ImpactELAJuly2011.pdf)

- "Creation of SpeechVive™ to commercialize a wearable device aimed at improving communication in individuals with Parkinson's disease (College of Health and Human Sciences)"

- "Create a market plan for a lab module using a Purdue-developed miniaturized system for manual DNA sequencing that would enhance the biotechnology curricula of community and small colleges and universities (College of Science)"

- "Create a student run, university/industry partnership air transportation system at Purdue to provide a living lab to test new business and operational models for the airline industry (College of Technology)"

- "Creation of GIVE—Genomic Innovations for Vector Eradication—a not-for-profit dedicated to the discovery, development and delivery of modern, safe chemistries to control insect vectors of disease in the developing world (College of Agriculture)"

- "Creation of Telos Discovery System to market a platform that substantially improves behavioral, neuropsychological, and physiological biomarkers collected as data from research using mice (College of Agriculture)"

- "Develop and offer graduate courses in entrepreneurship for biomedical engineering students which explore advanced topics in contemporary tissue engineering principles, systems and issues, and introduce students to the intricacies of translation from the university setting to small companies (College of Engineering)"

- "Create a 2d code enhanced demonstration book that reflects how content can be linked to illustrative sites (see *The Chronicle of Higher Education*, Wired Campus edition, May 28, 2010, 'Purdue Professor Embeds Hyperlinks in Printed Books,' http://chronicle.com/blogPost/Purdue-Professor-Embeds-Hyp/24378/) (College of Liberal Arts)"

This program encourages faculty to think entrepreneurially about their research, teaching, and strategic professional path. While the program may spur some added licenses or companies, the more important outcome is a change, or reinforcement, of entrepreneurial values and their role at Purdue. One participant in the 2010-11 program said,

> "Super program. Thank you so much for this opportunity. This program enabled professional development and growth into non-traditional areas via a safe framework. It really reinvigorated my research program and has taken us into new directions that are having a very positive impact on all aspects of our program. There is nothing else like this in the University, but I think it is invaluable!"

Not all faculty are interested in the program nor would all faculty benefit from participation in the Entrepreneurial Leadership Academy. Conversely, many faculty who have provided high praise for their participation are not planning to start a company. Rather, the program encourages them to reflect on their accomplishments and their future goals and to pursue those goals as an entrepreneur would—strategically and systematically.

One objective of this program is to create a network of entrepreneurial faculty on campus who can connect with each other. Now in its fifth year, the ELA has a cadre of some 50 faculty across campus who are connected by e-mail. To begin each year's program, a reception for all participants is held. For the last two years, Purdue's Provost and Executive Vice President for Academic Affairs has addressed the group, commending the importance of their activities to Purdue. This administrative level of support reflects the importance of faculty entrepreneurial activities at Purdue.

Several successful faculty entrepreneurs at Purdue rely heavily on the entrepreneurial spirit of their graduate students. Graduate student thesis research is a frequent source of innovation and discovery of new technologies. This faculty/student partnership is frequently between faculty in the STEM areas and M.B.A. students. The Burton D. Morgan Center for Entrepreneurship has a small cohort of M.B.A. students appointed to the Center as consultants for students, staff, faculty, and occasionally, community members. Faculty entrepreneurs appreciate the assistance that M.B.A. students bring to the development of a business plan for marketing, financial projections, and business plans. The experience of working with a renowned scientist and assisting them with the translation of their science into a marketable product is exciting with tangible career results for students.

Entrepreneurship and Infrastructure

Support for university entrepreneurship does require an infrastructure. For those who plan to start a company, access to specialized knowledge is essential: lawyers trained to understand the patent process; accountants who can assist with taxes and reporting for new ventures are needed; experts who understand target markets and how to market products are critical to this process. Purdue is fortunate

to have considerable fundamental infrastructure on which to build an entrepreneurial campus. Purdue's Research Park which was initiated in the 1950s boasts a number of experts who work with Purdue faculty, staff, and students and offers considerable assets for new companies. Over 50 young companies make up the more than 150 companies which reside in the Purdue Research Park. Support services like equipment, space, human resources assistance, and marketing expertise are available to the fledgling companies housed there. Also helpful is Purdue's Discovery Park which provides an interdisciplinary research platform for faculty and students. Discovery Park is home to the interdisciplinary Burton D. Morgan Center for Entrepreneurship which serves an educational role in entrepreneurship for the entire campus. Because this is an interdisciplinary platform, entrepreneurial ideas and products of every kind are facilitated.

