

The University of Iowa
FY 2014 Annual Economic Development Report

EXECUTIVE SUMMARY

To prosper in a global economy that is increasingly dependent on continuous knowledge creation and innovation, states must create and foster comprehensive ecosystems that spur research and development, transfer technology, train entrepreneurs and attract a highly skilled workforce. In Iowa, the public universities play a unique and crucial role in these activities. Whether transferring technology to companies through IP licensing or creating new startups based on university research, University of Iowa faculty and students are helping Iowa remain globally competitive, creating jobs, and attracting and retaining young talented professionals.

In FY 2014, the University of Iowa tailored its economic development strategy and execution to better align with the state's economic development priorities. Our new mission is:

To chart a path to economic prosperity for all Iowans by accelerating business and cultivating the state's workforce

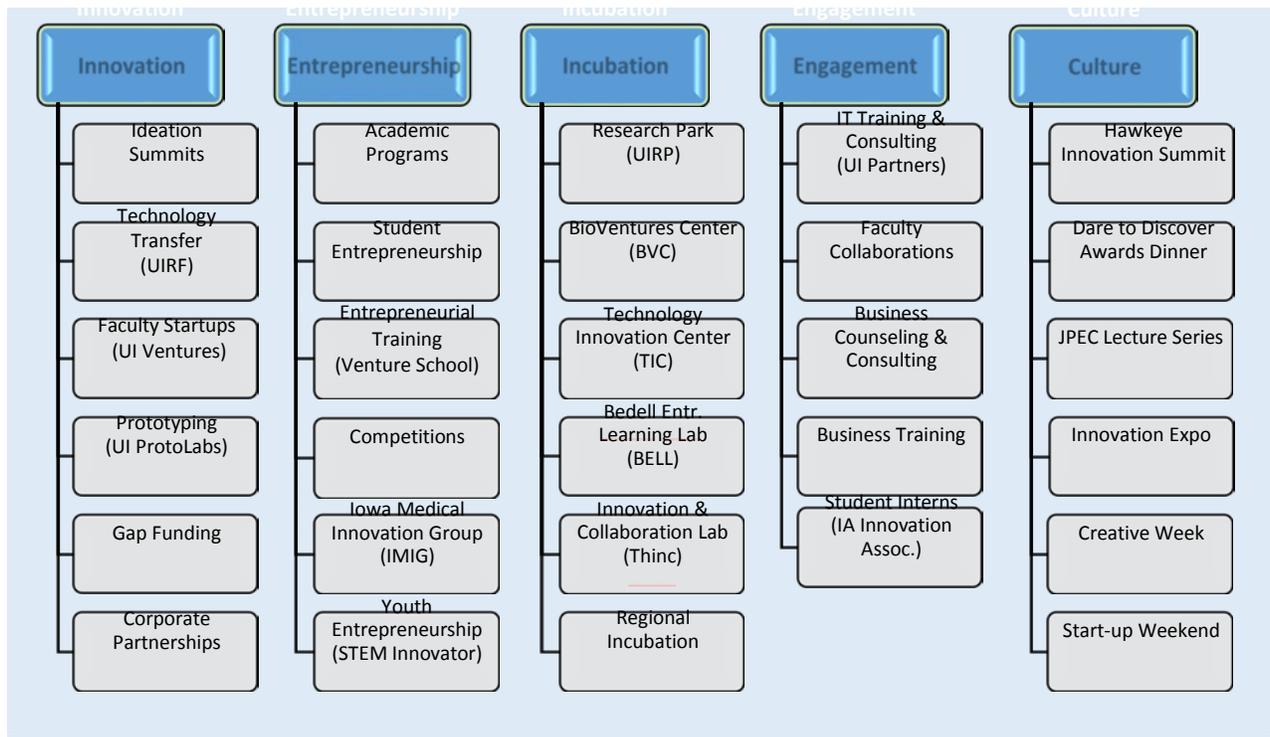
More specifically, the University of Iowa is fulfilling this mission by:

1. Developing a campus environment and culture where researchers are incentivized and rewarded for turning their research ideas into technologies, discoveries and research outputs companies can use
2. Training, empowering and inspiring faculty and student entrepreneurs to build scalable startups that create high-wage jobs in Iowa
3. Solving challenging business and technical problems for Iowa businesses to enhance competitiveness statewide
4. Providing business and IT training statewide to develop the 21st century Iowa workforce
5. Preparing Iowa's students for rewarding careers in high-demand fields through STEM education and activities, undergraduate research opportunities, career planning, internships and job placement assistance

New Initiatives. In FY 2014, we accelerated our pursuit of these goal by implementing several targeted economic development initiatives:

- *Venture School*, an entrepreneurship training program that teaches faculty, staff, student and community entrepreneurs to assess and then improve the commercial viability of their startups
- *UI ProtoLabs*, a public-private prototyping resource providing 3-D printing, fabrication, machining and electronics services to inventors and startups
- *UI Ventures*, an organization spun out of the University of Iowa Research Foundation, specifically to focus on helping faculty, postdocs and graduate students create startups, find mentors, recruit CEOs and raise capital
- *UI Partners*, an external-facing organization that provides hands-on IT assistance and training to Iowa small businesses and their workforce, making them more innovative and competitive
- *STEM Innovator*, a professional development program for teachers to infuse innovation and entrepreneurship into K-12 classrooms. The program pairs students from across Iowa with industry experts, entrepreneurs, teachers, and university and community college faculty to develop web and phone apps to grow the Iowa technology sector.

Organizational Structure and Programs. The University of Iowa's economic development strategy is now organized around five major themes: Innovation, Entrepreneurship, Incubation, Engagement and Culture. Programs within each of these themes are already yielding important economic development impact as highlighted below.



Examples of UI Economic Development Impact

- Technology Transfer (Innovation) - As a result of its increased faculty outreach efforts, the University of Iowa Research Foundation (UIRF) received **139 invention disclosures (up 44% over last year)**. It also executed 32 license or option agreements. University of Iowa startups accounted for 12 of these deals, an **83% increase in the number of startups over last year**.
- Faculty Startups (Entrepreneurship) - UI Ventures' focus on startup creation, CEO recruiting and raising capital is paying dividends. There are now **24 startups in the pipeline with 10 new ones being added this year alone**. Moreover, startups are beginning to efficiently leverage and navigate university and state economic development resources to build value and advance through the commercialization pipeline.
 - **Iowa Approach, Inc.**, a medical device startup developing tools to treat atrial fibrillation, used resources from the UIRF for market research, business planning, go-to-market strategy, and early-stage capitalization. The company has recruited an experienced CEO, raised \$300,000 in a Series A round and set regulatory milestones.
- Student Startups (Entrepreneurship) - Fifty-three student businesses are under development through the John Pappajohn Entrepreneurial Center's (JPEC) student incubator program housed at the Bedell Entrepreneurship Learning Laboratory.
 - **TranslaCare**, a student startup developing software for elderly adults who have experienced some form of speech, language, or memory deficit as a result of neurological injury, has been **awarded \$100,000 from the Iowa Economic Development Authority**. Ryan Ries, a UI Neurobiology and Linguistics major, started the company in 2011 from the Bedell Entrepreneurship Learning Laboratory. TranslaCare **won 3rd place at the Johns Hopkins Business Plan Competition**. The company launched their Iconotouch™ web-based software app in 2014.
- Venture School (Entrepreneurship) - 15 teams comprising 51 entrepreneurs attended Venture School to assess and improve the commercial viability of their startup ideas and business models. **Upon completion**

of the program, 12 new ventures were launched. Based on the success of the program in Iowa City, we have decided to take it across the state by offering Venture Schools in Des Moines, Council Bluffs, Cedar Falls and the Quad Cities in FY 2015.

- **Iowa Adaptive Technologies, Inc.**, a medical device startup developing tools to enable disabled patients to communicate with their caregivers, is a recent graduate of Venture School. The company has now hired a full-time CEO and is currently raising a \$750,000 Series A round.
- **STEM Innovator Program (Entrepreneurship)** - This professional development program for teachers, which infuses innovation and entrepreneurship into K-12 classrooms, was **completed by 36 educators (19 STEM, 15 Business and three Special Education) from 20 Iowa school districts.** The knowledge and experience gained by teachers will impact 3,800 Iowa high school students across Iowa.
- **Research Park (Incubation)** - There are now **12 companies (including three new startups) located at the BioVentures Center (BVC)** at the University of Iowa Research Park (UIRP). By more than doubling the number of companies it housed when it opened in 2008, the **BVC is now close to full occupancy.** There are a total of **36 companies at the UIRP, which employ over 1800 people.**
 - **Higher Learning Technologies**, an educational app development company, will soon “graduate” from the BVC, having grown its sales to over \$1 million from more than 500,000 downloads of their apps. The company currently employs 20 people and plans to add 20 more over the next eight months.
- **Small Business Consulting (Engagement)** - We continued our engagement with the Iowa small business community by having faculty/student teams complete **55 business consulting projects at 42 companies located in eight Iowa counties** (Cerro Gordo, Jasper, Johnson, Lee, Linn, Muscatine, Polk and Poweshiek).
 - Kamath Biosciences – “We had an excellent experience with our student team and faculty mentor...their market analysis report was excellent and we rely on it when analyzing our competitors.” - Anant Kamath
- **UP Global America Summit (Culture)** - The University of Iowa served as the presenting sponsor of the first UP Global America Summit last fall. UP Global is a non-profit organization dedicated to fostering entrepreneurship, grassroots leadership, and strong communities across the world. **More than 200 community leaders from across the country came together for this three-day conference.** Through this partnership, JPEC hosted Startup Iowa Town Hall at the Innovation EXPO, which **brought together nearly 500 students, entrepreneurs, and community builders.**

Economic Development Team

Research drives innovation at the University of Iowa. In FY 2014, total external funding at the University of Iowa rose 1.9% to \$515.8 million (\$431.3 million in sponsored research). This places the University of Iowa among the nation's elite public research universities and is especially significant in the face of continuing economic and research funding challenges in the U.S. This robust research enterprise, coupled with integrated economic development activities, plays an important role in supporting economic development in Iowa. Our economic development activities are directed by the Office of the Vice President for Research and Economic Development (OVPR&ED).

Office of the VP for Research and Economic Development	<ul style="list-style-type: none"> • Research support • Core research facilities • Economic development (faculty startup assistance, prototyping services, small business IT consulting and training, and public-private partnerships)
UI Research Foundation	<ul style="list-style-type: none"> • Faculty outreach and commercialization education • IP assessment, marketing & licensing • IP portfolio protection from infringement
UI Research Park	<ul style="list-style-type: none"> • Business incubation • Business expansion • Advanced research and educational facilities
John Pappajohn Entrepreneurial Center	<ul style="list-style-type: none"> • Academic programs • Student business incubation • Entrepreneurial training • Community and business partnerships
UI Colleges	<ul style="list-style-type: none"> • Academic programs • Faculty research • Business partnerships • Student interns and placement

The following sections of this report will directly respond to specific areas as requested by the Board of Regents. These include: the impact of University of Iowa activities on the economic growth in Iowa, institutional activities and services that indirectly promote economic development, quantitative information regarding economic development activities in FY 2014, a summary of outreach and service activities, direct economic development assistance to Iowa communities, a summary of RIF expenditures, and emerging trends in the area of economic development.

Impact of UI Economic Development Activities on Economic Growth in Iowa

Job Creation and Wealth in Iowa

University of Iowa Research Park (UIRP)

The University of Iowa Research Park (UIRP) is a blended campus consisting of commercial ventures and a variety of university academic programs and infrastructure assets. As of June 30, 2014, 11 established companies, 25 startup companies and six university anchor laboratories were located in the park. These companies have access to university research infrastructure, including high-speed internet, access to university libraries and research facilities (*i.e.*, core research facilities to support chemistry, biology, computation and instrumentation), faculty for joint collaboration, business support centers (*i.e.*, JPEC, SBDC and UIRF) and students as interns or employees. In FY 2014, the companies affiliated with University of Iowa Research Park and the Technology Innovation Center reported over 1,800 employees.

BioVentures Center (BVC)

The BioVentures Center (BVC) located at the University of Iowa Research Park opened in November of 2008. This 35,000 sq. ft. state-of-the-art biosciences incubator and office facility offers entrepreneurs and early-stage technology companies high-quality wet laboratories, a shared laboratory, a large multi-purpose room, multiple executive conference rooms and general shared space to meet their various business needs. At the end of FY 2014, 12 companies were located in the BVC employing 49 people. Thirteen of the 20 wet labs have been leased to startups, nine of which were formed from technology created by UI faculty.

Incubation at the BVC has helped companies such as Higher Learning Technologies (HLT) move beyond the startup phase. HLT, an educational app development company, will soon “graduate” from the BVC, having grown sales to

over \$1 million from more than 500,000 downloads of the company's apps. They currently employ 20 people and plan to add 20 more over the next eight months.

Technology Innovation Center (TIC)

The Technology Innovation Center (TIC) provides office space and a nurturing business environment to early-stage technology-based ventures that do not require wet laboratories. In FY 2014, the TIC reported a total of 13 companies and 21 employees.

Bedell Entrepreneurship Learning Laboratory (BELL)

The Bedell Entrepreneurship Learning Laboratory is the University of Iowa's student business incubator. The 10,000 sq. ft. facility, which has 17 furnished offices and several conference rooms, offers a campus wide program open to students from any major or college. The students receive intense mentoring and support as they launch or expand their businesses. The program, one of the first of its kind in the nation, has incubated over 200 businesses since opening in 2004. In FY 2014, 53 student businesses were being incubated at the BELL.

The Innovation and Collaboration Laboratory (THINC)

THINC provides student entrepreneurs with a space to meet to work collaboratively on their businesses or group projects. It was designed to mimic the offices of 1871 (an entrepreneurial hub for digital startups in Chicago) or Google to encourage collaboration and sharing. The space features whiteboard walls, a conference room available to students on a reservation basis, a kitchenette, a 3-D printer, a ping-pong table, Xbox, and coffee.

Institutional Activities and Services that Indirectly Promote Economic Development

Office of the Vice President for Research and Economic Development (OVR&ED)

University of Iowa Research Park, BioVentures Center and the Technology Innovation Center

A variety of educational and training programs were offered for UIRP/BVC/TIC tenants in FY 2014. These included: lunch & learns, quarterly roundtables and mixers, a service industry speaker series providing guidance on legal issues, human resources and financial management, and Iowa Innovation Council programs.

The University of Iowa Research Park hosts quarterly roundtable meetings for company executives representing all park companies. The BVC multi-purpose room was utilized by over 50 outside groups for, including but not limited to, legislative and state agency meetings, vendor shows, pitch and grow competitions, Chamber events, Iowa City Area Development forums, STEM education meetings, and the bi-monthly meetings of the Corridor Business Alliance. The state-of-the-art meeting and executive conference rooms at the BVC have become a vital meeting hub for both regional and state organizations.

Additionally, a Regents Innovation Development Fund Proposal competition was held for our BVC and TIC tenants with \$75,000 awarded to six companies to provide critical capital for growth. Award winners were:

- Accelegrant Consulting, a firm helping local companies access non-dilutive capital to grow their technology businesses - \$10,000
- BioPrint, a startup developing the next generation cartridge technology that allows 3-D printing of human tissues for pharmaceutical testing and research purposes - \$15,000
- Componica, a developer of computer vision-based facial tracking, characterization, and eye tracking using mobile devices - \$15,000
- Exemplar Genetics, a company developing innovative models of human disease - \$10,000
- Innovas Technologies, a company focused on optimizing efficiency in shell and tube condensers - \$5,000

- pxAlpha, a startup developing rotating shield brachytherapy (RSBT), a novel prostate cancer radiation therapy technique that maximizes therapeutic benefit to patients while minimizing damage to healthy tissues - \$20,000

John Pappajohn Entrepreneurial Center (JPEC)

JPEC offers one of the most comprehensive entrepreneurial education and business support programs in the nation. Featured programs supporting economic development include:

- Providing business consulting services to small companies located across Iowa through its faculty/student field study program (70 companies assisted in FY 2014)
- Hosting/sponsoring elevator pitch and business plan competitions to support innovation and new venture creation (15 competitions held in FY2014)
- Supporting the creation and launch of student-based businesses at the Bedell Entrepreneurship Learning Laboratory (BELL) located on the UI central campus; student entrepreneurs receive office equipment, computers and access to high speed internet.
 - In FY 2014, total of 53 businesses participated in the BELL. Since its opening in 2004, a total of 449 students from nearly every UI college have been impacted by the facility and associated programs.
- JPEC delivers campus-wide and online undergraduate entrepreneurial education and technology innovation coursework in the MBA program.
 - In FY 2014, there were 3,990 total student enrollments in 96 sections of courses and 263 students graduated from one of the Certificate or BBA programs offered by JPEC.
- The Jacobson Institute for Youth Entrepreneurship is a comprehensive program that enriches K-12 students' lives through classroom and practical educational experiences.
 - During FY 2014, the Jacobson Institute impacted 5,866 youth and worked with 987 high school teachers in Iowa who are using the Institute's YouthBiz Central online curriculum. In addition, 146 youth participated in summer camps held across Iowa.

Other Economic Development Activities

The economic development leadership team participated in a large number of economic development organizations in FY 2014.

Statewide:

- Iowa Innovation Council
- Iowa Innovation Corporation
- Iowa Biotechnology Association, Board of Directors
- Technology Association of Iowa, Board of Directors
- Technology Association of Iowa, Panelist Reviewer for TAI annual awards
- BEST of Iowa
- STEM Advisory Board

Local and Regional:

- Cedar Rapids Metro Economic Alliance Economic Development Committee
- Corridor Business Alliance
- East Central Iowa Council of Governments, Loan Review Committee
- Economic Development Center (EDC), Board Member
- Iowa City Area Chamber of Commerce, Member
- Iowa City Area Development Group, Board of Directors and Executive Committee
- Midwest Engineering Entrepreneurship Network (MEEN)

National:

- Small Business Administration (SBA)
- Global Consortium of Entrepreneurship Center (GCEC), Leadership Circle
- University Economic Development Association (UEDA)
- United States Association for Small Business and Entrepreneurship (USASBE)
- Colligate Entrepreneurship Organization (CEO)
- Students in Free Enterprise (SIFE)
- National Collegiate Inventors and Innovators Alliance (NCIIA)
- NBIA National Business Incubator Association
- AURP Association of University Research Park and Association of University Midwest
- National Academy of Inventors

Metrics describing University of Iowa economic development activity in FY2014 & FY 2013

	FY 2014	FY 2013
a. Number of disclosures of intellectual property	139	98
b. Number of patent applications filed		
• U.S. Applications	90	85
• National Applications	73	28
• Patent Cooperation	21	29
• Total Applications	184	142

c. Number of patents issued	80	74
d. Number of license and option agreements executed on institutional intellectual property	32	29
• In Iowa	12	12
e. Number of license and option agreement yielding income	140	92
f. Revenue to Iowa companies as a result of licensed technology	\$1.87MM	\$2.38MM
g. Number of startup companies executing licenses or options for UI technologies	12	8
• In Iowa	12	8
h. Number of companies in research parks, incubators and graduates located in Iowa	49	47
i. Number of new companies in research parks and incubators	7	4
j. Number of employees in companies in research parks/affiliates and incubators	1,824	1,707
k. Royalties and license fee income	\$1.87MM	\$1.38MM
l. Total sponsored funding	\$515.8MM (based on total external funding) \$431.3MM (sponsored research)	\$506.3MM (based on total external funding) \$424.1MM (sponsored research)
m. Corporate sponsored funding for research and economic development		
• In total	\$71.4MM	\$62.0MM
• In Iowa	\$2.7MM	\$1.5MM
n. Iowa special appropriations for economic development in the following categories		
• Annual state appropriations for ongoing programs (TIC, ORP and CADD)	\$209,279	\$209,279
• RIF appropriations	\$1,050,000	\$1,050,000
o. Estimated jobs created by SBDC clients	129	111

Direct and hands-on technical assistance to businesses, faculty inventors & entrepreneurs

Office of the Vice President for Research and Economic Development (OVR&ED)

- **University of Iowa Research Foundation (UIRF)**

As the university's technology transfer office, the UIRF's primary functions are:

- Protecting IP through patents and copyrights
- Advising on intellectual property terms in sponsored research agreements and clinical trials
- Executing outgoing material transfer agreements
- Marketing to identify suitable licensees and private-sector partners for commercializing technologies
- Protecting the university's IP portfolio against infringement

In FY 2014, we separated the IP licensing function from startup assistance, leaving the UIRF with the former activities and creating a new entity, UI Ventures, to focus on the latter. This strategy is proving successful as the UIRF has had more time for faculty outreach, which has produced more invention disclosures and licenses.

The University of Iowa Research Foundation (UIRF) received 139 invention disclosures (up 44% over last year). It also executed 32 license or option agreements. Iowa startups accounted for 12 of these deals, an 83% increase in the number of startups over last year.

- **UI Ventures (New in FY 2014)**

UI Ventures was established in 2014 specifically to focus on faculty startup creation, financing, mentoring and CEO recruiting. The organization's activities include:

- Scouting for entrepreneurial faculty and new inventions
- Developing new ventures
- Educating inventors and startup founders
- Evaluating technology market potential and developing go-to-market plans, business plans and investor presentations
- Providing gap funding to advance promising IP
- Connecting new ventures to sources of capital
- Performing due diligence on the viability of startups
- Generating business models for startups

UI Ventures' focus on startups is paying dividends. There are now 24 startups in the pipeline with 10 new ones being added this year alone. Moreover, startups are beginning to efficiently leverage and navigate university and state economic development resources to build value and advance through the commercialization pipeline.

2014 Commercialization & Business Development Funding Awards

UI Ventures, in collaboration with the UIRF and outside experts, worked to vet new projects and provide proof-of-concept funds for projects that could lead to new company formation. A summary of projects evaluated in FY 2014 is shown below. An historical view of GIVF commercialization funding that stimulated startup activity is also provided in Appendix A.

Gap Funding Awards for FY 2014

Title	PI(s)	Venture/License	Gap Funding	Additional Funding	Technology
Fatty acid filtering	Bowden, Ned	Pure Oleochemicals	\$47,000	\$700,000	Industrial device
Reliability software transition to commercial use	Choi, KK	RAMDO Solutions	\$75,000	\$250,000	Software
Fluid mechanics protocol for selecting cancerous from normal epithelial cells from a standard CTC preparation of a patient's blood sample	Henry, Michael & Vigmostad, Sarah	License	\$75,000		Medical device
The Iowa Smart Switch	Hurtig & Hahn	Iowa Smart Switch	\$55,000	\$100,000	Medical device
Triple negative breast cancer therapeutic Z1101	Jin, Zhendong	InnoBio Pharma	\$75,000		Therapeutic
3D printer for making vascularized tissue	Ozbolat, Ibrahim	BioPrint	\$75,000	\$100,000	
Immunoplex mucosa: utilizing Immunoplex technology to develop needle-free vaccines	Vandenbush, Tony & Norian , Lyse Onco	Memcine	\$75,000	\$650,000	Therapeutic
Immunoplex Mucosa: utilizing Immunoplex technology to develop needle-free vaccines	Vandenbush, Tony Mucosa	Memcine	\$75,000		Therapeutic
Analysis of expressed and secreted human embryonic microRNA for the prediction of embryo health and implantation, determination of embryonic chromosomal makeup, and optimization of culture media microRNA content	VanVoorhis, Brad	License	\$75,000		Medical diagnostic
Near real-time screening of radiation treatment protocols	Xia, Junyi	Applied Ray Tech	\$8,000		Software
		Totals	\$635,000	\$1,800,000	

- **UI ProtoLabs (New in FY 2014)**

UI ProtoLabs, launched in May 2014, is a public-private prototyping resource open to faculty, students and staff, startups, businesses, and the general public. The partners that make up UI ProtoLabs are the university's Engineering Machine Shop, Physics & Astronomy Machine Shop, and M.C. Ginsberg Advanced Design and Manufacturing. These shops work together to provide a full menu of prototyping services including: 3-D printing, CAD, and development of associated electronics/software. Labor costs are waived for projects shown to have high commercial and economic development potential. Users pay only for the cost of the required materials.

Prototyping services allow users to:

- Find and fix flaws in their initial designs
- Demonstrate technologies to potential investors using hands-on presentations and pitches

- Raise the odds of obtaining a patent or increase the value of existing IP
- Investigate the manufacturability and cost parameters of initial designs

Although UI ProtoLabs did not open until the final two months of FY 2014, it still received six projects submissions from various colleges within the university, as well as private-sector firms and public inventors. We expect the pipeline of potential prototyping projects to continue to expand throughout FY 2015.

- **UI Partners (New in FY 2014)**

IT Assistance: UI Partners was created to help Iowa small businesses innovate by solving their information technology (IT) challenges using practical insights and ideas drawn from university faculty, staff, and students. UI Partners was piloted in Iowa City with two full-time IP professionals who direct a team of four student interns. Students get to work with multiple businesses needing IT assistance. This experience is meant to prepare them for an IT career and in some cases may lead to permanent employment with UI Partners client. Services offered include: free technology assessments, custom application development, advanced networking, computer optimization, security and performance, hardware and software installation, data backup, remote monitoring of mission critical PCs and website design. Through its first two months, the organization assisted 15 clients in Cedar Rapids, Coralville, Iowa City, Kalona, Millersburg, Parnell, Pella, West Branch and Williamsburg.

IT Training: Talented programmers are a limiting reagent in the Iowa innovation ecosystem. To address the shortage, UI Partners, in partnership with Kirkwood Community College, offers guest speakers, weekend IT workshops, one-week programming programs and the intensive Dev/Iowa Bootcamp. Topics include: HTML/CSS, JavaScript, NodeJS, Databases, Version Control and Open Source. Designed and led by industry experts, the courses offer a hands-on, immersive learning environment. Emphasizing fundamental web development skills and industry practices, the courses a skill-set heavily sought after by employers across the state and across the world.

John Pappajohn Entrepreneurial Center (JPEC)

- **Venture School:** JPEC offers an immersive "Lean LaunchPad", or business model canvas, bootcamp-style training program named Venture School to accelerate startups. Venture School is available to students, alumni, faculty, staff, and community members who are committed to investigating their business hypotheses and applying the scientific method to improve their concept and to better gauge the viability of their ideas. Venture School emphasizes real-world entrepreneurship through experiential learning, a flipped classroom and immediate feedback.

15 teams comprising 51 entrepreneurs attended Venture School to assess and improve the commercial viability of their startup ideas and business models. Upon completion of the program, 12 new ventures were launched. Based on the tremendous success of the program in Iowa City, we have decided to take it across the state by offering Venture Schools in Des Moines, Council Bluffs, Cedar Falls and the Quad Cities in FY 2015.

- **Assistance to Businesses:** JPEC faculty and staff provide one-on-one and faculty/student team-based consulting services to technology-based entrepreneurial companies located at the UIRP, the BELL and throughout Iowa's Creative Corridor.
 - JPEC staff provided consulting services to over 244 regional entrepreneurs and business startups, totaling over 9,160 hours of assistance.

- An estimated 6,600 hours of research, analysis and strategic planning services were performed for 55 Iowa companies assisted through the JPEC faculty/student team consulting courses.
- MBA students completed six technology commercialization feasibility studies for nascent technologies being developed by University of Iowa faculty.
- **Six-Week Start-Up** – JPEC delivers this intense entrepreneurial training program for start-up and growing businesses. The initiative prepares aspiring entrepreneurs to launch new ventures and existing companies to grow their businesses. Two classes were held in Iowa City in FY 2014.
- **Seminars/Workshops/Lecture Series** – JPEC hosted 14 different opportunities last year for students, faculty and persons from the community. In FY 2014, over 3,000 attendees came to learn from experienced entrepreneurs on a variety of topics including: the Technology Export Roundtable, various tax workshops, Entrepreneurial Boot Camps and lecture series.
- **Wellmark Venture Capital Fund** – JPEC is the regional administrator of the \$5M Wellmark Venture Capital Fund that supports the creation and growth of new businesses throughout the state. JPEC screens applicants, performs due diligence, evaluates business concepts, and assists applicants with their business plans. JPEC partners with area angel investors, equity fund managers, lenders, the Iowa Economic Development Authority, and the Small Business Administration to help business owners secure additional venture funding.
- **Elevator Pitch Competitions** – Two Elevator Pitch Competitions were held with \$49,000 in cash prizes awarded. One contest was open to any current University of Iowa faculty, staff, or graduate student; 54 teams participated in the competition and 16 winners received \$29,000 in funds. A separate competition was held for University of Iowa students in which \$20,000 was awarded to 11 undergraduate student teams; 52 undergraduate teams competed.
- **UI Business Model Competition** – JPEC and UIRF hosted the spring 2014 Business Model Competition. This competition was open to all University of Iowa students, faculty and staff, as well as startup companies with a principal address at UI-affiliated incubators. Over 35 teams competed for \$67,000 in total cash prizes. The top student team received an additional \$5,000 and the opportunity to participate in the International Business Model Competition held at Harvard University.
- **Iowa Medical Innovation Group (IMIG)** – This unique student-led program focuses on identification of solutions to clinical problems through collaborations between the Colleges of Medicine, Engineering, Business and Law. Students work on creating medical devices and/or Health IT solutions with the assistance of staff from JPEC and UIRF; to date, over 40 interesting technologies have been identified and reviewed and two are currently moving forward in advanced phases of development in anticipation of forming startup companies.

UI Small Business Development Center (SBDC)

- In FY 2014, the UI SBDC, which provides small business counseling services and training in Cedar, Johnson, Iowa, Poweshiek and Washington counties, served 227 entrepreneurs and small businesses, resulting in 29 new business starts. SBDC clients raised over \$6.9 million in external financing and created an estimated 129 jobs. The SBDC also sponsored 11 entrepreneurial training workshops and provided 827 hours of one-on-one counseling.

Direct economic development assistance to Iowa communities

John Pappajohn Entrepreneurial Center (JPEC)

- **Online Education** – Students who cannot come to Iowa City may still earn a BBA or Certificate in Entrepreneurial Management online through the University of Iowa’s Division of Continuing Education. The certificate is also accessible through JPEC’s partnership with several Iowa community colleges.
- **Business Consulting Services** – Through the Entrepreneurial Management Institute, JPEC offers business consulting services to entrepreneurial and startup companies around the state. In FY 2014, 55 projects were completed for Iowa-based companies and organizations.

Office of the Vice President for Research and Economic Development

UI Partners

UI Partners was created to help Iowa small businesses innovate by solving their information technology (IT) challenges using practical insights and ideas drawn from university faculty, staff, and students. The organization also offers IT training to support workforce development. After a successful pilot in Iowa City, we are now ready to take UI Partners’ services and programs across Iowa. Before the end of 2014, UI Partners–Council Bluffs and UI Partners–Sioux City will open at Iowa Western Community College and Western Iowa Tech Community College. A fifth location in Des Moines is also in the works.

Corridor Business Alliance

The Corridor Business Alliance was created in December 2009 and is composed of leaders from the Cedar Rapids Metro Economic Alliance, the Entrepreneurial Development Center, the Iowa City Area Chamber of Commerce, the Iowa City Area Development Group, Kirkwood Community College, MidAmerican Energy, Kirkwood’s Small Business Development Center, the *University of Iowa’s Small Business Development Center, the Research Foundation and the John Pappajohn Entrepreneurial Center*. More information on this regional approach is available at <http://corridor2020.com/2009/11/corridor-business-alliance/>. The overarching goal is to identify and leverage the region’s unique educational, business development and industrial assets to enhance recruitment of new companies, development of innovative startup companies and retention of existing industry.

Economic development services provided by the research parks, incubators similar service/ units

The University of Iowa Research Park, BioVentures Center and Technology Innovation Center

Corporate tenants of the Park benefit from sustained relationships with University of Iowa in the form of access to specialized research facilities, library access, faculty consultation, research collaboration and access to students as interns and employees. University of Iowa resources also provide smaller companies with assistance in business planning, identification of professional service providers, introductions to local and state government agencies and the regional business community, help in identification of potential sources of investment and other funding and communications. For a list of companies and developers associated with the Research Park, BioVentures Center and Technology Innovation Center, see Appendix B.

University of Iowa Core Facilities

In addition to campus-based core university facilities, four specialized University of Iowa laboratories reside within the Research Park. These facilities provide technical support services critical to the growth of startup companies as

well as UI and existing industry partners. These units provide Iowa with unique capabilities that IEDA and local economic development entities have utilized to recruit outside companies to the Research Park, the region and the state. These facilities include:

- **University of Iowa Pharmaceuticals (UIP)**

The University of Iowa Pharmaceuticals, a division of the University of Iowa College of Pharmacy, offers contract analytical, development, and GMP manufacturing services to the pharmaceutical and biotechnology industry. The Center for Advanced Drug Development (CADD) within UIP is a U.S. Food and Drug Administration (FDA) registered and cGMP-compliant laboratory that works closely with the manufacturing groups at University of Iowa Pharmaceuticals. The focus of CADD is the development of analytical methods and testing to support the manufacture and control of clinical supplies of new drugs entering initial clinical trials.

CADD has a client base of mainly smaller biotechnology and pharmaceutical companies and a growing pool of U.S. and foreign pharmaceutical firms. CADD is particularly well positioned to work directly with discoveries from Iowa university research laboratories, thereby providing an opportunity to hasten technology transfer and shorten the time to market. The presence of these FDA registered facilities along with the Center for Biocatalysis and Bioprocessing makes the University of Iowa unique among U.S. universities to facilitate the development of new therapeutics from pharmaceutical and biotechnology-based companies, as well as serving to enhance the translational science research occurring within the University of Iowa.

- **Center for Biocatalysis and Bioprocessing (CBB)**

The CBB is a microbial pilot plant facility and education center reporting to the Vice President for Research and Economic Development. The center links university scientists from six different colleges who focus on biocatalysis and bioprocessing. The center also performs scale-up of products ranging from ethanol to proteins, process research and development. CBB serves industries from Iowa, the U.S. and around the world for fermentation and bioprocessing of food products, biofuels, bio-pharmaceuticals and other products of biotechnology. The center collaborates with startup biotechnology companies from Iowa for production of small molecules to complex proteins, such as alcohols, vaccines, antibiotics, anticancer drugs, polymers, biochemicals, enzymes, pharmaceutical intermediates and derivatives of bioactive compounds. In the Research Development and Process Laboratory, they conduct extensive process research including first level production from the bench-scale to 1000 liter fermentation. For example, CBB is now developing Simulated Moving Bed Chromatography for protein and small molecule separations. The center also has a current cGMP production facility for biotherapeutics at a scale of up to 300 liters.

CBB has worked with ICE, IEDA and other Iowa economic development agencies to recruit companies to Iowa. CBB is the leading bioprocessing facility located in a U.S. university setting and the only biopharmaceutical production facility in the State of Iowa with a state-of-the-art fermentation and bioprocessing laboratory to produce biotherapeutics for Phase I human trials.

- **National Advanced Driving Simulator (NADS)**

The National Advanced Driving Simulator (NADS) is a center for driving simulation excellence located at the University of Iowa's Research Park. This center has the mission of improving driving safety for everyone by researching the connection between humans and motor vehicles. Development and research conducted at NADS is sponsored by government, military, and industry partners, saves lives and improves quality of life for motorists, and advances the cutting edge in driving simulation. This facility is home to the one of the world's most advanced research driving simulators, the NADS-1. In addition, NADS has developed an in-house portable driving simulator, the MiniSim™, which is currently being marketed to research institutions around the country. Recent research at NADS has focused on detection of impaired drivers, distracted driving, drowsy driving, advanced vehicle crash warning systems, and future vehicle communication systems.

- **State Hygienic Laboratory**

The State Hygienic Laboratory (SHL) was established in 1904 to provide laboratory services to both governmental and private-sector individuals and organizations concerned with the health and environment of the state. Today, SHL conducts more than 500,000 tests for clients in all of Iowa's 99 counties through disease detection, environmental monitoring, and newborn and maternal screening. Clinical laboratory tests provided include virology, serology, microbiology, molecular biology, blood lead screening and biological and chemical terrorism response. State-of-the-art chemical, biologic and enzymatic analytical methods are used in this testing, which is performed at three SHL facilities, the UI Research Park in Coralville, on the DMACC campus in Ankeny and at the Board of Regents Lakeside Lab in Milford, Iowa. The SHL makes these services available to both for profit and not for profit organizations as well as individuals on a fee for service basis. The State Hygienic Laboratory also offers unique training facilities for companies and personnel associated with the clinical laboratory specialties, as an experiential education site for community and four-year college students studying laboratory chemistry. In FY 2014, the Center for the Advancement of Laboratory Science opened at the SHL. With a conference center that accommodates 150 people, BSL2 and BSL3 learning laboratories and modern classrooms, the Center provides unique spaces and resources for community, state, regional and national partners to advance laboratory science.

Collaboration for economic development with Iowa entities

Kirkwood Regional Center at the University of Iowa - Providing solutions to the workforce needs in Iowa

Construction of the Science, Technology Engineering and Mathematics (STEM) center, a partnership between the University of Iowa and Kirkwood Community College, is on track for completion in summer the of 2015. The facility will also house the professional development staff of the Grant Wood Area Education Agency (AEA) and provide STEM-related coursework and Career Academy experiences to high school students from six regional school districts. College of Education faculty will partner with the schools and Grant Wood AEA to also provide K-12 professional development for teachers. The advanced TILE-like classroom design within the University of Iowa space of the Center will serve to assess new models of teaching and learning, as well as serve to train high school and community college teachers in active learning delivery strategies. A variety of UIRP technology companies and University centers and laboratories, including the State Hygienic Laboratory, the National Advanced Driving Simulator, UIHC, the Center for Computer Aided Design and the Flood Center will serve as experiential sites to augment career academy experiences. Additionally, University of Iowa health science colleges will engage in adding value to Kirkwood's highly successful Health Science Career Academies across all health disciplines. This unique center will also serve as a programmatic home for the Southeast Regional STEM hub created under the Governor's STEM taskforce.