Discovery Park offers assistance to entrepreneurially-oriented faculty for the submission of large, interdisciplinary proposals or for the launch of new interdisciplinary centers. Interdisciplinary research teams often spawn tremendous innovation within a university. Discovery Park's nine integrated centers support faculty ideas for new activities across today's global challenge areas such as energy, the environment, climate change research, disease prevention, detection, and treatment, healthcare efficiency and safety, cyber innovations, nanotechnology, and research on STEM learning strategies.

One of the original centers of Discovery Park, the Burton D. Morgan Center for Entrepreneurship, is an entrepreneurial infrastructure for faculty and students which connects them with programs and resources. The Center sponsors business plan competitions as both an educational activity and to reward great ideas with money. While the University has held the Burton D. Morgan Business Plan Competition since 1987, the Center has recently added business plan competitions in both the life sciences and in nanotechnology. These competitions typically involve teams which include both students and faculty and require a comprehensive, well-developed business plan. The Burton D. Morgan Business Plan Competition targets student entrepreneurs. Half or more of the competing team must be Purdue students and students must be the presenters in the final round. This competition has an undergraduate and a graduate division so that undergraduate entrepreneurs do not have to compete against the sophisticated technologies often found in the graduate division. Nevertheless, the undergraduate teams are increasingly technologically advanced with well-developed business plans. The M.B.A. student consultants provide reviews of business plans and help the students prepare. Offered every year, this competition enriches the academic curricula and creates a campus-wide network of students and faculty who are entrepreneurial. Investors and successful entrepreneurs serve as judges and select the recipients of funding awards—totaling $100,000.

Last spring, the Burton D. Morgan Center for Entrepreneurship sent questionnaires to past winners from 1987 to the present who could be reached by e-mail. Though the survey results are more anecdotal than scientific, the results are encouraging and indicate that such competitions are educational and do launch companies and careers for students. Following are a few of the results.

BURTON D. MORGAN BUSINESS PLAN COMPETITION SURVEY RESULTS

86%	indicated that their participation as a finalist in the Burton D. Morgan Business Plan Competition enhanced their education
59%	indicated that their participation as a finalist in the Burton D. Morgan Business Plan Competition influenced their career goals
67%	indicated that they currently view themselves as an entrepreneur
35%	indicated that a company was started as a result of participation as a finalist in the Burton D. Morgan Business Plan Competition
41%	who indicated that, although they did NOT start a company following their participation in the Burton D. Morgan Business Plan Competition, they had started a company later in their career (and 55% of these respondents had started 2-3 companies)
67%	of the companies launched following the Burton D. Morgan Business Plan Competition remained in existence at the time of the questionnaire

(http://www.purdue.edu/discoverypark/main/assets/pdfs/impactStatements/Impact-Burton-Morgan-Competition-Feb-2011.pdf)

Like many other activities, the business plan competitions are a partnership with the Purdue Research Park and Purdue's Office of Technology Commercialization.

The entrepreneurial infrastructure at Purdue includes several critical and interrelated components. The most basic entrepreneurial assets at Purdue are faculty members who are entrepreneurs in many ways. Several Purdue faculty are involved in developing technologies which can be licensed or are the core technologies for a new company. These faculty entrepreneurs serve as role models for other faculty and for students. They bring entrepreneurial concepts into their courses. They develop new courses for both undergraduate and graduate students. They connect Purdue with other entrepreneurs and professionals who are interested in entrepreneurship. Just as importantly, they provide credibility to those who argue that entrepreneurs are productive researchers and scholars and are innovative teachers. The entrepreneurial faculty will be the change-makers in the promotion and tenure processes of the future for universities. Their activities and insights draw attention to gaps in the entrepreneurial infrastructure and envision interesting new ways for support.