IC CoLab

The University of Iowa is a sponsor of the IC CoLab, a co-working space developed by the Iowa City Area Development Group (ICAD Group) to serve the needs of young entrepreneurs and their businesses. Co-working is not just about the space, it's about a social gathering of people who share values and who are interested in the synergy that can happen from working with like-minded talented people in the same space. Co-working offers a solution to the problem of isolation many entrepreneurs experience while working at home.

**IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**FY14 Board of Regents, State of Iowa,
Annual Economic Development and
Technology Transfer Report**

**PRESENTED BY
MICHAEL CRUM, VICE PRESIDENT FOR ECONOMIC
DEVELOPMENT AND BUSINESS ENGAGEMENT,
OFFICE OF THE PRESIDENT**

October 22–23, 2014

FY14 Board of Regents, State of Iowa, Annual Economic Development and Technology Transfer Report

1. Please briefly describe the relationship of your institution's economic development activities to the enhancement of economic growth in the state. The description should cover, but not necessarily be limited to the following:
- A. the relationship between institutional activities and creation of jobs and wealth in Iowa
 - B. Institutional activities and services which indirectly promote economic development, such as training provided to staff of local economic development agencies

1A. Enhancement of Economic Growth through Job Creation and Retention, Investments, Sales, and Cost Savings

Economic development is a high priority for Iowa State University, and the university is very proud of the tremendous impact it has on the state economy. The university recently reorganized its economic development enterprise to make it easier for external constituents to access its expertise, capabilities, resources, and facilities and to better integrate, coordinate, and grow the vast array of services that ISU offers. The new Office of Economic Development and Industry Relations was launched July 1, 2014 (please see section 3 for a description of the reorganization).

ISU promotes economic growth in Iowa in a number of ways. We create intellectual property and help move research ideas to the market, we support the creation of new companies, we offer assistance to existing companies, we help attract new companies and entrepreneurs to Iowa, and we contribute to workforce and entrepreneurial development.

The ISU Research Park is a resource provider and business incubator that encourages commercialization of university research. The Innovations Development Facility (IDF), part of the Plant Sciences Institute, incubates new plant biotechnology companies. The Small Business Development Center (SBDC), and the ISU Pappajohn Center for Entrepreneurship work with individuals interested in starting new companies and they interact with existing companies across Iowa to solve management problems, to improve operations, to seek financing, and to pursue new opportunities. The improved performance resulting from these interactions allow businesses to retain and often expand their workforce. The ISU Research Foundation (ISURF) and Office of Intellectual Property and Technology Transfer (OIPTT) manage, market, and license the intellectual property of ISU researchers and work with them to patent inventions and market the innovations to commercial partners. The Center for Industrial Research and Service (CIRAS) works with primarily, but not exclusively, manufacturing companies to enhance their performance in numerous ways, including process improvement, strategic planning, new product development, supply chain management, and market expansion.

The following are some examples of the direct impact that these ISU units have had this past year and over the recent past.

- The ISU Research Park continues to be successful in initiating as well as nurturing numerous new businesses. Eleven new companies and affiliates joined the Park in FY14, bringing the historical total to 232 companies, research centers, and affiliates. Currently, there are 63 companies and research centers

and 14 affiliates located in the Park, employing 1,365 and 119 people, respectively.

- There are currently three faculty-affiliated startup companies located in the Innovations Development Facility, the on-campus business incubator in the Roy J. Carver Co-Laboratory under direction of the Plant Sciences Institute. A total of 18 companies have used this business incubator space since the facility opened in September 2003.
- During federal FY13, which is the most recent full year for the program, the Small Business Development Center provided business assistance to individuals and companies across the state totaling 2,579 clients and 10,900 counseling hours. As a result of this counseling, 209 new businesses were started and 1,134 jobs created. The program also helped retain 411 jobs during FY13. The clients of the SBDC generated capital infusion for their businesses in excess of \$48 million and had sales increases in excess of \$42 million. The SBDC also provided 140 trainings or workshops in which 1,779 individuals participated.

The ISU SBDC, along with the ISU Pappajohn Center for Entrepreneurship, provided 614 hours of counseling assistance to startup and existing companies; served 109 clients with one-on-one counseling; educated 318 attendees through workshops; provided advice to several hundred clients via telephone and e-mail; and advised 24 technology companies in the areas of licensing, equity-based financing, market entry, and numerous operational areas.

- Technologies originating at ISU and licensed to Iowa companies have resulted in over \$21 million in sales by those companies in calendar year 2013. Total sales of ISURF-licensed technologies were \$462 million, not including germplasm.
- The Office of Intellectual Property and Technology Transfer (OIPTT) began supporting SBIR (Small Business Innovation Research) and STTR (Small Business Technology Transfer) outreach efforts in FY06. Preliminary award reports show that SBIR and STTR funding has rebounded compared to FY13, when budget sequestration affected the number of awards made. Twenty-three companies received assistance in preparing 25 proposals in FY14. To date, awards worth \$6.2 million have been reported for FY14, with 20 different Iowa companies winning 23 new or continuing SBIR and STTR awards. The departments of defense, agriculture, and energy, as well as the National Institutes of Health (NIH), the National Science Foundation, and the National Aeronautics and Space Administration, are funding this year's Iowa SBIR/STTR award winners. The funded projects reflect Iowa's strengths in biotechnology, information systems, manufacturing, agriculture, and materials. Nearly \$2.5 million in support was awarded from NIH for diverse projects that range from the development of new drugs and diagnostic approaches to new medical information technologies. In addition, just over \$2 million has been received from the National Science Foundation for projects that include the development of nanomaterials, renewable chemicals, and process monitoring technologies.
- The Regents Innovation Fund (formerly Grow Iowa Values Fund) program at Iowa State has a competitive research component that pairs ISU faculty members with Iowa industries (primarily new to young startups) to create

economic benefit for the companies. Surveys completed by companies on projects funded from June 2006 through June 2013 (surveyed one year after project completion) documented 149 jobs created or retained and an annual sales impact of nearly \$19 million due to the research projects conducted in partnership between ISU and the companies.

- ISU's Center for Industrial Research and Service (CIRAS) helps Iowa's economy prosper and grow by enhancing the performance of industry through applied research, education, and technical assistance. CIRAS has been working with companies in communities across Iowa for more than 50 years and has a vision for Iowa of healthy communities through business prosperity. Cumulatively, over the past five years, CIRAS and partners have reported impact from companies totaling over \$2 billion dollars (\$1.7 billion in sales gained or retained, \$221 million in new investments, \$88 million in costs saved or avoided) with 29,390 jobs added or retained as a result of the assistance received.
 - Last year, 1,280 businesses from 94 counties in the state received assistance on projects or attended educational workshops from CIRAS staff or partners. Companies responding to surveys reported \$446 million in total impact — \$383 million in sales gained or retained, \$50 million in new investments, and \$13 million in costs saved or avoided. Company executives stated that 6,795 jobs were added or retained as a result of the assistance they received from CIRAS and its partners.
 - Bush Construction in Davenport, Iowa, worked with CIRAS in order to enhance sales through government contracting. Bush Construction staff attended workshops presented by CIRAS and received one-on-one counseling that focused on working with small businesses and establishing joint ventures. The assistance helped the company to successfully compete for government contracts; over \$61 million in government contracts in 2011–2012 were reported.
 - Walsh Door & Hardware Co. in Des Moines worked with CIRAS on a multi-year transformational effort resulting in \$1.8 million in new sales and addition of 10 new jobs. The commercial door and hardware manufacturer improved its layout, developed long-term growth plans, and developed a strategy to increase focus on the company's electronic security division.
 - Huxley-based Kreg Tool is best known for its innovative Kreg Jig. The nearly 25-year-old firm has seen consistent growth during the past few decades, but company leaders have a plan that calls for Kreg to triple its sales over the next 10 years. CIRAS introduced Kreg to its innovation cycle services—a four-phase process of definition, discovery, development, and delivery that helps companies establish a formal approach to innovation. These tools standardized the innovation process to ensure each new concept addresses critical factors such as competitive advantage, strategic fit, and value proposition to the customer. As a result, Kreg has made a multimillion-dollar investment in a new home-improvement kit. The kit bundles three existing products into a

comprehensive one-stop solution for customers. Two other projects are nearing launch.

- CIRAS government contracting specialists work with Iowa businesses, from one-person operations to some of the state's largest employers, to help them understand the government procurement process and to secure contracts. CIRAS is the only organization in the state of Iowa that provides contracting assistance at all three levels of the government market segmentation—local, state, and federal. CIRAS staff counseled more than 900 companies, resulting in more than \$208 million in government contract impact as a result, in part, to this assistance. The Defense Logistics Agency, which funds CIRAS to provide assistance to Iowa companies, indicated this impact helped create or retain 4,177 jobs.
- The ISU College of Engineering Industrial Assessment Center partnered with CIRAS in providing energy audits to 14 manufacturing companies. ISU teams comprised of faculty and students, both graduate and undergraduate, visited company sites to collect data and conduct analyses. Reports were then created recommending ways each company could reduce energy consumption and increase profitability.
- CIRAS is working with the BEST of Iowa (Business Expansion and Strategic Trends), a coalition of Iowa utility concerns, Iowa Economic Development Authority, Iowa Innovation Council, Iowa Workforce Development, Association of Business and Industry, Iowa Area Development Group, Iowa Business Council, Iowa Department of Education, and Iowa's regent universities and community colleges to provide a statewide coordinated business retention and expansion program. Economic developers throughout the state use the Synchronist data system to interview executives of Iowa industries to create an Iowa Competitive Capacity ScoreCard for the state. Results of this coordinated effort have driven development and support of a portfolio of new services focused on helping Iowa companies improve their ability to innovate.
- CIRAS entered into a new partnership with the Association of Business and Industry and joined its advisory council. This partnership focuses on providing educational events to manufacturers across the state.
- CIRAS developed a partnership with the Iowa Innovation Corporation (IIC) beginning in July 2014. The partnership will combine the IIC's expertise in high-growth startups with CIRAS's expertise in manufacturing to better support growing companies in their transition to manufacturing products.
- CIRAS is working with the regional economic development marketing groups across Iowa to address economic development strategies in their particular regions. Strategic planning, workforce development, business outreach, buyer/supplier efforts, and industrial assistance programming are provided within each of the separate groups.

- Institute for Physical Research and Technology Company Assistance (IPRTCA) is now managed by CIRAS to expand the reach, improve the efficiency, and grow the impact of the program. IPRTCA continues to benefit Iowa companies through their assistance on technical problems and advancing R&D activities. IPRTCA is composed of three segments that each support Iowa businesses in unique ways: the Materials Group and Nondestructive Evaluation Group provides shorter-term no-cost technical assistance while the research Cost-Sharing Program helps Iowa companies access ISU's faculty and facilities for research by providing a 1:1 cash-match on research projects. Working with these three segments, Iowa companies have reported positive impacts to their sales, investments, and operating costs.

In the last five years, FY2009-2013, IPRTCA has helped more than 347 Iowa companies, covering 67 Iowa counties. Companies have reported an annual economic impact of \$15.6M from this partnership over the last three years (CY2011-2013).

- US Manufacturing Wear Technologies in Eldora turned to the IPRTCA Materials Group to assist with a proprietary process called "CADEN Edge" that extends the life of wear on parts by applying a wear-resistant welded edge to them. They came to the group seeking assistance for controlling base-metal softening. With this guidance from the Materials Group, the company is seeing a 50 percent reduction in base-metal softening. US Manufacturing's COO Curt Labertson had this to say about the experience: "IPRT has helped our small company improve our product and competitiveness, as well as sustain and grow jobs in rural Iowa. Their staff was easy to work with, flexible, and knowledgeable, and they explained concepts in terms I understand!"
- Sheffield based Sukup Manufacturing Company turned to IPRTCA's Non-destructive Evaluation (NDE) Group for techniques to inspect welds. Sukup is a leading manufacturer of grain storage, grain drying equipment, and steel buildings and turned to the NDE Group for help in improving the reliability of their weld inspection protocol. The NDE Group used ultrasonic testing equipment to inspect Sukup's welds and then teach the company how it can use the same technology in-house to search for flaws.
- Nutra-Flo is a manufacturer of peptides and microbials for livestock feed based in Sioux City. The company enlisted the IPRTCA Cost-Sharing Program to help them determine the effectiveness of a soy based peptide given to pigs that have recently been weaned. Peptides are low in anti-nutritional factors, thereby increasing the availability of the nutrients, while also avoiding the negative immunological response observed from feeding intact soybean protein. The results of this investigation have the potential to increase Nutra-Flo's market and benefit Iowa pork producers.

The preceding examples come from the economic development units that are part of the new Office of Economic Development and Industry Relations and the ISU Research Park both of which are in the Office of the President. Additionally, ISU Extension and

Outreach in collaboration with ISU colleges provides services that also impact the state's economy, most notably through its programs in Community and Economic Development, Agriculture and Natural Resources, Human Sciences, and 4-H Youth Development (please see section 3 for a detailed description of these programs). The following examples come from these programs.

➤ *ISU Extension and Outreach Latino Business Assistance*

Community and Economic Development Extension and Outreach (CED) maintains two community development specialist positions with expertise in minority businesses and leadership. Himar Hernández, based in Ottumwa, and Jon Wolseth, based in Perry, worked with Latino business owners throughout the state. During the past year, Hernández and Wolseth helped 36 Latino business owners start or improve their own businesses, trained 8 Latino leaders and entrepreneurs, assisted with the creation of 15 jobs and the retention of 54 jobs for minority employees.

In 2013–14, CED conducted a pilot program that includes primary research and the development of programming and resources with Interstate Power and Light – Alliant Energy. Alliant Energy funded the \$62,451 program. CED specialists Himar Hernández, Scott Timm, and Jon Wolseth conducted six focus groups to identify areas of greatest need and potential impact for energy efficiency programs. In addition, a literature review of prior or existing utility programs targeting Latinos was performed. The program identified gaps and proposed solutions to overcome language and cultural barriers that impede the dissemination of energy-efficiency information to Alliant's Latino customers.

CED and Human Sciences Extension and Outreach began a three-year project, "Integrated Latino youth, family, community, and business development," focused on Latino populations in Sioux City, Perry, and West Liberty. CED is in the process of hiring three new community development specialists, which will be joint positions shared with nonprofit partners in each of the three communities. A holistic approach that crosses program units and colleges, and that sustains networks and relationships in Latino communities of place has been lacking. Building on existing Latino outreach programs, this project will expand ISU Extension and Outreach Latino focused programming in a place-based fashion, will use culturally relevant pedagogy, and will work closely with selected communities to identify, further develop, coordinate, implement, and evaluate ISU Extension and Outreach programs that effectively promote positive Latino youth, families, community, and business development.

➤ *Iowa Retail Initiative*

CED is part of the Iowa Retail Initiative (IRI), a collaboration to create thriving rural communities. Iowa State University is leading a new initiative to support Iowa's independent retailers and revitalize rural downtowns. Financed by a Strategic Initiatives Grant from ISU Extension and Outreach, IRI unites existing campus services and provides a single point of contact for rural communities and retailers seeking help. Working with Clarinda, Red Oak, and Shenandoah, 24 ISU students in the senior-level Retail Scapes studio class developed design concepts to enhance local retail experiences, creating a regional vision with connections and collaborations that can strengthen the area's economy.

- *Local Food Providers Learn Good Ag Practices (GAP)*
The growing demand for local and regional food offers an unprecedented market opportunity for small and mid-sized farms and holds great promise for increasing access to healthy and affordable food for rural areas. However, participation in the food system beyond the local direct market often demands that farms demonstrate compliance with complex GAP certification. Working with the Northeast Iowa Food & Farm Coalition, ISU Extension and Outreach used a grant to achieve two goals: (1) to develop a training program to equip food safety “coaches” who could provide technical assistance to farmers to implement GAP and prepare them for food safety certification, and (2) to create a GAP cost-share program to assist farmers with the cost of an audit. Through the coaching program, 21 Iowa fruit and vegetable farms received assistance in writing a food safety plan. The mock audit helped participants identify food safety areas of concern, so they could address them prior to paying for a real audit. Following the mock audit, 11 farms requested a USDA GAP audit for their farm and 100 percent passed, allowing these growers greater market access for their produce.

- *Iowans Gain Economically and Environmentally by Installing Solar Systems*
As fossil fuel powered electrical generation plants have come under increasing scrutiny by environmental groups, the need for alternative energy sources has been rewarded through tax credits from state and federal governments. Some electrical utility companies offer incentive programs to encourage investments as well. The cost of solar arrays has dropped dramatically over the last five years. Because of the tax credits, incentive programs, and lower costs, there has been an increased demand for information on solar photovoltaic systems.

Working with the Washington Economic Development Group (WEDG) and Louisa County Extension, ISU Extension and Outreach held two meetings in Southeast Iowa. Presentations were made by Bill Hamman, Iowa Energy Center, and by representatives from several utility companies explaining their interconnect agreements. Vickie Larson with USDA Rural Development discussed USDA grants that are available and several vendors described their solar array options. At each meeting, farmers who recently installed solar arrays discussed their experiences and answered questions. The two meetings drew 110 people and many accessed the information electronically in the weeks following. As of June 13, for the 2014 year, \$1,280,243 of State of Iowa tax credits had been issued for installing solar arrays. This equates to approximately \$8.5 million of solar investment in the State of Iowa.

Center for Industrial Research and Service (CIRAS) reports several economic development training and other activities.

- CIRAS held the third annual corridor procurement conference in Cedar Rapids, educating companies on the key elements of capturing business sales with government agencies or partnering with prime contractors. The event provided opportunities for over 50 companies to network with government buyers, including contracting personnel from the City of Cedar Rapids, Iowa Department of Administrative Services, Iowa Department of Transportation, and the Rock Island Arsenal.

- CIRAS developed a new workshop series aimed toward assisting companies with networking and partnerships with other companies in their government contracting pursuits. During this period, CIRAS sponsored three networking and partnership events focused on different industry sectors (manufacturing, construction, and professional services) in different parts of the state (Cedar Rapids, Dubuque, and Des Moines). The event provides training on the importance of networking, an overview of the different types of partnerships and opportunities for companies to share best practices, and resources. These workshops have reached over 120 attendees.
- CIRAS, with its partners Iowa Area Development Group and the Cornbelt Cooperative, hosted a workshop in Spencer focused on strategic opportunities in innovation and sustainability. Twenty-nine economic developers and business leaders learned techniques from peer businesses and innovation experts on how to grow profits.
- ISU's College of Engineering creates STEM-related experiences that engage, educate and interest students of all backgrounds with a focus on creating an engineering pipeline to support workforce and economic development in Iowa. In the 2013-14 academic year, K-12 outreach programs impacted tens of thousands of individuals. Approximately 4,400 young people participated in FIRST LEGO LEAGUE, 500 in Jr. FIRST LEGO LEAGUE, 23,000 students in Project Lead The Way classes, and over 500 youth in summer kids' camps. In addition, thousands of students are impacted through the state fair, Odyssey of the Mind, various field trips and activities, and by the teachers and administrators who attend ongoing training and professional development throughout the year. The college is keeping Iowa youth inspired through STEM initiatives today to build a better Iowa for tomorrow.
- The Iowa Economic Development Administration University Center has operated within CIRAS since the program began at Iowa State University in 1980. In 2013, CIRAS was awarded a technical assistance contract to develop and implement the Iowa Advanced Manufacturing Innovation Network program in the state. CIRAS selected plastics and rubber manufacturing as the first of five subsectors, performing an innovation needs assessment and disseminating results to manufacturers throughout the state. In April 2014, CIRAS hosted the first annual Innovation Summit attended by 27 engineers and executives from 17 Iowa plastics and rubber companies, providing them a platform to generate innovative new ideas based on the business growth strategies identified through the survey. One attendee, Sam McCord, chief executive of MCG BioComposites in Cedar Rapids, hopes to adapt one of his ideas to drastically expand his already growing business, stating the process "really helps us with the brainstorming— fleshing out both the good and the bad."

ISU Extension and Outreach

Community and Economic Development Extension and Outreach (CED) reports the following training and other activities.

- *Communities to Community (C2C)*
The Communities to Community program offers a two-year schedule of bundled design, educational, business, and leadership development services available through CED and the College of Design. C2C involves a multi-faceted approach that includes faculty, staff, and students from the College of Design and CED. The C2C program has generated \$106,488 for the CED unit through partnerships with Ottumwa, Maquoketa, and Waukon. Results from these partnerships include a housing needs assessment for Ottumwa and comprehensive plans for Maquoketa and Waukon.

- *Disaster Preparedness*
Gary Taylor, CED extension specialist and associate professor of community and regional planning, conducted the Flooding in Iowa Project in collaboration with the Iowa DNR. This project involved creating a website and a series of web-based videos designed to educate local officials, business leaders, and the general public about floodplains, flood risks, and basic floodplain management principles. The website (<http://www.extension.iastate.edu/floodinginiowa>) hosts the videos and has links to several resources where the public can obtain more information about flooding. The videos are divided into five categories: Introduction to the NFIP, Understanding Flooding, Floodplain Mapping, Floodplain Regulation, and Flood Insurance.

Deborah Tootle, extension sociologist and associate professor, and Brian Perry, community development specialist, are developing a curriculum designed to help community foundations and their partners—roughly 10 percent of the state’s economy—work seamlessly to build their leadership and local capacity for addressing disaster preparedness, response, and recovery by addressing issues related not only to disaster management but also to inter-organizational and community leadership as well. The curriculum will be tailored to specific needs within particular areas and community foundations and will be developed on a creative platform based on community leadership development and engagement skills, disaster management skills, and techniques of adult education.

Agriculture and Natural Resources Extension and Outreach (ANR) reports the following training and other activities.

- *Annie’s Project Empowers Farm Women in Decision Making*
Annie’s Project celebrated its 10th year in Iowa, assisting farm women in production, financial, marketing, human resource, and legal issues on the farm via a discussion format with clear learning objectives. More than 1,000 women have participated in the program during the decade.

ISU Extension and Outreach personnel have been critical to Annie’s success, developing curriculum, training educators, and facilitating workshops. A recent survey of Annie’s participants summarizes the impacts Annie’s Project has had. Participants reported that they had developed a network of peers and had made connections with professional service providers, had increased confidence in decision making across all aspects of farming, and had become better farm

managers and business partners. More than half of the participants reported contacting professionals regarding financial or legal issues. More than a third of the participants had contacted other Annie's participants or professionals on agricultural production or marketing issues.

- *Farmers Seek Farm Financial Security by Preparing for Lower Profitability*
Crop producers have seen the prices for their production drop dramatically over the last year. Agricultural lenders and producers expressed a desire to understand the current and projected financial positions within agriculture and prepare for leaner economic times in crop production. ISU Extension and Outreach farm management specialists developed a suite of programs to help participants review their financial positions, determine their financial stability, and explore financial concepts via case studies. Fifteen meetings were held across the state in which participants received a binder of materials, including information sheets, sample balance sheets, activities, and reference materials.

More than 500 crop producers and agricultural lenders participated in the programs. Sixty-four percent of the participants indicated a desire to increase their knowledge on financial management and strategies. End-of-program evaluations indicated an increase in participants' knowledge levels for factors that affect financial stability, purpose of financial ratios, components to calculate key financial ratios, effect of deferred taxes, resources for financial information, and the financial position of their farm businesses.

- *Timely Farm Management with Online Ag Decision Maker and Estate Planning Workshops*
Farmers, financial lenders, farm managers, and agriculture educators understand that having current, unbiased agricultural economics and business information is important to making sound farm management decisions. Knowing where to go in a rapidly changing agricultural environment to access up-to-date information that includes new and emerging issues is critical to their success. The Ag Decision Maker (AgDM) website, www.extension.iastate.edu/agdm, is such a resource. The website currently has more than 5,000 visitors per day, nearly 2,000 more than last year. Overall downloads of information sheets and decision tools reached nearly 650,000. More than 100 information files, decision tools, voiced media, and teaching activity files were added to the site. More than 15,000 users receive monthly updates highlighting the materials on the Ag Decision Maker site. Many of the ISU Extension and Outreach farm management programs are supported by the site as it serves as a web-based resource for the programs. Farm leasing materials were provided to nearly 1,800 participants. More than 14,000 downloads were recorded for the "Evaluating Your Estate Plan" programs that help farm families proceed on farm transition.

- *Economic Benefits from Hands-on Ventilation Workshops*
Swine producers face challenges of managing the ventilation system within production facilities. Ventilation impacts energy costs, pig health and productivity, animal welfare, and worker health and safety. Most producers, while knowing swine production well, have limited background in ventilation management. A new ventilation demonstration unit was developed through the support of the Iowa Pork Industry Center to provide hands-on training on ventilation system management so that producers can understand and adopt proper management

for their operations. The demonstration unit includes modern equipment used in swine production but allows training on a neutral site in order to avoid biosecurity issues. The workshops incorporated hands-on methods that allowed participants to learn not only from the specialists but also from putting the newly acquired information into practice. In FY14, workshops reached 130 pork production operations and/or systems through nine day-long workshops. Those completing the post-workshop survey had influence over 13.1 million market hogs annually, representing a third of Iowa's swine industry.

➤ *Producers Understand, Manage New Swine Disease*

A new transnational disease has been devastating to local producers, with 100 percent mortality for pigs under two weeks old. This disease, PEDv, is spreading rapidly throughout the swine industry. Slowing the spread is important for the financial stability of producers and the economic performance of the swine industry. Extension and Outreach conducted two emergency regional meetings in fall 2013, four regional meetings during the winter, a 30-minute presentation to more than 1,000 private manure haulers, and two follow-up regional meetings in the summer of 2014.

Of 1,223 swine operations, 689 already have a biosecurity plan, but 335 swine operations planned to develop a biosecurity plan because of the presentation in the manure hauler certification workshop. Changes in behavior were documented as the swine industry changed truck wash protocols, limited cross traffic, used more plastic boots, and understood the clean-dirty line concept. An Ida County producer applied ISU Extension and Outreach biosecurity education to his operation, saying, "It reinforced how particular we need to be with bio-security protocols, we have not yet had the disease." A typical swine farrowing unit will farrow 1,000 pigs per week; this new disease can wipe out four weeks of production. This year 4,000 of those lost pigs would be worth about \$200,000 extra profit, as profit per head this year averaged \$50. Several operations attending ISU Extension and Outreach trainings have been able to avoid the disease or manage it more effectively, resulting in tremendous economic gain this year.

➤ *Swine Educational Program Improves Animal Welfare and Food Safety*

Death loss and downer pigs during transport are issues costing the swine industry millions of dollars annually. In addition, training for food safety could help reduce economically expensive meat recalls. Proper heating and cooling and other welfare topics taught, such as management of medication, could lead to increased swine herd health and improved economic performance.

Annually, more than 500 producers have completed a workshop on pork quality assurance (PQA Plus) or transport quality assurance (TQA) taught by ISU Extension and Outreach. Changes in behavior were documented by third-party audit. Documented changes in animal welfare, handling, and food quality were shown by follow-up farm assessment. For example, producers learned about timely euthanasia; follow-up shows implementation of that learning at 94.87 percent. Good heating/cooling and air quality were documented on more than 97 percent of farms. Many other practices such as emergency planning, euthanasia planning, residue avoidance, medical records, and facility upkeep were implemented to improve welfare and increase food safety. Additionally, as a

result of the education, the percentage of farms making improvements is increasing. Third party audits of 90 farms showed year-over-year decrease in minor and major non-conformities dropping from 80 to 63 and from 25 to 9, respectively. A yearly decrease in percentages of dead and downer pigs of 21,600 hogs valued at \$4.3 million industry wide at packer plants can be linked to the handling education provided at these workshops.

- *Database Records Set Risk Management Practices*

The swine production database provides pork producers with a mechanism to establish production and financial benchmarks, enhancing their risk management strategies. An example is the marketing group in Northeast Iowa composed of five producers who purchase approximately 84,000 weanling piglets a year. Based on the last 12 months' breakeven projections, one producer was forecasted to average just over \$8.00 per hog sold (9.0% ROI), which was before the 2014 record-setting summer markets increase due to PEDv. Breakeven projections enable these producers to position corn and soybean meal purchases up to a year in advance on the front side and allow for hog pricing to be tracked, and thereby allow for objective-based selling strategies rather than subjective, reactionary strategies on the back side. This type of proactive business strategy adds validation to record keeping and a production database within a production network. It also has given creditability to the Swine Field Specialist working with this group to take these management practices to other pork producers looking for assistance in risk management and production benchmarks.
- *Farmers, Grain Handlers Get Updates on Current Grain Handling Practices and Issues*

Consistently increasing production and growing local uses for grain (feed, ethanol) has put pressure on the grain market's ability to store large quantities in the face of increasingly variable weather conditions. Producers and grain dealers alike hold larger stockpiles of grain to be used by quality-sensitive local processors. Spoilage, mycotoxins, and inventory shrink are among the primary concerns. The ANR Grain Storage Team, led by Dr. Charles Hurburgh and including five field specialists in agronomy, farm management, and engineering, has created a series (currently five) of online training modules and spreadsheet decision tools for grain management. Five more are in progress. This group also does pre-harvest and harvest-time briefings to update current harvest issues, such as the crop variability seen in 2013. Approximately 500 clients attended the various pre-harvest briefings. There were articles in the major ag publications serving Iowa. The Extension IT system is being upgraded to be able to track usage of the online modules through the Extension Store; presently we cannot track their usage.
- *Regulatory Officials, Grain Industry Professionals Trained in Food Safety Applied to Bulk Commodities*

The Food Safety Modernization Act (FSMA) and subsequent rules applicable to bulk grains and feed ingredients are having a significant impact on the grain distribution and processing network. FDA is being required to move or hire inspectors unfamiliar with commodity agriculture, and industry is being asked to keep more records, verify more operations, and conduct more tests than were ever previously required. ISU Extension and Outreach and Kansas State University Grain Science have collaborated on a \$1.5 million training project for

FDA inspectors in feed and grain situations. ISU Extension and Outreach faculty have created web-based self-help checklists for grain handling and processing industries to assess their readiness and needs for compliance with FSMA. Some 150 FDA inspectors have been trained in feed and grain processing. A 20-module distance education program now is offered through the FDA for future inspectors of bulk agricultural businesses. The checklists have been downloaded approximately 250 times; updates are in progress as rules evolve. Planned improvements in ISU Extension and Outreach web-tracking capability will enhance impact assessments.

- *High-Tech Instrument Companies Assisted in Entering the Grain Analysis Market*
Analysis for nutritional properties of ag commodities is becoming cheaper and more adaptable because of recent developments in near infrared technology. For an instrument company, entry into the market is costly because calibrations are needed for a range of properties and products. Calibration is expensive, time consuming, and risky, in that readings need to match expectations of potential users wanting to replace various laboratory methods with rapid testing. The grain lab developed near infrared analysis calibrations for 12 makes of NIR instruments, covering wheat, corn, soybeans, soybean meal, distillers' grains and bakery meal. The lab also began a long-term project to share data and expertise with a major laboratory company located in Des Moines, to help the company create a new testing and instrument quality control service. Instrument manufacturers used the grain lab's calibrations as part of their initial sales packages. One NIR instrument typically costs \$50,000 to \$100,000. The service at the lab in Des Moines is anticipated to generate at least \$1 million in revenue and two new jobs in its first year (2015).

- *Iowa Farm and Rural Life Poll Helps Agricultural Stakeholders Address Pressing Issues*
Iowa agriculture has maintained its unparalleled productivity over time by adapting to challenges. Challenges that have arisen in the past few years, especially those associated with increased weather variability, pose threats to long-term maintenance of agricultural productivity. The Iowa Farm and Rural Life Poll (IFRLP), an annual survey of Iowa farmers, generates information that helps the agricultural community to better understand farmers' knowledge, perspectives, and experiences so specialists can do a better job of helping farmers adapt to changes. The 2013 IFRLP collected data on critical issues such as adaptation to increased weather variability, herbicide-resistant weeds, Bt-resistant corn rootworm, and soil compaction. The 2013 Farm Poll data have helped ISU research and extension faculty and field staff, state and federal agency staff, and private sector agricultural advisors to better help their clientele adapt to agricultural challenges. For example, the data have helped weed science extension specialists to better understand what farmers are thinking and doing (or not doing) to manage herbicide-resistant weeds, and adjust programming accordingly. Data have been disseminated widely, with numerous articles citing the data published in the agricultural press (e.g., *Corn and Soybean Digest*, *Wallaces Farmer*) and the mainstream press, including *The Guardian* (UK) and the *Des Moines Register*, and presentations given to stakeholder groups and academic audiences across the state and country.

- *Farm Energy Efficiency Resources Reach Growing Audience*
The recent volatility of energy prices has increased the need for up-to-date information about energy efficiency for farm enterprises. However, many of the existing resources about this topic were outdated or not available electronically. With funding support from the Iowa Energy Center beginning in 2010, ISU Extension and Outreach launched “ISU Farm Energy” to provide educational resources and outreach regarding agricultural energy efficiency. New digital resources include a series of 25 publications addressing energy efficiency for electricity, propane, and diesel for Iowa’s farmers and rural utility service providers. During the past year, more than 30,000 copies of the ISU Farm Energy publications were downloaded digitally by farmers, educators, and utility service providers. In addition, the popularity of these resources has paved the way for field trials of grain drying energy management that are currently underway at ISU Research and Demonstration Farm locations statewide.

- *Iowa Beef Center Addresses Lingering Effects of 2012 Drought*
The 2012 drought was one of the most severe national droughts since the days of the Dust Bowl, resulting in poor pasture growth, low hay harvests, reduced corn grain and silage yields, and high nitrate levels in corn silage. Massive cow liquidation was seen nationwide. Iowa Beef Center staff conducted more than 25 meetings during November and December 2012 to address current and future issues related to recovering from the drought. Topics included future climate predictions, economic outlook for cattle prices, feeding the 2012 forage crop, nitrate issues in corn silage, alternative feedstuffs, and renovating pastures for the 2013 year. More than 300 beef producers attended. Follow-up evaluations showed participants managed an average of 83 cows, 60 feedlot cattle and 31 backgrounders. As a result of attending, a quarter of the producers adopted the technologies of testing feed sources, balancing rations, testing for nitrates, and switching to a limit-fed ration to reduce feed needs. More than 20 percent said they incorporated a new feedstuff, supplemented additional energy if needed, and diluted high quality feeds to reduce feed needed. Sixty-four percent said this program helped them to maintain their cow herd despite the drought, 32 percent said they retained additional heifers, and 15 percent expanded their cow herd. Respondents said the economic impact of this program was \$500-\$1,000 per operation, or more than a \$300,000 economic impact to the Iowa economy.

- *Update Beef Feedlot Facilities to Protect Water Quality*
Water quality is important to all citizens, and Iowa’s cattle feeders are proactively modifying their facilities to protect water quality. More than 40 percent of participants in beef feedlot facility meetings have made changes in their operation to reduce manure runoff and protect water quality. More than 350 producers attended four programs focused on understanding Iowa’s environmental regulations for beef feedlots. All featured best management practices to protect Iowa’s waters, and Iowa DNR and EPA staff spoke on the current regulations and water quality protection. Follow-up surveys showed 63 percent of participants checked their feedlots for manure runoff following the program, 48 percent stopped any existing manure discharge, and 40 percent removed a man-made conveyance below their yards. Assuming that all participants responded in the same ways as those responding to the survey, 140

feeders adopted one or more of the management technologies to improve manure management and reduce potential water impacts.

- *Beef Producers Increase Profitability through Technology*
Beef cow numbers in the United States are the lowest since the 1950s. The ISU Iowa Beef Center and the Iowa Cattlemen's Association hosted 10 Heifer Development Clinics across Iowa in January, February, and March 2012. Participants who completed a post-meeting evaluation managed an average of 103 cows and retained 20 heifers each year. Over 90 percent of the attendees showed improved understanding of technologies available to develop heifers, management practices to improve conception and longevity, and keys to successful heifer development. The majority of participants plan to retain heifers in the future and more than 20 percent plan to increase the number retained. Participants managed more than 61,800 cows and retained 12,000 heifers each year. This program was posted to YouTube in 2014 and has received a total of 742 views.

- *Economic Benefits from Drainage School*
Field and campus specialists have developed a training program on drainage design. Annually since 2007, this three-day drainage school trains 40 contractors and farmers on economic drainage design that can benefit the environment and production. This drainage school has attracted attendance from at least nine states throughout the Midwest, along with attendees from Canada. The drainage schools use a hands-on approach to allow participants to learn not only from the specialists but also from each other. Nearly all participants have indicated the program will help them increase revenues for their operation. Multiple participants in 2013 indicated the drainage school would help them increase revenues by at least \$100,000

4-H Youth Development reports the following economic development training activity.

- *STEM Skills for Iowa's Future Workforce*
For Iowa youth to be successful in the 21st century, they must be prepared with science, technology, engineering, and math (STEM) skills necessary to meet Iowa's workforce needs and economic development plans. ISU Extension and Outreach's 4-H Youth Development program, in partnership with many local and national organizations and businesses, provides STEM opportunities for youth in every Iowa county. These programs inspire and prepare today's youth to become science-literate citizens and meet future Iowa workforce needs. ISU Extension and Outreach plays a vital role in filling the STEM pipeline for Iowa companies. The 4-H program provides leadership for pre-collegiate (K–12) STEM outreach, including the State Science and Technology Fair of Iowa, 4-H STEM projects and exhibits, STEM camps, county STEM programming, 4-H STEM special events at the Iowa State Fair, and STEM focused 4-H clubs. In FY13, 629 sixth through 12th grade students participated in the State Science and Technology Fair of Iowa. Extension and Outreach programs at the county level engaged 12,417 participants in STEM focused programs or 4-H STEM projects ranging from environmental stewardship to geospatial mapping—from which 412 exhibits in the science and engineering category and 203 in the agriculture and natural science category advanced to the Iowa State Fair. Also, 18,423 youth were enrolled in groups using STEM curricula or engaging in STEM activities in 4-H

programs. In addition, 121 youth participated in Robotics STEM Challenge at the Iowa State Fair and 17 youth led hands-on STEM learning experiences at the Iowa State Fair. Eleven youth participated in a STEM workshop at the State 4-H Youth Conference.