Another critical component in Purdue's entrepreneurial infrastructure is engaging the larger community. This community includes the Purdue Research Park and Purdue's Office of Technology Commercialization; these organizations are already closely aligned with Purdue. In addition, a strong entrepreneurial infrastructure requires relationships with dozens of professionals who are willing to interact, offer assistance, and/or participate in the professional relationship. The entrepreneurial community list is long. The willing and voluntary participation of experienced investors and

entrepreneurs in the business plan competitions; the voluntary participation of expert speakers in the various faculty and graduate student programs; the linkages with accounting firms, IP lawyers, state organizations that promote economic development, professional business organizations like the Chamber of Commerce as well as global entrepreneurs and companies—all of these people and organizations are necessary to enhance the entrepreneurial infrastructure at Purdue. Both students and faculty members appreciate the capability to access expertise in specific areas essential for innovation.

This breadth and depth of Purdue's entrepreneurial infrastructure has attracted new global partnerships. As an example, Purdue University was selected as one of four U.S. universities to participate as partners with two Russian research universities in a program called, Enhancing University Research and Entrepreneurial Capacity (EURECA). This program which is administered by the New Eurasia Foundation and the American Councils for International Education is aimed at "bringing together a distinguished group of entrepreneurially focused public research universities in Russia and the U.S. to develop new capacities, and new products and services for technology transfer and IP commercialization" (*EURECA Summary of Modular Proposals*, January 2011, p. 2). Purdue's specific project is to provide models and training for the University of Nizhni Novgorod (UNN) for the development of a Student Center for Innovative Entrepreneurship Development. Purdue is providing models for center activities, student courses, faculty involvement, and community partnerships. UNN will create a regional electronic hub for the dissemination of information to other Russian research universities. Ultimately, through EURECA, student and faculty from both universities will interact and Purdue's entrepreneurial infrastructure will continue to expand.

Challenges for an Entrepreneurial Campus

Public universities face increasing funding challenges as appropriations are decreased while, conversely, expectations for universities to create jobs and add to the economy as entrepreneurs are increasing. Faculty, too, must be entrepreneurial in their search for funding for research programs. Universities are being asked to engage locally and globally. Students seek a strong education that prepares them to be leaders in the next work force. Creating an entrepreneurial campus is important to Purdue and is equally important for our faculty and students. Creating an entrepreneurial campus energizes faculty and students toward new futures.

In order to be an entrepreneurial campus, a university must be willing to take some risks and be creative. Support for entrepreneurship requires resources. The Kauffman Campuses Initiative award has provided Purdue with the opportunity to fund programs for faculty and students that no one was certain would work. Today the success of those programs has advanced campus discussions about what Purdue should do next to support entrepreneurship. In fact—like a prototyping center—the more visibility that is provided for entrepreneurship, the more opportunities are identified. The past five years reflect the importance of our Strategic Plan and the investment of the Kauffman Foundation.

While the short-term rewards from support for entrepreneurship may be anecdotal—students who indicate their education is enhanced, faculty who say they are energized, and new start-up companies—the potential long-term benefits are evidenced through increased funding from donors and companies, broadening global partnerships, and an expanded vision of new strategies for entrepreneurial success in both research and teaching.

The initiation of the Kauffman Campuses Initiative award at Purdue coincided well with the goals of our "New Synergies" Strategic Plan. Through the programs afforded by the Kauffman Campuses Initiative, the University has made significant strides in our efforts to facilitate entrepreneurship and innovation and create a culture on campus where students and faculty are encouraged to pursue new ventures and take risks. Purdue's enhanced entrepreneurial culture will remain a key ingredient not only for the success of our students and faculty but the future endeavors of the University.