➤ *Building Youth Interest and Participation in STEM Initiatives*

Keeping Iowa youth interested and participating in STEM initiatives will create a better-prepared future workforce and ultimately help improve economic development in the state of Iowa. Increasing opportunities for youth was a priority during the second year of the North Central STEM Hub at Iowa State, which was established by the Iowa Governor's STEM Advisory Council. As part of the STEM Initiative, the North Central Hub supported STEM festivals that included the Middle School VEISHEA Day, when 80 youth experienced STEM experiences at Iowa State University. The NC STEM Hub hosted a STEM event at the State Fair in the 4-H Exhibits Building, where more than 500 youth experienced various scale-up programs. Approximately 200 youth attended the "This is STEAM" Festival at Mason City Lincoln Intermediate School, which kicked off the STEAM Academy in sixth grade that will be implemented in 2014 (STEAM is science, technology, engineering, arts, and math). The Experience Health Scale Up program was implemented only in the North Central region. In this scale-up program approximately 300 youth experienced health careers through visits to local hospitals and community colleges in partnership with Des Moines University. The 4-H program in the North Central STEM Hub supported and participated in the Regional Scale-Up programs that served more than 20,000 learners. The program also participated in STEM Scale Up programming statewide through the other five regional hubs. Well over 100,000 youth were provided opportunities to participate in STEM programming statewide through the efforts of all six regional hubs. The 4-H program was a key partner in implementing various scale-up programs in every region.

➤ *Engaging Youth in Animal Science STEM Programs*

Educating Iowa's 4-H youth in the area of Animal Science STEM programming is a key priority for ISU Extension and Outreach. Of more than 23,000 Iowa youth enrolled in 4-H clubs, more than 16,000 are enrolled in a livestock project area. With such a large portion of Iowa 4-H youth involved in animal agriculture, it is critical for them to have the necessary skills in STEM. Employers in the field of agriculture have increased their demand for knowledgeable and competent workers, especially in STEM-related positions. The number of producers/farmers continues to decline across the country; therefore, substantial research and education on increasing food safety/consumer confidence, animal production, and efficiency has become a top priority with a focus on the latest technology advancements along with basic livestock production to a more urban youth audience. More than 1,900 youth participate annually at the Iowa State Fair 4-H youth livestock exhibitions. The 4-H Animal Science Roundup event provides in-depth, hands-on STEM education for more than 175 youth annually. Other outreach programs at the county, regional, and state level include a swine skillathon competition, beef workshops, dairy challenge event, and livestock quiz bowls. Currently, efforts are underway for the development of a comprehensive, online, video-based animal science curriculum for youth STEM education with emphasis on volunteer and 4-H project leader training as well as fundraising for the project.

Human Sciences Extension and Outreach reports the following economic development training activity.

- *Volunteer Income Tax Assistance Helps Families Build Financial Security*
The Earned Income Tax Credit (EITC) augments the wages of low- and moderate-income workers and, in turn, this flow of income makes a substantial economic impact in local communities. EITC recipients circulate their refunds through the local economy, creating a ripple effect that exceeds the size of the original refund. This money bolsters family financial well-being, strengthens neighborhoods, assists small businesses, and spurs local economic development. ISU Extension and Outreach worked with community partners to recruit and train 43 volunteers to provide free tax preparation services to low- and moderate-income families through the Volunteer Income Tax Assistance (VITA) program. In 2014, VITA volunteers working at 25 VITA sites helped 1,649 low- and moderate-income Iowans complete their 2013 income tax returns. Special efforts are made to increase awareness of the EITC and VITA in rural Iowa. As a result, 748 filers qualified for the EITC and received \$901,415 in the 25 counties that participated in the Extension and Outreach/community partnerships to expand VITA programs in rural Iowa.

- *Workforce Development in Early Care and Education*
Iowa ranks second in the nation for the percentage of young children with employed parents (2012). More than 70 percent of Iowa children from birth through age 6 are in child care. Demand is high for quality early childhood programs. By 2020 the number of child care professionals is expected to increase nationally by 20 percent (Bureau Labor Statistics 2012). Human Sciences Extension and Outreach offers workforce development opportunities for professionals serving young children and their families in various capacities. An array of educational programs engage participants in on-site and virtual learning experiences for skilled and emerging professionals. The aim is to increase understanding and practice of research-based best practices in the field. Human Sciences Extension and Outreach programs taught 9,520 early care and education professionals new skills to promote early learning, literacy, science, math, and nutrition education. Of the more than 1,700 participants completing course assignments and responding to surveys, 90 percent demonstrated new skills and program improvements. Additionally, 850 new early childhood teachers and 200 program administrators participated in a 30-lesson program preparing new teachers for the early childhood classroom. Evaluations show that teachers significantly increased understanding in parent communication, child development, early learning, managing children's behavior, and health and safety practices.

<p>2. Please provide the following information for FY14: (If your institution utilizes additional metrics specific to your institution's specialized areas of research or service, please include them here)</p>
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Note: Unless noted, the data provided below are FY14 data.

- a. Number of disclosures of intellectual property: **113**
- b. Number of patent applications filed: **39**
- c. Number of patents awarded: **33**
- d. Number of license and option agreements executed on institutional technologies, in total and in Iowa: **59 total, 19 in Iowa**
- e. Number of license and option agreements yielding income: **176**
- f. Revenue to Iowa companies as a result of licensed technology: **\$21 million (CY13)**
- g. Number of startup companies formed, in total and in Iowa (through licensing activities): **3 total, 3 in Iowa**
- h. Number of companies in research parks and incubators: **ISU Research Park: 49 private and 14 university-related; Plant Sciences Institute Innovations Development Facility (IDF): 3 (all university-related or affiliated)**
- i. Number of new companies in research parks and incubators: **ISU Research Park: 9 private, 1 university-related and 1 affiliate; Plant Sciences Institute IDF: 0 (university-affiliated)**
- j. Number of employees in companies in research parks and incubators: **ISU Research Park: 1,365; Plant Sciences Institute IDF: 4.75 FTE (all university-related or affiliated)** Royalties and license fee income: **\$4.8 million**
- k. Total sponsored funding received: **\$368.4 million of which \$226.4 million is for research**
- l. Corporate sponsored funding received for research and economic development, in total and in Iowa: **\$27.8 million total, \$13 million in Iowa**
- m. Iowa special appropriations for economic development in the following categories:
 - Annual state appropriations for ongoing economic development programs (such as research parks, SBDC, IPRT): **\$2.5 million—including \$1,037,345 SBDC (includes state-wide programs), \$122,355 ISU Research Park, and \$1,365,602 IPRT**
 - Regents Innovation Fund appropriations: **\$1,050,000**
- n. Research expenditures (federal, state and local; business; nonprofit; institution funds; all other sources): **\$266.6 million**—Note that this is the FY13 total reported to NSF for its Higher Education Research and Development (HERD) Survey.
- o. Licenses and options executed per \$10 million research expenditures: **2.6 (est.)**—Note that this is an FY13 figure, the most recent number available.
- p. Sales of licensed products by Iowa-based companies: **See d. above.**
- q. Number of employees for current Research Park tenants and incubators, as well as former tenants that are still in existence in basic form world-wide: **4,590**

3. Please describe the ways in which your institution is engaged in the following activities (For example, what is the nature of the outreach and service activities? Which units provide it? What kinds of people and organizations benefit?)

- A. Direct and hands-on technical assistance to businesses and entrepreneurs
- B. Direct economic development assistance to Iowa communities
- C. Economic development services provided by research parks, incubators or similar service units

Effective July 1, 2014, the new Office of Economic Development and Industry Relations (EDIR) was launched. EDIR consists of the following key university economic development units: Center for Industrial Research and Service (including IPRT Company Assistance), Small Business Development Center, Pappajohn Center for Entrepreneurship, ISU Research Foundation, and Office of Intellectual Property and Technology Transfer. Michael Crum, Vice President for Economic Development and Business Engagement, leads EDIR and he reports directly to President Leath.

The primary objectives of this reorganization are (1) to increase the integration and collaboration among the university's economic development units to provide more comprehensive service to our clients and partners (i.e., a one-stop shop) and (2) to serve as the gateway or portal to the university's expertise, capabilities, resources, and facilities that support and enhance economic development throughout the state. EDIR works very closely with the ISU Research Park and other university units that contribute to the university's economic development efforts and impact, including the Office of the Vice President for Extension and Outreach, the Office of the Vice President for Research, and the academic colleges.

3A. Direct and Hands-on Technical Assistance to Businesses and Entrepreneurs

The following ISU units provide direct and hands-on technical assistance to businesses and entrepreneurs:

Pappajohn Center for Entrepreneurship and Small Business Development Center at ISU (SBDC)

These units work with researchers and other entrepreneurs to define the technologists' role in the company, evaluate markets, assist in the creation of a business plan and help the company develop connections with a network of business resources including consultants, accountants, attorneys, prospective employees and investors.

- The Pappajohn Center, working with IPRT-CA, the Plant Sciences Institute, ISURF/OIPTT and other research centers, worked with approximately 25 technology clients this year, one of which resulted in a business startup. These technologies can take 6 to 26 months to develop sufficiently to justify the formation of businesses. During this time, the researcher receives business development assistance from the Small Business Development Center and Pappajohn Center for Entrepreneurship to move the technology from the researcher's bench to the marketplace. The Pappajohn Center helps the researcher develop the model for the business and establish the network of resources necessary to implement the plan. These resources can include business assistance, students or capital.
- The Pappajohn Center/SBDC continues to provide a referral network for entrepreneurs and facilitates the recruitment of students, including access to internships for companies located at the ISU Research Park.
- The Pappajohn Center, with leadership from the College of Business, launched a new student consulting program to further engage students in the process of solving business problems. Through the CyBIZ Lab, startups, small businesses, and other companies and organizations can access student talent working in

teams to research and validate new market opportunities and solve business challenges. CyBIZ Lab students will be working specifically with the eight faculty members who have received funding via the Research Innovation Fund.

ISU Research Foundation (ISURF) and the Office of Intellectual Property and Technology Transfer (OIPTT).

- ISURF owns and ISURF and OIPTT jointly manage, market, and license the intellectual property for Iowa State University. ISURF/OIPTT works with faculty members in regard to the reporting and protection of innovations, including patenting inventions. It markets the innovations to find commercial partners interested in licensing. ISURF also provides assistance to Iowa companies, including ISU faculty startups with SBIR and STTR applications. A FY13 reorganization brought the team responsible for negotiating industry-sponsored research agreements into OIPTT to more closely coordinate efforts to build public-private relationships.
- Iowa State University and the University of Iowa began offering a new research sponsorship option in 2013 that allows industry to pre-negotiate exclusive licenses to breakthroughs that grow out of their partnerships with university researchers. The new option spurs increased partnerships between Iowa's regent universities and industry by giving companies more tools to protect their research investments, and increase the rate of technology transfer to the private sector. In 2014, OIPTT is working on a promotional plan to increase awareness and utilization of this option.
- In FY14 ISURF/OIPTT went through a strategic planning process with the ISURF board and laid out an aggressive plan for improvement. Examples include a focus on increased invention disclosures and an increased emphasis on communicating across all stakeholder groups. Implementation has already begun.

Center for Industrial Research and Service (CIRAS) helps companies grow and prosper. The CIRAS mission is to improve the quality of life in Iowa by enhancing the performance of industry through applied research, education, and technical assistance. CIRAS has been working with companies in communities across Iowa for over 50 years and has a vision for Iowa of healthy communities through business prosperity. Since multiple resources are necessary to meet the needs of Iowa businesses, CIRAS partners with Iowa's universities, community colleges, government agencies, and business associations throughout the state.

- CIRAS employs the “Engage. Educate. Embed.” model to create a specific solution that drives results for each company. Account managers meet with clients to assess needs and provide links to resources that companies can use to increase their competitiveness. Solutions are offered through a combination of direct assistance from center staff, university faculty, partner organizations, and outside consultants.
- CIRAS staff members have expertise in engineering, innovation, government contracting, productivity, management practices, safety, supply chain

management, sustainability, quality management, and community-business economic development.

- Service to industry includes technical assistance and applied research in conjunction with ISU College of Engineering labs; regional economic development studies to better understand rural economies; development of company transformational plans for profitable growth; and educational workshops and mentoring for small- to medium-sized businesses.
- CIRAS manages the statewide National Institute of Standards and Technology's Manufacturing Extension Partnership (MEP), a program of the Department of Commerce. The mission of the MEP is to enhance the productivity and technological performance of U.S. manufacturing. Through this program, CIRAS provides small- to medium-sized manufacturers with the training, tools, and connections to accelerate innovation, leading to new opportunities in domestic and export markets.
- CIRAS manages the Defense Logistics Agency's, Procurement Technical Assistance Program (PTAP), a program of the Department of Defense. The purpose of the program is to generate employment and to improve the general economy by serving as a resource for businesses pursuing and performing under contracts with the Department of Defense, other federal agencies, state and local governments, and with government prime contractors. Staff help businesses determine if they are suitable for government contracting, provide workshop training and outreach events, assist businesses with capturing government sales, and provide post-award contract assistance.
- CIRAS manages a technical assistance contract under the Economic Development Administration University Center Program in Iowa. The goal is to develop and implement the Iowa Advanced Manufacturing Innovation Network program in the state. This program applies research-based methods to create an idea incubator supporting technology commercialization and high-wage job growth for the advanced manufacturing industry cluster in Iowa. Specifically, these activities include (1) needs assessment for existing industry clusters, (2) innovation summits to develop innovative solutions to industry needs, and, (3) idea incubation to drive technology commercialization. The focus of this center is regional commercialization, advancing high-growth entrepreneurship, and cultivating innovation.

IPRT Company Assistance (IPRTCA) helps Iowa companies leverage the expertise of ISU research centers and other ISU capabilities in order to solve technical problems, create new products and processes, and increase productivity and quality. IPRTCA, now managed by CIRAS, provides help through both its R&D cost-sharing program and through short-term, no-cost technical assistance. They actively collaborate with Iowa companies on technology development projects. Many companies have benefited from this relationship including Groschopp, Inc. of Sioux Center, MAHLE Filter Systems of Winterset, and Midwest Central Railroad of Mount Pleasant.

- The staff members of the Materials Group and the Nondestructive Evaluation Group provide significant and broad expertise to help Iowa manufacturers address material and inspection issues. These programs offer state-of-the-art

capabilities to businesses and both groups have expanded their capabilities to keep pace with research advances and modern industrial needs. Recent expanded capabilities include a three-dimensional digital microscope to capture precise surface profiles. This direction allows them to interact with various industrial clients and tackle an increasingly wide range of challenges.

- The Research Cost-Sharing Program is available to Iowa companies for pursuing research conducted at ISU. The program, supported by state funding and company fees, provides an effective yet inexpensive way to access the facilities, expertise, and knowledge of the faculty and professionals working at Iowa State. Through the program, companies can receive 1:1 cash matching on their research projects.

Agriculture and Natural Resources Extension and Outreach provides unbiased, research-based information and education to agricultural professionals to grow the economic base of Iowa agriculture. Extension and Outreach educates Iowans about local actions to produce a safe, sustainable, accessible, and affordable food supply for the state, the nation, and the world. Programs address all segments of the food supply chain, from productive capacity of Iowa's agricultural and human resources, to production and processing technology, market functions, and management. Programming also includes accessibility, affordability, and safety to reduce food insecurity of Iowa families. Assessment, analysis, and education are provided on a broad scope and scale of Iowa's food system.

- Commercial agriculture production programs provide research-based information and education on economically viable commercial production of commodity crop and livestock producers. Field days, research reports, webinars, meetings, peer groups, decision support software, and on-farm research and consultation help farmers and agribusinesses stay current on latest trends and technologies to improve efficiency and sustainability. Emphasis is placed on long-term economically and environmentally optimal production systems.
- Protecting Iowa's natural resources is essential to a sustainable agriculture-based economy and for quality of life for all Iowans. Education, demonstration, and information programming address management decisions affecting farmed and natural landscapes as they relate to soil and water quality, conservation practices, tree management, recreational activities, energy efficiency, certification programs, and connecting youth and families with nature.
- Global market conditions and increasing climate volatility contribute to increased risk for farmers. Educational programming and decision support software provide farmers with methods to evaluate market conditions, government programs, crop insurance, farm leasing arrangements, and how production systems impact risk exposure.
- Financial management of farm businesses has a significant impact on long-term sustainability, growth, and overall success. Programs address economic decisions for crop and livestock production, land management and values, machinery investments, and human resource management. The farm population is aging and facing decisions about retirement and estate and the next

generation of farmers. Programs address the needs of new farmers and estate planning for farm families and tax and estate professionals.

- Local food production is rapidly growing in the Midwest to address the increasing demand for locally produced fruits, vegetables, and animal products. These farming operations typically are smaller with lower capital and provide opportunities for new farmers to get started or existing farms to diversify their operation. Programs address strategic and tactical decisions, as well as the day-to-day production and marketing decisions for these farms.

Examples of technical assistance to businesses and entrepreneurs include:

ISU Office of Economic Development and Industry Relations

- *American Athletic Uses ISU Structures Laboratory to Test Product Design*
American Athletic in Jefferson, Iowa, which designs and manufactures sporting equipment, developed a new bracket to enhance the safety of its overhead, structurally mounted equipment for institutional play. CIRAS, working in partnership with ISU's Structural Engineering Laboratory, operated in the Department of Civil, Construction, and Environmental Engineering, conducted preliminary structural engineering tests for internal company use. American Athletic reported that based on the success of the testing, the design will be a great addition to a family of products for a national service market that will allow them to retain or hire 10 or more employees and increase product sales dramatically.
- *\$17.5 Million Impact Generated by Student Projects with Companies*
Senior capstone design projects are the culmination of engineering education for undergraduate students. Iowa companies, through a partnership between CIRAS and the College of Engineering, provide students with challenging opportunities to apply their engineering knowledge to real-world applications as a final step in preparation for joining the workforce.

By working with the students, companies gain a new perspective on difficult engineering problems as well as the value engineers bring to an organization. As a result of the projects, many companies achieve innovative solutions that lower costs and enhance quality and productivity. This collaborative program reinforces the benefits and challenges of working in team environments. The program also allows companies to gain insights regarding students as potential future employees.

In addition to the senior capstone design projects, engineering students have worked with companies on projects related to lean manufacturing and facility planning.

In 2013, students worked on 89 projects with 26 different companies across 14 counties. Companies responding to surveys reported impact of more than \$17.5 million for these projects.

- *Project Helps Pella Manufacturer Add 30 Jobs and Increase Sales by 30 Percent*
LDJ Manufacturing in Pella formed in 1995 to manufacture and sell products to make farming a better way of life. Through a customer-centric mindset, the family-owned business became a leader in fuel and service trailers for the agriculture industry. However, their rapid growth created new constraints that threatened continued growth.

CIRAS and LDJ used a Theory of Constraints (TOC) project to help identify and break down the barriers to growth, resulting in a variety of changes to the business ranging from a \$1M facility expansion to an improved safety training program in the company.

- *Regency Consulting Rockets to Success with Help from CIRAS*
Regency Consulting, a supplier of computer hardware and services, increased their federal contracts from zero at the beginning of 2013 to about \$9 million by the end of the year. CIRAS assisted Regency Consulting with identifying contract information and contacts inside government as well as provided guidance in leveraging their 8(A) certification. CIRAS also assisted Regency Consulting with developing their general supply award schedule.
- *CIRAS Sets Table for Food Manufacturing Success*
CIRAS, the Iowa State University Meat Science Extension, and the Center for Crops Utilization Research combine their expertise to help Iowa food manufacturers respond to rapid changes in food safety regulation and consumer preferences. Through this partnership, 70 Iowa manufacturers worked on 132 different projects and reported a combined \$62 million in economic impact last year. The wide range of topics included applied research, food safety training, business continuity planning, and internet marketing strategy.

ISU Extension and Outreach:

- *ServSafe Food Safety Training Program*
Commercial operations recognize the value of training staff in safe food handling procedures, as an incidence of a foodborne illness can be devastating for business. In addition, promotion that staff members are certified in food safety can be a marketing advantage, as many operations post these certificates. Proper preparation, holding, and service of food are critical in any place where food is served. Many ServSafe participants work in operations that serve those considered at greater risk of contracting a foodborne illness due to compromised immune systems; food safety training can avoid costly medical expense. In addition, Iowa recently adopted a newer version of the Food and Drug Administration Food Code, which requires at least one supervisory employee in licensed foodservices be certified in food safety through an approved program.

Iowa State University Extension and Outreach nutrition and health specialists are registered instructors for the National Restaurant Association's Educational Foundation's internationally recognized food safety certification program. ISU Extension and Outreach specialists have taught the ServSafe food safety certification program for close to 20 years. Participants are from commercial retail foodservices such as restaurants and institutional operations such as hospitals

and schools. ServSafe is one of the approved programs. More than 1,800 Iowans participated in a ServSafe food safety course taught by ISU Extension and Outreach, with more than 80 percent successfully earning certification. Preventing foodborne illnesses helps reduce health care costs and increase business profitability.

➤ *Increasing Understanding of the Affordable Care Act and Improving Health Insurance Literacy*

Confusion surrounded the rollout of the Patient Protection and Affordable Care Act of 2010 (ACA). Changes to the health insurance market, including new benefits and requirements for consumers, challenged an already complicated financial product and decision. Most Americans struggle to understand basic health insurance terms and do not understand or are unfamiliar with the benefits and options created by the ACA provisions.

Between October 2013 and March 2014, College of Human Sciences program specialists in family finance conducted an outreach and education campaign to increase consumer awareness and knowledge of the rights and responsibilities related to the ACA. The campaign included a two-hour health insurance literacy program called Smart Choice Health Insurance. A stakeholder partnership with the Iowa Insurance Division, support from County Extension Councils, and assistance from local libraries and other partners facilitated the effort to improve understanding of the ACA and health insurance literacy. The campaign had direct and indirect contact with 991,737 consumers. Approximately 302 outreach and education events were delivered with 3,341 direct contacts. More than 455,000 “Young Invincibles” (18- to 34-year-olds in Iowa) were geo-targeted in a social media campaign using Facebook, YouTube, and Google AdWords. Roughly 530,420 contacts were made through earned and paid print and radio media. Based on pre- and post-test data from 53 Smart Choice Health Insurance workshops delivered to 315 consumers, there was improvement in five measures of health insurance literacy. In addition to the 991,737 direct and indirect contacts, approximately 38,475 educational materials were distributed to 800 partnership sites, including public libraries and food banks.

➤ *Crop Advantage Series and Field Agronomists Improve Farmer Profits*

The 2012 growing season had exceptional challenges. The extremely hot and dry weather negatively impacted corn and soybean growth and development. The Crops Team worked together to provide timely agronomic information through presentations at the Crop Advantage Series in January 2013. At the conclusion of the meeting series, participants were surveyed for the financial impact of the information they received. The 2013 annual survey from the Crop Advantage Series showed 86 percent of respondents increased profits more than \$5 per acre, and an additional 10 percent increased profits more than \$20 per acre. Survey results showed that attendees represented more than 1.2 million acres in crop production. In addition:

- When ISU Field Agronomists had on-site visits with farmers, they valued the impact to improve profits at \$25 per acres on an average of 600 acres per farm. On-site visits with commercial agronomists or crop consultants indicated they estimated a value of \$50 per acre.
- Five agronomists collected data from 20 farm visits with crop producers. All but one indicated increased profits to their operation from the on-farm

visit of more than \$500, with 11 of the 20 farmers valuing the field visit at more than \$2,500, with a total value of more than \$31,500 to these farms.

- Research and education on alfalfa response to fungicide application increased the knowledge of leaf identification with 53 percent of meeting attendees, and also of fungicide resistance stewardship with 84 percent. Later survey results showed increased profits of \$18.30 per acre on 11,600 acres over a two-year period.

➤ *Rapid Measurement Technology Developed for Corn Breeders*

Corn breeders who are developing lines of corn with increased levels of essential amino acids can accelerate the breeding process by accurately measuring levels of methionine, lysine, and cysteine in experimental lines. Users of the newly developed corn lines with enhanced amino acids will be able to reduce the levels of synthetic amino acids added to livestock rations, and in third world countries where corn is a human diet staple, the new corn lines can supply appropriate levels for human nutrition.

Working in conjunction with the Iowa Grain Quality Initiative, Michael Fields Agricultural Institute, and USDA Agricultural Research Service, Value Added Agriculture has developed calibrations for near infrared (NIR) whole grain analyzers with sufficient accuracy to be used in specialty corn breeding programs. In turn, samples from the corn breeding programs have strengthened the measurement accuracy for methionine, lysine, and cysteine. The ability to accurately measure methionine, lysine, and cysteine by NIR over a broader range has shortened traditional breeding practices by several years and saved individual corn breeding companies tens of thousands of dollars in analytical cost. The future impact of the breeding programs will be more efficient feed formulation and improved corn lines for human nutrition.

➤ *Development of FDA Inspector Training Materials*

The Food Safety Modernization Act (2011) requires FDA monitoring of primary grain processing companies for adherence to food safety standards. FDA had no prior experience with primary grain processors (i.e., feed mills, oil extraction facilities, grain elevators), so training is necessary. The Iowa Grain Quality Initiative at Iowa State developed a series of 15 online interactive modules (hosted by Kansas State University and FDA) to train new FDA inspectors in operations of grain processing and feed formulation. Thirteen informational modules (hosted by Crop Adviser Institute) have been developed for use by industry and students about grain production, handling, and processing. A checklist was developed to prepare industry personnel for FDA compliance, which can be downloaded from the www.iowagrains.org website. Three onsite training sessions were given in addition to the online training. To date, approximately 150 FDA inspectors have been trained using the online modules in conjunction with three face-to-face training sessions. More than 200 copies of the checklist have been downloaded.

➤ *Direct Technical Assistance through Feasibility Studies and Market Analysis*

Staff provided direct technical assistance to 28 businesses on a variety of topics, including vineyard/winery feasibility, food safety planning/GAPs certification, local foods and agritourism, organizational structure, specialty crops, crop quality measurement, and business feasibility. This assistance enabled 28 businesses

to continue operations and maintain or grow personnel, resulting in new or retained jobs for Iowans. Businesses ranged from sole proprietorships to cooperatives to limited liability corporations. Support provided by the Value Added Agriculture Program through the feasibility study process played a significant role in the process of those businesses preparing to make, or making capital investments that exceeded \$80,840,000 with sales of \$136,900,000 and 279 jobs added.

- *Annie's Project Develops Management Skills*
With an increasing number of women assuming ownership and management roles in agricultural businesses, there is a need to strengthen and expand training for women in these modern farm enterprises. Through six different educational sessions, Annie's Project fosters problem solving, record keeping, and decision-making skills in farm women. The Value Added Ag Program serves as the national office for the program, in partnership with the ISU Extension and Outreach Farm Management team. In 2013, 148 Iowa farm women attended one of three different types of Annie's Project classes: Traditional Annie's Management Project, Managing for Today and Tomorrow, and Women Managing Cattle. All participants learned and development management skills that had direct and immediate impact on their respective businesses.

3B. Direct Economic Development Assistance to Iowa Communities

Assistance to Iowa communities is the focus of many of the programs managed by ISU Extension and Outreach. Three of these programs are described below. Additionally, the business and technical assistance units in the ISU Office of Economic Development and Industry Relations described above often work directly with Iowa communities.

Community and Economic Development Extension and Outreach helps organizations and local governments develop and build their capacity to make Iowa communities better places to live and work.

- Extension and Outreach community and economic development specialists provide skills training each year for more than 60,000 community leaders, local government officials, business owners, entrepreneurs and volunteers.
- Community sustainability services focus on helping organizations and individuals meet the needs of the present without sacrificing the ability of future generations to meet their own needs. These services provide communities, economic developers, individuals, and businesses with the tools to manage the financial, social, and environmental issues they face to ensure success in the long run.
- CD-DIAL (Community Development—Data, Information, and Analysis Laboratory) works with communities and organizations to build decision-making capacity as they collect and use information about their local population. Iowa Community Indicators Program provides web-based information products such as local retail trade analysis and demographic and economic indicators. Regional trade center analysis provides an in-depth economic assessment of the financial,

social, and environmental "triple bottom line" well-being of a regional trade center.

- The Community Visioning Program empowers local leaders through a planning process that results in a transportation enhancement plan reflecting the values and identity of the community. Community tourism assessments help communities learn how their current tourism assets and readiness place them within today's tourism marketplace. In addition, they receive recommended steps for building tourism as a community economic tool.

Human Sciences Extension and Outreach provides research-based information and education to help families make decisions that improve and transform their lives.

- Programming focuses on activities and projects to help Iowans live healthier lives through improved healthy behavior and physical health, and enhanced family, work, and community environments. Programs address caregiving for the aging population, community health, financial health, nutrition and physical health, and parenting.
- Specialists help individuals, families, communities, professionals, and organizations assess their health and well-being needs; provide training, tools, and resources to meet those needs; and evaluate the impacts of these efforts to help Iowa reach the governor's goal of becoming the healthiest state in the nation by 2016.
- Human Sciences Extension and Outreach addresses emerging issues that affect the economic viability of Iowa families. Specialists help parents and caregivers to build the knowledge and skills necessary to form and sustain healthy families; child care providers manage their money and plan for retirement; and consumers to increase their knowledge and self-confidence in making health insurance decisions so that they can meet their health insurance needs and budget goals.

ISU Extension and Outreach 4-H Youth Development prepares Iowa's young people for future careers. One in every five Iowa youth develops communication, citizenship, leadership, STEM, and healthy living skills by participating in 4-H educational learning experiences.

- Extension and Outreach programs that engage Iowa youth in science, technology, engineering, and math educational opportunities build skills to ensure more students are well equipped to be knowledgeable citizens and to begin college or career training prepared for success.
- K-12 outreach programming connects Iowa children and youth with Iowa State University's knowledge and research base to help them reach their full potential. Education and positive youth development hands-on experiences are offered on campus, within counties, across the state, and nationally.
- K-12 outreach includes both 4-H Youth Development programs as well as outreach partnerships through Iowa State University colleges and departments.

These experiences help youth explore exciting learning opportunities and discover new career choices.

Youth are challenged to actively pursue education beyond high school and build skills that improve their communities and world. Programs are delivered through caring volunteers, community-based partners, educators, and county Extension staff. 4-H Youth Program Specialists assess youth programming needs, train adults who implement quality educational programs and experiences, ensure safe environments, and evaluate programs' effectiveness.

Some examples of direct economic development assistance to Iowa communities are provided below.

ISU Office of Economic Development and Industry Relations

- *Sustainable Economies Program*
CIRAS and Extension and Outreach's Community and Economic Development (CED) partnered to leverage \$614,000 of state funding with \$614,000 of federal funding through a three-year grant from the Economic Development Administration University Center Program, which concluded in 2013. This Sustainable Economies Program provided Regional Trade Centers in rural Iowa with an in-depth economic assessment of the financial, social, and environmental "triple bottom line" well-being of the region, coupled with technical assistance to the critical organizations and businesses of the region.

Technical assistance was provided in the Carroll region, Lee County (Fort Madison and Keokuk), Appanoose County (Centerville), and Cerro Gordo County. Assistance helped these rural areas to better understand their economic sustainability and provided support in taking steps to long-term prosperity. In addition to the economic analysis, technical assistance projects were launched within the communities and businesses participating in the program.

In 2013, 29 distinct clients were served with more than 300 regional stakeholders attending planning meetings and sustainability sessions facilitated by CIRAS and CED. Stakeholders included participants from the business sector, government, nonprofits, education, and interested citizens—uniting a variety of existing programs to create a common set of goals and actions for their region. Communities and businesses participating in the program reported over \$11 million in financial impact in 2013.

ISU Extension and Outreach:

- *Student Involvement in Business and Community Development*
This year the Partnering Landscape and Community Enhancements (PLaCE) program involved more than 113 students in outreach projects in dozens of Iowa communities, including Monona County, Montgomery County, Polk County, Story County, Webster City, Montour, Muscatine, and Slater. Projects ranged from storefront designs to an outdoor classroom and a dog park. The ILR Community Visioning Program employed student interns to work in 10 communities, and the Community Design Lab employed several interns to assist community design projects in Waukon, Maquoketa, and Clarinda.

- *University Extension Community Development Collaborative*
 In 2012, Community and Economic Development Extension and Outreach (CED) established a partnership with the City of Dubuque and the University of Wisconsin and created a joint faculty position specializing in community planning and leadership. The agreement and joint appointment is one of the first of its kind in the country between two land-grant institutions. The person was hired with tenure at the rank of Associate Professor and is tenured at Iowa State University. Through the collaborative, ISU Extension and Outreach, University of Wisconsin–Extension, and University of Illinois Extension co-hosted the Community Development Society 2014 Annual Conference in Dubuque, which drew 232 community development specialists from several countries to the city, giving international exposure to ISU Extension and Outreach, the University Extension Collaborative, the city of Dubuque, and the surrounding area featured in mobile workshops.

- *Regional, State, and Local Partnerships with ISU Extension and Outreach*
 Community and Economic Development Extension and Outreach (CED) maintains partnerships and shares joint community development specialist positions with the Chamber of Commerce of Keokuk, the City of Fairfield, the economic development organization of West Liberty (WE-LEAD), the development organization of Cedar County (CCEDCO), and the regional development organization of Southwest Iowa (SWICO). Each local economic development position is jointly funded by ISU Extension and Outreach and a local partner; the person serves as a local development official who provides economic development education on a part-time basis.

Extension and Outreach cosponsors another significant joint position with the Iowa League of Cities. This joint educational position focuses upon local government finance. Joint programming coordinated through this position included the Iowa state municipal clerks institute and webinar series on tax incremental financing attended by more than 500 across the state. In 2013, a team of CED specialists revised the *Township Trustee and Clerk Reference Manual*, a guide for township governments. Iowa residents and businesses in rural areas outside of incorporated cities rely on their local township government to provide a broad range of services, from vital functions such as fire protection to maintenance of public cemeteries and the resolution of fence disputes. Some townships also provide other support such as emergency medical service, township halls, parks, libraries, community centers, and playgrounds.

In 2013–2014, CED’s Office of State and Local Government Programs trained 170 city/county employees, service providers, and community elected officials in five counties. In 2013–2014, CED and the Iowa Association of Regional Councils (IARC) entered into a joint position agreement, allowing IARC to continue its rapid growth with a new, full-time executive director and allowing ISU Extension and Outreach to create better connections between the university’s community and regional planning department and ISU Extension and Outreach’s capacity to connect to cities, counties, businesses and nonprofits. Recently, the National Association of Development Organizations selected IARC as a 2014 Innovation Award recipient because of its collaboration with ISU Extension and Outreach.

- *Road Scholar Program*
Road Scholar named the Community and Economic Development Extension and Outreach program the “Top Road Scholar Program in North America” from a field of 368 North American colleges and universities in the United States and Canada, based on a mathematical analysis of participant evaluations. Diane Van Wyngarden, community development specialist, has managed the ISU Road Scholar Program since 2007, teaching local businesses to capitalize on tourism in Iowa. In 2013–14, ISU’s Road Scholar program generated \$203,615 in direct impacts on 86 local businesses. Since 2007, Van Wyngarden has taught 34 courses, which assisted 497 businesses for a direct economic impact of \$807,792.
- *Iowa’s Living Roadways Community Visioning Program*
Since 1996, the Community Visioning Program has helped rural communities plan transportation enhancements using state funds from the Iowa DOT. To date, 209 Iowa towns have completed the process and collaborated with design teams to create conceptual transportation enhancement plans. The program continues to make a significant impact throughout the state. For example, in 2013–14, four communities—Clarksville, Fonda, Manning, and Mapleton—that participated in the visioning program were awarded more than \$275,000 from the Iowa DNR REAP (Resource Enhancement and Protection) program for natural and cultural resource protection and improvement.
- *Mapleton Rebuild and Recover*
The fall 2013 landscape architecture community design studio worked with the Mapleton Rebuild and Recover Committee and Foundation to assist Mapleton’s long-term recovery. In 2011, more than half of the community was damaged by a Category 3 tornado. Since fall 2012, Mapleton has been working with ISU through the community design studio and the Iowa’s Living Roadways Community Visioning Program to rebuild the community and make long-term improvements. Mapleton applied for and was accepted to the 2013 Iowa’s Living Roadways Community Visioning Program, through which they are continuing with transportation enhancement planning. Mapleton also received funding to do roadside planting, which was completed in spring 2013.
- *Community Design Lab*
The Community Design Lab (CDL) is a partnership between the ISU College of Design and ISU Extension and Outreach that focuses on long-term, issue-driven design research with the goal of developing models that are applicable globally and pertain to sustainable initiatives on various scales (building, neighborhood, city, region, etc.). In 2013, CDL received a grant through the Leopold Center for Sustainable Agriculture and launched the Agricultural Urbanism Toolkit in spring 2014 with three communities: Cedar Rapids, Cresco, and Des Moines. This toolkit uses agricultural urbanism tactics (e.g., school gardens, farmers’ markets, and food hubs) as a strategy to promote local food system revitalization in communities. CDL collaborated with the Extension and Outreach C2C program on master plans for Waukon, Maquoketa, and Centerville.
- *Iowans Walking Assessment Logistics Kit (I-WALK)*
First offered in 2010, I-WALK is a partnership with the Iowa Department of Public

Health and ISU Extension and Outreach. The goal of I-WALK is to develop community coalitions and provide them with relevant local information to help them continuously update, implement, and evaluate the infrastructure and programs to support a more walkable, healthy and safe community. In 2013–14, elementary schools in the communities of Bloomfield, Carroll, Cedar Falls, Dyersville, Greenfield, Knoxville, and Perry took part in I-WALK. Parents and children completed more than 350 surveys in which 1,835 locations of barriers/opportunities were mapped. Teachers submitted 76 teacher tallies to formulate a baseline to use in grant applications, and more than 100 residents attended GPS workshops to collect infrastructure data. More than 100 citizens have joined local coalitions.

3C. Economic Development Services Provided by Research Parks, Incubators and Similar Units

Iowa State University provides physical space for business incubation in the ISU Research Park, the Plant Sciences Institute's Innovations Development Facility, the Center for Crops Utilization Research, and the BioCentury Research Farm. Additionally, ISU maintains more than 20 research facilities that provide instrumentation and equipment to businesses on a fee-for-service basis.

The following are some of the key units that provide space and equipment for economic development purposes.

Iowa State University Research Park

The Iowa State University Research Park is a 230-acre development with over 500,000 square feet of building space and is located south of the Iowa State University campus. The Park is embarking on a major expansion that will add nearly 200 more acres for development and more than triple the current square footage of building space. Furthermore, Iowa's governor and legislators provided \$12 million in funding to support a new Economic Development Core Facility in the Iowa State University Research Park that will be the signature building in Phase 3 of the Park's expansion. The new facility will be the home of the Office of Economic Development and Industry Relations and the ISU Research Park administration, thus bringing together formerly scattered university units that support technology transfer and economic development. Construction of the new building is expected to be completed by mid-2016. Currently, the Research Park offers two types of incubator facilities.

- **Biotech Wet-lab Incubator:** ISU Research Park houses three separate incubator facilities with over 15,000 sq. ft. of office and wet-lab incubator space. The incubation facility provides laboratory space for the growth and development of startup, spin-off and established biotechnology companies.
- **Technology Incubator:** The Technology Incubator identifies early-stage, tech-based concepts and businesses and aids in economic development and technology transfer. This provides an environment for growth by helping develop viable business plans and secure financial backing. To date, the Technology Incubator has supported over 130 startup companies. To qualify, businesses must be Iowa companies formed under Iowa law, in the pre-venture capital stage

of development, show potential for growth and development as an Iowa company, be based on a technology and related to ISU research and/or research services.

Innovations Development Facility (IDF). This is a business incubator operated by the Plant Sciences Institute to promote the commercialization of plant biotechnology. IDF encourages ISU faculty, staff, and students to commercialize their research in the plant sciences and promotes the development of startup companies among aspiring entrepreneurs. IDF is housed in the Roy J. Carver Co-Laboratory and consists of six well-equipped laboratory modules and three office spaces. The facility offers an environment to transition research from a university to a business setting. The IDF facility is a productive research location where scientists from academe and industry can work together to advance the mission of the Plant Sciences Institute and to promote economic development in Iowa.

The Virtual Reality Applications Center (VRAC) is an interdisciplinary research center whose primary focus is developing computer interfaces that integrate virtual environments, wireless networking, pervasive computing and third generation user interface devices to amplify the creativity and productivity of people. Research facilities at VRAC assist companies in addressing a diverse range of challenging problems spanning science, engineering, and the humanities.

4. Please briefly describe two or three examples of major economic development collaborative projects with such other entities as Regent universities, Iowa community colleges, the Iowa Department of Economic Development, Iowa Workforce Development, or other state agencies.

Major Economic Development Collaborative Projects

CIRAS Partnership with Iowa Innovation Corporation

CIRAS developed a partnership with the Iowa Innovation Corporation (IIC) beginning in July 2014. The partnership will combine the IIC's expertise in high-growth startups with CIRAS's expertise in manufacturing to better support growing companies in their transition to manufacturing products.

Iowa State University and University of Iowa Collaboration on Research Sponsorship Option to Meet Industry Needs

Just prior to submitting last year's report Iowa State University and the University of Iowa announced a new research sponsorship option that allows industry to negotiate exclusive licenses to breakthroughs that grow out of their partnerships with university researchers. The new option spurs increased partnerships between the Regents universities and industry by allowing companies to pre-negotiate a license at fixed rates to any inventions or software arising from the project the company sponsors. The sponsor pays the full cost of research plus a small option fee to obtain worldwide rights to the innovation, as well as the right to sublicense. The new option provides a cost-effective way for companies to reap the benefits of discovery by allowing them to secure rights to the technology for their competitive advantage. The two universities worked together on the new intellectual property option to offer consistent and unified terms to companies interested in investing in university research in the state of Iowa.

ISU Partnership with Cultivation Corridor

Iowa State University serves on the Board of Directors of the Cultivation Corridor, a regional economic development initiative to attract ag-bioscience firms to Iowa, that was launched in April 2014. Other board members include Iowa Economic Development Authority, leading Iowa companies in the ag-bioscience industry, and Iowa commodity groups. ISU also serves on the Advisory Cabinet of the Executive Director of the Cultivation Corridor. ISU's Office of Economic Development and Industry Relations works closely with the Cultivation Corridor, providing university expertise and services to support the Corridor's efforts.

State-wide committees

Many people from ISU serve on committees that promote economic development programs, such as the Iowa Innovation Council, the Iowa Innovation Corporation, the Biosciences Alliance of Iowa, Iowa Meat Processors Association, Association of Business and Industry Advisory Council, Institute of Food Technologists-Iowa Section, the Iowa Lean Consortium, Professional Developers of Iowa, the Iowa Business Council, the Iowa Alliance for Wind Innovation and Novel Development (IAWIND), Innovate Iowa!, Technology Association of Iowa, Capital Crossroads, and the Cultivation Corridor.

5. Please provide the following information about Grow Iowa Values Fund projects for FY 2014:

- A. Identify and briefly describe each project or initiative which received GIVF funding in FY 2014 including information on outcomes or progress made
- B. Identify metrics which were used to measure outcomes for each project and report progress on each metric for FY 2014.
- C. Provide a description of the sources of the matching institutional dollars for each GIVF-funded project

The Regents Innovation Fund (formerly Grow Iowa Values Fund [GIVF]) program has a competitive research component that pairs ISU faculty members with Iowa industries to create economic benefit for the companies. See **Appendix 1** for a complete report.

6. Optional: If desired, please include observations regarding:

- A. Availability of startup and venture capital for technology entrepreneurs
- B. Suggestions for new programs or activities that could further enhance the impact of university technology transfer and service on creation of jobs and wealth in Iowa.

6A. Availability of startup and venture capital for technology entrepreneurs

6B. Suggestions for new programs or activities that could further enhance the impact of university technology transfer and service on creation of jobs and wealth in Iowa.

The following is a summary of what benefits would occur if additional funds for economic development and technology transfer activities were made available.

- **Small Business Development Centers.** The SBDC helps its clients generate new taxes for the Iowa treasury in the form of income taxes on new jobs and sales taxes on increased sales. During the last full program year ending September 30, 2013, SBDC clients generated a total of \$2,422,000 in new taxes, resulting in a return on investment of \$2.07 for every Iowa tax dollar expended on the program. In addition, the SBDC helped clients avoid eliminating through layoffs or firm closings 411 jobs, resulting in a savings of unemployment compensation benefits of \$1,821,531. Additional state support to SBDC would increase the state's return on investment and retain Iowa jobs.

Many of the centers operate as one-person outreach locations. The SBDC would strengthen our rural centers by providing the funding that they need to add another staff person. Rural clients must drive to their nearest center if they would like assistance, which in many instances is over an hour drive one way. With the demand for service continually increasing, additional support would help to provide more outreach into the rural areas. The network would create additional satellite offices throughout the state with partner agencies and local development organizations to create more opportunities and resources for entrepreneurs, innovators, and small businesses. Several SBDC locations have created satellite locations within their territories to reach underserved areas. As a result, the network has seen an increase in our impact statistics due mainly to the ability to provide the additional outreach in these areas. Higher sales increases, more business starts, and more jobs created have been a direct result of being able to reach out to the rural communities. Without an increase in funding, our one-person centers do not have the staffing to provide these services and our urban locations are overwhelmed with client demand for services. We believe that if we create additional value through our satellite offices, we will have more opportunities to leverage additional collaboration that in turn opens up the possibility for more funds and to be more visible in the economic development community.

The Iowa SBDC wants to provide more training and do more to educate existing businesses in an effort to strengthen our small business foundation within Iowa. Under the current funding conditions, we are unable to do just that. Additional funding will allow the collaboration within entrepreneur groups to create a larger-scale training network and educational vehicle driven by the Iowa SBDC.

- **Iowa State University Research Park.** Any new funds to the ISU Research Park would be utilized to support costs associated with the planned expansion of the Park as well as to increase marketing efforts to attract new tenant companies.
- **The Center for Industrial Research and Service (CIRAS)** has been supporting the growth of Iowa industry since 1963. CIRAS has successfully leveraged the state funding to bring in additional federal grants and fees to expand technical assistance, education programs, and economic development studies to assist Iowa businesses. In FY14 CIRAS helped generate an additional \$1.55 of external funds for each \$1 of state funds provided, yielding over \$3 million of additional funding to support state economic development efforts.

For every \$100,000 of additional state funds that are made available, CIRAS

could leverage the funds to bring in up to \$150,000 from grants and fees and hire two new business professionals to provide services in the areas of engineering, innovation, management practices, government contracting, productivity, growth services, supply chains, quality systems, and community-business economic development. These two staff would help create nearly 160 jobs and \$10 million in new sales, cost savings, and investment impact in Iowa companies.

- **The IPRTCA Group**, now managed by CIRAS, has been supporting the growth of Iowa industry since 1987. CIRAS and IPRTCA staff have successfully leveraged the state funding to bring in additional fees from the research cost sharing program and from federal grants. There is potential to further leverage these funds to grow fees.

For every \$100,000 of additional state funds that are made available, IPRTCA could leverage the funds to bring in up to \$80,000 from grants and fees and support 1.5 FTEs of scientists and faculty to provide research and services in the areas of engineering, IT, and agriculture. These staff would help create nearly 80 jobs and \$5 million in new sales, cost savings, and investment impact in Iowa companies.

- **ISU Extension and Outreach works across ISU colleges** and with external partners to provide technical assistance, research-based education, and access to the resources of ISU to improve the quality of life in the state. Iowans want an economy that can form new businesses, grow existing industry, enhance communities, and recruit companies to the state. With Iowa STEM jobs expected to grow by 16 percent this decade, Iowans see the need to stop the “brain drain” and take steps to develop the state’s future workforce, connecting youth with opportunities here in Iowa. With additional funding, ISU Extension and Outreach will expand economic development projects to broaden Iowans’ entrepreneurial aspirations with education and technical assistance. Extension and Outreach also will address the distinct needs of minority populations, as well as a burgeoning local foods industry and many struggling rural downtowns. These are only a few of the basic needs and urgent trends facing this state. ISU Extension and Outreach has the capability to address these concerns with education for Iowa’s people but needs additional resources to operate at the full capacity required to meet these challenges.
 - ISU Extension and Outreach work in economic development is growing businesses and strengthening communities.
 - ISU Extension and Outreach tackles food and environmental challenges by supporting local actions to produce a safe, sustainable, and affordable food supply.
 - Programs for health and well-being are helping Iowa become the healthiest state in the nation.
 - Through K-12 youth outreach, ISU Extension and Outreach is preparing Iowa’s young people for the future, including through one of our most recognizable programs—4-H.

ISU Extension and Outreach expects to leverage every \$100,000 in new state funds with \$150,000 in new federal matching funds, grants, fees and gifts to generate a projected \$2.5 million of impact and 25 new jobs throughout Iowa. For

every \$100,000 of new funds, an estimated 2.5 additional staff will be hired to address growing demands and increase the depth and reach of work with families, businesses, and communities in all 99 counties across the state.



University of Northern Iowa Annual Economic Development and Technology Transfer Report FY 2014

Section 1. UNI's Economic Development Activities to Enhance Economic Growth in Iowa

The University of Northern Iowa (UNI) has a strong history of supporting Iowa's economic development needs through innovative and applied programs. Every year, these programs reach out across the state to provide direct assistance in all 99 counties. Specific areas of service offered by UNI include: entrepreneurship, community and economic development, market research, environmental research and service, sustainability, advanced manufacturing, metal casting, and new Iowa immigrants. UNI's economic development outreach programs are housed in the Business and Community Services (BCS) division. BCS engages the entire university community in its outreach efforts including faculty, staff, students and alumni – all of whom play a critical role in the economic health of the state. Outcomes realized by key economic development/technology transfer programs during FY 2014 include:

Overall

- Provided service in all 99 counties to more than 1,950 unique business, community and local government clients with an additional 28,000 engaged in MyEnte.Net/IASourceLink.
- Reached more than 65,000 Iowans through BCS programs and projects.
- Involved 259 faculty members and nearly 1,900 students in the delivery of these services.
- Leveraged each \$1 invested by the state with \$5 in private grants, fees or federal funding.

Entrepreneurship, Business Incubation and Technology Transfer

- Provided job growth assistance to 53 second-stage Iowa companies through Advance Iowa, the state's certified Economic Gardening program.
- Usage of IASourceLink online resources, a joint program of UNI and IEDA, doubled to 28,000.
- 16 new companies located in the UNI incubators.
- 64 innovators have graduated from the Innovation Incubator and 4th Street Incubator.
- MyEnte.Net provided on-demand business and market information to 511 businesses through its Concierge service; 216 new clients were served by the UNI Small Business Development Center.
- 20 student businesses were tenants in the John Pappajohn Entrepreneurial Center's R.J. McElroy Student Business Incubator and 54 additional student entrepreneurs were assisted by the affiliate program.
- UNI faculty and staff submitted 9 new intellectual property disclosures.
- 2 patents were received and 3 new patents were filed.
- 2 new license agreements were approved and a total of 7 license agreements are currently generating income.



Waste Reduction, Environmental Assistance and the Bioeconomy

- Buy Fresh, Buy Local participating restaurants and institutional buyers spent \$2.8 million on locally grown foods in 2013.
- The CEEE created the first student-led garden on UNI's campus. In its first year, the garden served 630 guests, provided 1,500 pounds of produce to UNI students, and educated 45 volunteers about gardening.
- Green Iowa AmeriCorps weatherized 329 homes and conducted 589 energy audits, saving nearly \$1.2 million in utility costs.
- The Tallgrass Prairie Center distributed native prairie seeds to 55 Iowa counties as part of its roadside vegetation project.
- The Tallgrass Prairie Center initiated a Plant Iowa Natives marketing program to increase prairie plantings.
- The IWRC hosted five Iowa Food Waste Reduction Project workshops throughout Iowa for 287 attendees.
- Environmental technical assistance and on-site reviews were provided to 78 small businesses.
- IWRC conducted four workshops with 63 attendees to promote deconstruction as an alternative to demolition with the overall goal of reducing waste going to Iowa landfills.
- GeoTREE developed numerous web mapping/GIS applications that serve Buy Fresh Buy Local, the Waterloo African American Cultural and History Museum, the Community Foundation of Northeast Iowa, the Iowa Governor's STEM Advisory Council, and others.
- GeoTREE developed GIS urban stormwater modeling applications with training for 25 federal, state and local agency personnel as well as private environmental consulting companies.
- Recycling and reuse project funding and outreach services were provided to 48 companies and organizations.

Local Economic Development

- The Institute for Decision Making (IDM) and the Regional Business Center (RBC) became a designated EDA University Center and launched a 5-year regional entrepreneurship project in two regions.
- IDM and the RBC completed the EDA Entrepreneurial Communities project in two economically distressed communities.
- IDM conducted workforce development planning in eastern and western Iowa in partnership with two community colleges.
- Community clients report creating approximately 1,500 jobs as a result of local economic development technical assistance from IDM.
- Strategic planning and comprehensive technical assistance was provided to 39 community partners and 8 regional groups across Iowa.
- IDM expanded the market for economic development training to include a six-state region through the Heartland Economic Development Course.
- Restructuring of Iowa's regions was led by IDM in collaboration with Professional Developers of Iowa.



UNI Economic Development and Technology Transfer Report – 2014

- Strategic Marketing Services launched MarketSolv to help economic developers better serve their local industries.

Advanced Manufacturing & Market Research

- UNI’s Metal Casting Center (MCC) provided custom 3D sand-cast mold printing services to 50 foundries and supply chain companies.
- Federally funded research was started by the MCC to determine effective methods for the acceleration of advanced molding methods by the metal casting industry.
- Market research and competitive intelligence was provided to 19 Iowa companies by Strategic Marketing Services (SMS).

Section 2. Technology Transfer and Intellectual Property

FY 2014

	UNI
Number of disclosures of intellectual property	9
Number of patent applications filed	3
Number of patents awarded	2
Number of license and option agreements executed on institutional intellectual property	2
Number of license and option agreements yielding income	7
Revenue to Iowa companies as a result of licensed technologies	\$1,850,000
Number of start-up companies formed, in total and in Iowa	71/71
Number of companies in research parks and incubators	29
Number of <u>new</u> companies in research parks and incubators	16
Number of employees in companies in research parks and incubators	61
Royalties/license fee income	\$40,506
Total sponsored funding	\$40,800,000
Corporate-sponsored funding for research and economic development and revenue generation (excludes corporate philanthropy - all in Iowa)	\$1,208,000
i. Annual appropriations for economic development	\$1,066,419
ii. Regents Innovation Fund	\$900,000

Section 3. Overview of UNI’s Economic Development Programs

UNI outreach services for community and economic development activities are outlined in a table format on the following seven pages. The format provides a brief overview of each program, its purpose, those served and outcomes. Together, the programs served 1,950 unique businesses and organizations in the past year and another 28,000 individuals through the MyEntre.Net entrepreneurial development system and IASourceLink.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
Institute for Decision Making (IDM)	Hands-on community and economic development technical assistance, planning and research	Economic development organizations, chambers of commerce, city councils, counties, communities and others	<ul style="list-style-type: none"> ✓ Conducted, in collaboration with Professional Developers of Iowa, 2.0 Regional Asset Mapping for Iowa’s Economic Development. ✓ Became an EDA designated University Center and launched a 5-year regional entrepreneurship project in the first 2 regions. ✓ Technical assistance, planning and research provided to 39 community partners and 8 regional development groups. ✓ Expanded the market for economic development training to 6 states. ✓ Partnered with two community colleges to develop regional workforce development plans. 	<ul style="list-style-type: none"> ✓ Served 720 entities in communities in all of Iowa’s counties to date. ✓ Community clients report 1,500 – 2,000 new jobs annually as a result of IDM assistance. ✓ Trained over 1,800 economic development professionals. ✓ Provided planning assistance in entrepreneurial development to two economically distressed communities.
New Iowans Program (NIP)	Helping Iowa communities and businesses accommodate the needs of newcomers	Communities, faith-based organizations and businesses	<ul style="list-style-type: none"> ✓ Created a colorectal cancer awareness campaign for Asian immigrants. ✓ Provided training for law enforcement officials. ✓ Awarded multi-year contract to address disparities in Iowa’s child welfare system. 	<ul style="list-style-type: none"> ✓ Assistance in accommodating the needs of newcomers has been provided to more than 200 Iowa companies and organizations. ✓ More than 25,000 copies of four different guides/manuals (and untold electronic copies) have been distributed throughout Iowa.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
Tallgrass Prairie Center (TPC)	Research, techniques, education and source-identified seed for restoration and preservation of native vegetation	Iowa counties, state and federal agencies, commercial native seed producers, the community, students, educators, restoration ecology discipline, and others	<ul style="list-style-type: none"> ✓ Native seed distributed to 55 counties via transportation enhancement funding. ✓ Joined Monarch Joint Venture in support of monarch conservation efforts. ✓ Offered workshops in weed identification, fire management and seedling ID to practitioners. ✓ Continued <i>Carex</i> research and agronomic production of <i>Carex</i> seed. ✓ Determined multi-year biomass production of biomass energy plots. ✓ Formed partnership with IDNR Prairie Resource Center to produce native seed. ✓ Provided museum specimens of prairie roots and interpretive materials to fourteen county nature centers. 	<ul style="list-style-type: none"> ✓ More than 15,500 acres of Iowa counties rights-of-way have been restored to native vegetation. ✓ Increased public knowledge regarding prairie. ✓ Completed publication of Proceedings of 22nd North American Prairie Conference. ✓ Made research information available to restoration ecology community. ✓ Made <i>Carex</i> available to native seed growers. ✓ Continued research on wildlife response to prairie biomass production.
Recycling and Reuse Technology Transfer Center (RRTTC)	Recycling and by-products research, education and outreach	Serving the UNI Campus, Iowa businesses, the recycling industry and Iowa citizens.	<ul style="list-style-type: none"> ✓ Research project funding and outreach services related to recycling and reuse have been provided to 48 companies and organizations. 	<ul style="list-style-type: none"> ✓ Over 42 RRTTC funded research projects. Over 170 reports and publications available. ✓ Outreach and services provided to more than 9,350 individuals this year, including the UNI campus, Iowa business & industry, K-12 students and teachers, and Iowa citizens.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
Iowa Waste Reduction Center (IWRC)	Free, confidential, non-regulatory environmental assistance for small businesses	Small businesses throughout Iowa	<ul style="list-style-type: none"> ✓ Environmental technical assistance and on-site reviews were provided to 78 small businesses. ✓ Online resources for the Minor Source Emission Inventory were provided to 71 businesses. ✓ Online resources for Paint Tracker were provided to 64 businesses October-June. ✓ Hosted five Iowa Food Waste Reduction Project workshops throughout Iowa for 287 attendees. ✓ Conducted four workshops with 63 attendees to promote deconstruction as an alternative to demolition with the overall goal of reducing waste going to Iowa landfills. ✓ STAR4D staff provided training to 87 military or contractor painters and STAR4D satellite sites trained 247. 	<ul style="list-style-type: none"> ✓ Provided 5,592 on-site reviews to Iowa small businesses. (RCRA = 3,783 and Air = 1,809). ✓ Provided online resources to 369 businesses with Minor Source Emission Inventories. ✓ For military or contractor painters, provided 2,582 certifications or re-certifications.
Strategic Marketing Services (SMS)	Market research and analysis	Businesses, entrepreneurs and non-profit organizations	<ul style="list-style-type: none"> ✓ Market research and analysis services were provided to 19 Iowa companies. 	<ul style="list-style-type: none"> ✓ Since 1990, market research and analysis services have been provided to 287 Iowa companies.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
<p>John Pappajohn Entrepreneurial Center (JPEC)</p>	<p>Research, entrepreneurship education, application development (mobile, tablet, and web), intellectual property, and technology transfer, and capital investment programs</p>	<p>Students interested in entrepreneurship, UNI faculty and staff entrepreneurs, other universities, new ventures and rapidly growing small companies</p>	<ul style="list-style-type: none"> ✓ 2,358 K-12 students and 128 teachers were served with JPEC K-12 outreach. ✓ 4,649 businesses and individuals were assisted through all JPEC programs. ✓ 20 student businesses were provided space and services in the student business incubator and 54 student business owners were provided services as affiliates. ✓ 54 individuals were served through the new AppsLab. ✓ One student business incubator tenant was named in FY14 the Iowa Recycler of the Year by the Iowa Recycling Association, as well as the Okoboji Entrepreneurial Institute’s most successful alumnus from the OEI 2012 class. 	<ul style="list-style-type: none"> ✓ From FY08 to FY14, more than 13,000 people were served by JPEC programs. ✓ The JPEC has provided 44 students with internships through its CIPCO program since FY05. ✓ The JPEC Student Business Incubator has provided space to more than 68 business owners since FY05. ✓ The JPEC has consulted with 442 faculty and staff. ✓ Since FY13, 809 College of Business Administration students have learned about and crafted an elevator pitch through presentations by JPEC instructors.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
Regional Business Center/ Entrepreneurship Outreach	Rural and Urban Entrepreneurship development, online entrepreneurship resources, business consulting, business training, business incubation	Small- and medium-sized businesses, entrepreneurs, entrepreneurial service providers, community leaders	<ul style="list-style-type: none"> ✓ 18,207 Iowans were served in FY14 by an RBC program or online resource. ✓ The statewide Advance Iowa program served 53 mid-sized Iowa companies with advanced research and technical assistance. ✓ There were a total of 1,808 attendees at one of 19 live webinars with an additional 5,065 views of prior archived webinars. ✓ The Business Concierge provided business intelligence to 511 small businesses. ✓ 419 attendees participated at the 7th annual EntreFEST. ✓ Dream Big Grow Here attracted 185 contestants from two thirds of Iowa’s counties. ✓ The Business Concierge and Dream Big Grow Here programs won national awards. 	<ul style="list-style-type: none"> ✓ www.IASourcelink.com doubled the number of users in FY14 to 28,049. It continues to touch 10,287 users monthly. ✓ 6,208 small businesses have attended a Webinar since 2003. ✓ 64 businesses have graduated from the RBC and Innovation Incubators. ✓ RBC’s online social media reach grew to 18,223 across Facebook, LinkedIn, Twitter and Pinterest, a 509% increase from the previous fiscal year.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
Center for Energy and Environmental Education (CEEE)	Technical assistance, educational programs and leadership in energy conservation and renewable energy, environmental conservation and community-based agriculture	Iowa cities, counties, Iowa schools, teachers, farmers, businesses, elected officials, state agencies, community leaders, citizen organizations	<ul style="list-style-type: none"> ✓ Green Iowa AmeriCorps sites combined to weatherize over 329 homes and conducted over 252 educational programs with nearly 10,000 participants. ✓ Iowa Farm Energy Working Group helped reduce fossil fuel use on 60 small to mid-sized farms. ✓ Buy Fresh, Buy Local participating restaurants and institutional buyers in the Black Hawk County area spent \$2.8 million on locally grown foods. ✓ Created the first student led garden on UNI’s campus. In its first year, the garden served 630 guests, provided 1,500 pounds of produce to dining services. ✓ 2013-14 outreach impacted about 150 teachers and future teachers, and about 400 non-traditional educators. Teachers, in turn, reached an estimated 1,225 K-12 students. 	<ul style="list-style-type: none"> ✓ Since 1998, CEEE’s Northern Iowa Food & Farm Partnership has facilitated purchase of \$15.3 million worth of meat and produce from hundreds of area farmers by food vending institutions.
Metal Castings Center (MCC) and Center for Additive Manufacturing	Metal casting technologies, applied research, testing and training	Iowa casting users, foundries and foundry suppliers	<ul style="list-style-type: none"> ✓ Maintained active contracts with over 50 companies. ✓ Conducted DOD-sponsored research into 3D Printed castings. ✓ Collaborated with Youngstown State University and the University of Iowa in industrial research projects. ✓ Participated in a federally funded research project through the America Makes Innovation Institute. 	<ul style="list-style-type: none"> ✓ Over 75 industry-funded research projects have been completed to date.



Section 3. Overview of UNI’s Economic Development Programs (continued)

Programs	Services	Those Typically Served	FY 2014 Results	Cumulative Results
<p>Geoinformatics Training, Research, Education and Extension Center (GeoTREE)</p>	<p>Geospatial technologies, education, research, and outreach activities for federal, state, local and tribal agencies</p>	<p>Federal, state, local and tribal (FSLT) government agencies (NASA), UNI Faculty, staff, and groups</p>	<ul style="list-style-type: none"> ✓ Developed innovative new server side LiDAR data processing/delivery application for Iowa DNR which is utilized by users throughout Iowa. ✓ Developed numerous web mapping/GIS applications that serve Buy Fresh Buy Local, the Waterloo African American Cultural and History Museum, the Community Foundation of Northeast Iowa, the Iowa Governor’s STEM Advisory Council, and others. ✓ Development of GIS extension for urban stormwater modeling application with training in its use provided to 25 federal, state and local agency personnel. 	<ul style="list-style-type: none"> ✓ Provided free geospatial software tools downloaded by users throughout Iowa and the world. ✓ Developed numerous web mapping and GIS applications. ✓ GeoTREE has provided more than 20 training and educational workshops for hundreds of federal, state, local and tribal government staff members.



Section 4: Regents Innovation Funding Report

UNI's 2014 Regents Innovation Funding Annual Report has been submitted and is on file with the Board of Regents.

Section 5: Collaborative Projects

Metal Casting Center (MCC) Collaborates with Ames Laboratory, ISU and UI

- The MCC is collaborating with the Iowa Innovation Corporation and Ames Lab at Iowa State University to investigate the characterization and assistance in the commercialization of spray atomized metal powders for direct metal laser sintering.
- The MCC is collaborating with the University of Iowa on a project funded by the Iowa Energy Center. UNI has been subcontracted to pour castings for UI and assist in the determination of thermo physical properties of foundry insulating materials and a grant awarded by the Iowa Energy Center to investigate Ablation casting of steel components.

IDM Collaborates with the Iowa Business Council, Iowa Economic Development Authority, Iowa Workforce Development and Kirkwood Community College

- *Home Base Iowa*
IDM, in collaboration with the Iowa Business Council (IBC), the Iowa Economic Development Authority and Iowa Workforce Development, is assisting Home Base Iowa in determining the current and future workforce needs of IBC member businesses and how those in-demand occupations match with occupations in the military branches. The objective of this project is to help returning veterans identify potential employment opportunities in Iowa.
- *Iowa's Creative Corridor's Regional Workforce Development Plan*
IDM, in collaboration with Iowa Workforce Development (IWD) and Kirkwood Community College, is assisting Iowa's Creative Corridor Region with the development of a Regional Workforce Development Plan. The Plan's purpose is to better align the region's current and future workforce to meet the needs of the employers in the seven-county region. The planning process built upon primary and secondary research conducted by IDM and IWD for the Creative Corridor Region. IDM has designed and facilitated the planning process, which was initiated by Kirkwood Community College, Cedar Rapids Metro Economic Alliance and Iowa City Area Development Group with Kirkwood Community College serving as the lead administrative partner. To develop the Regional Workforce Development Plan, a Regional Workforce Development Coalition was established which represents regional employers and businesses, school districts, higher education, government, workforce development agencies, non-profit organizations and economic development organizations.



Iowa Waste Reduction Center Collaborates with State and National Partners

- The IWRC, in partnership with the Des Moines-based Center on Sustainable Communities has created a program to reduce the amount of construction and demolition waste being discarded in landfills. This project, funded by the United States Department of Agriculture’s Rural Utilities Service program, consists of developing educational materials, a website, regulatory summaries and case studies while also conducting several workshops on reducing construction and demolition waste through deconstruction and other techniques.
- The IWRC’s STAR4D painter training program continues to work with and be funded by the United States Marine Corps (USMC) Corrosion Prevention and Control (CPAC) office. CPAC provides oversight to the initiatives taken throughout the year, as well as the subcontracts with Science Applications International Corporation and Vision Point Systems. Initiatives include providing painter training to U.S. military base spray painters and completing research and development projects.

Regional Business Center Partnerships Key to Success

- IASourceLink: The UNI and Iowa Economic Development Authority IASourceLink partnership continues to deliver one of the most content rich and trafficked SourceLink models in the nation to Iowa business owners. Co-contributors include ISED Ventures, Women’s Business Center, Iowa Department of Revenue, Technology Association of Iowa, Pappajohn Entrepreneurial Center, Connect Iowa, Iowa Waste Reduction Center, U.S. SourceLink, U.S. Small Business Administration, Iowa Small Business Development Centers, Iowa Farm Bureau/Renew Rural Iowa, Iowa Area Development Group, Iowa Association of Business and Industry, BizStarts, and many more. In FY2014, 28,049 visitors sought information and business assistance through the IASourceLink portal resulting in 511 direct interactions with Iowa business owners via the MyEntre.Net Business Concierge (with many more requests served by means of the IEDA Business License Information Center service). Additionally, 19 UNI MyEntre.Net powered webinars made available on IASourecLink have attracted 1,808 attendees – an average of 95 business owner attendees per online presentation- a record for the webinar program.
- Dream Big Grow Here: UNI Regional Business Center/Entrepreneurial Outreach, the Iowa Bankers Association, the Technology Association of Iowa, Renew Rural Iowa, the Iowa Economic Development Authority, Delta Dental and ten regional economic development organizations statewide partnered to conduct the third annual Dream Big Grow Here contest. The third year contest generated close to one million page views and tens of thousands of online votes and comments supporting Iowa-owned small business owners. The number of regionally sponsored contests represents two-thirds of all Iowa counties. The 185 contestants competed for \$71,500 in awarded prize money.



John Pappajohn Entrepreneurial Center Partners with Community Groups and Schools to Offer Youth Camps

- A STEM Entrepreneurship camp was offered in Cresco for fourth-grade student campers to learn about STEM and entrepreneurship while developing their own businesses. They enjoyed company tours, guest speakers, 3-D printing, and building solar race cars. Teachers from the Howard-Winneshiek middle school and Notre Dame Catholic School were trained to be facilitators for future STEM and entrepreneurship camps. The UNI JPEC developed this pilot camp model, adapted some curriculum from the University of Iowa’s Jacobsen Institute for Youth Entrepreneurship, and provided the training in conjunction with the UNI STEM region manager.

Center for Energy and Environmental Education (CEEE)

- CEEE is working with ISU Extension in Black Hawk and surrounding counties to strengthen commerce around local foods as well as creating a network of community-run gardens to increase access to fresh fruits and vegetables.
- CEEE collaborated with the Northeast Iowa Food Bank to establish a garden to produce vegetables for people in need.
- CEEE collaborated with the Leopold Center at ISU to host a workshop in soil health and cover crops.

Strategic Marketing Services (SMS) Partners with Iowa Companies

- Strategic Marketing Services leveraged its Regents Innovation Fund (RIF) allocation to formulate and market a branded market research program, **MarketSolve**, for Iowa based companies with strong technology offerings. For example, MarketSolve subsidized meaningful portions of market research scopes for Mechdyne Corporation in Marshalltown, and for Accumold in Ankeny. Mechdyne benefited from learning how large customers and prospects in the private and public sectors go about selecting technology partners. Accumold benefited from gaining deep insight into their global micro-mold markets: e.g., definitions, trends, needs, and outsourcing methodologies.

Section 6. Suggestions for New or Expanded Programs to Enhance UNI’s Impact in Iowa

UNI proposes a combination of new and expanded initiatives to support entrepreneurs and small businesses. Our primary focus is to enhance existing programs that have proven to be effective in building vitality for Iowa’s economy. Direct assistance will be provided to entrepreneurs and small businesses in all regions of Iowa and will build on the momentum in Iowa being recognized as a supportive place to start and grow a business. A brief description of the key initiatives are outlined below.

- 1) Advance Iowa (AI) – The Battelle Memorial Institute is outlining economic development strategies for Iowa and specifically recommended expanding AI (second stage company support) as a strategic priority in the recently released “Economic Development Roadmap for Iowa.” UNI’s AI program is endorsed by the Iowa Economic Development Authority as Iowa’s economic gardening hub. Second stage companies are defined as having 10-99



employees and at least \$1 million in sales. Many of the new jobs created, and the resulting economic impact for the economy, come from second stage companies. These companies have grown past the startup stage, but have not yet grown to maturity and are poised for additional future growth by selling to national and global markets. UNI's AI program has experienced initial success in delivering strategic assistance and support to 52 Iowa second stage companies in the past year. Additional funding is required to expand the service delivery channel by modestly increasing the staffing capacity through designated regional representatives and supporting entrepreneur roundtables. These expanded efforts will target companies within the state that have the greatest potential for job growth.

- 2) **Business Concierge (BC)** – Small business owners need access to business intelligence (market, demographic, industry, customer, etc.) and appropriate referrals to Iowa service provider partners and resources. In the past 6 months, the BC tested a statewide system providing direct support to entrepreneurs and connecting 400 entrepreneurs to needed data or to the correct service providers. The pilot program, the first of its kind in the nation, has won national recognition from the University Economic Development Association and the International Economic Development Council. The BC proposes adding three new initiatives within the BC program to more than double the number of small businesses served each year. First, the BC will be directly linked to local economic development organizations and resource providers throughout Iowa. UNI will embed the I-Framed BC technology modules onto many of the 300 Professional Developers of Iowa members' websites to provide direct connections to companies through a trusted resource. Second, another new initiative within the BC service is creating a Service Provider Referral Service. An enhanced referral service will be provided to public and not-for-profit service providers who work with and/or are contacted regularly by entrepreneurs looking to increase the profitability and scalability of their business. Third, the BC will pilot a focused interaction with female entrepreneurs for greater awareness of BC services with the intent of addressing Iowa's low ranking in female entrepreneurship. Connections will also be made to effective programs such as IA SourceLink and the UNI AppsLab.
- 3) **Additive Manufacturing** – Supporting the foundry industry has long been a unique service of the UNI Metal Casting Center. The installation of a large-format 3D sand mold printer has placed UNI in a unique position to help the castings industry innovate. However, small- and medium-sized foundries and pattern shops in Iowa need technical assistance prior to effectively using 3D printing technologies. CAD designs and modeling are needed for these companies to effectively integrate 3D printing into their operations. The UNI Metal Casting Center is proposing a new initiative to provide direct technical assistance for design and virtual modeling for small companies and entrepreneurs to enhance their competitiveness and to improve the castings industry supply chain throughout Iowa. Design assistance and virtual reality modeling are the primary barrier preventing Iowa's small and medium companies from benefiting from 3D printing. This is yet another step toward the UNI Metal Casting Center becoming the premier Additive Manufacturing Center in the United States.