

Quad Cities Manufacturing Innovation Hub = Outreach with a Plan

Curt Burnett sees his job two ways: he is both the pilot of a "connection machine" and a regional navigator, charting a long-range course toward the future for Quad Cities manufacturing.

The complicated part is that Burnett, executive director of the relatively new Quad Cities Manufacturing Innovation Hub, is doing both things while the machine is still being built.

The Quad Cities Manufacturing Innovation Hub, formally launched last fall, is designed to be part planning organization and part business outreach. Supporters envision an organization that eventually will know nearly everything about the capabilities of Quad Cities manufacturers and therefore will be

able to tackle items such as workforce and technology problems on a massive, regionwide scale. Building that scope will take years, however. So Hub officials right now are working to solve immediate needs by matching manufacturers with a host of experts who can make those businesses better.

CIRAS, a formal partner with the Hub, is slated to play a key role.

"I'm their connection to resources that are available to Iowa manufacturers," said Glenn Volkman, CIRAS account

manager for the Quad Cities region. "Our role in this is to be service providers and to partner with them on new services that can be provided."

"We talk about us being the Sherpa," Burnett said of his organization. "We're going to hold [businesses'] hands the whole way. But we're going to need specialists to help us with different parts of the journey."

The journey of the Quad Cities Manufacturing Innovation Hub formally began in August 2015, when the 6-year-

Continued on page 2

- 1 Quad Cities Manufacturing Innovation Hub = Outreach with a Plan
- 3 New CIRAS Advisory Council Members
- 4 Iowa Supreme Court Will Continue Special System for Business Disputes
- 4 ISU Lab Overview
- 5 CIRAS and Deaf Services Unlimited—A Partnership in Growth
- 6 Metal 3-D Printer Proving Popular with Iowa Manufacturers
- 7 New CIRAS Road Map Aims to Help Companies Navigate Government Contracting
- 8 Getting to Know Iowa's Construction Sector
- 9 What to Measure and What Works Best
- 13 State of the State
- 14 Chenhall's Staffing Finds Long-term Adviser in CIRAS
- 14 GovTalk—B2G Sales
- 15 Made in Iowa
- 15 Manufacturing Day
- 16 Registration Open for 2016 Manufacturing Leadership Program
- 16 Noteworthy
- 17 Iowa State University and Valent BioSciences Corporation Contribute to Fast-growing Biorationals Industry
- 18 Staff News
- 18 Upcoming Events
- 19 Contact Information
- 20 The Innovation Cycle

On the Cover: Equipment inside Genesis Systems Group, a Davenport-based company that calls itself "a recognized leader in robotic systems integrations."

CIRAS Mission: *Every day we will enhance the performance of industry through applied research, education, and technical assistance.*

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old Quad Cities Chamber of Commerce officially launched its new entity out of the chamber's Davenport office.

Paul Rumler, the chamber's former chief economic development officer, described it then as a tool to speed development of the 900-some manufacturing companies who exist within a 80-mile radius of the Quad Cities. Manufacturing makes up 18 to 20 percent of the regional economy, according to Rumler, while providing roughly 16 percent of its jobs. Many of those are small companies who soon could face new requirements from their customers to do business in newer, more high-tech ways.

"There is a litany of technology needs that will be coming over the next few years... If we can ensure that the majority of our manufacturers are digital ready, then we'll be in a really good place."

— Paul Rumler

"It's our job to look over the horizon," Rumler said in February. "There is a litany of technology needs that will be coming over the next few years... If we can ensure that the majority of our manufacturers are digital ready, then we'll be in a really good place."

Toward that end, the Hub in November announced a partnership with the Chicago-based Digital Manufacturing and Design Innovation Institute (DMDII), a \$320 million public-private partnership created to tackle various manufacturing issues using digital design technology. The relationship means Quad Cities businesses will have early access to promising new technology, while DMDII researchers will get to test new methods in a regional economy.

The Quad Cities Chamber of Commerce also is partnering with the University of Illinois, John Deere, and others to perform a \$5.5 million assessment of "Illinois communities that have been adversely impacted by changes in federal defense spending." Combined with other grants, the assessment means Burnett's organization will spend the next few years painstakingly developing a comprehensive assessment of Quad Cities manufacturers, what they can do, and what they need—as well as trying to pinpoint the high-priority areas where more resources should be focused.



"What we're trying to do is map the assets—all of the manufacturing assets that are in eastern Iowa and western Illinois—and understand what are our strengths, weaknesses, opportunities, and threats," Burnett said. "Basically, we're going to ask what technologies are going to be most important to manufacturing in the future. So when we go to diversify, we can plan for the future."

For example, one possible role for the Hub would be to form cooperatives so that many small manufacturers can lower modernization costs and share time on expensive machinery.

"This really gets visionary in a hurry," Burnett said. "What we're really trying to do is create this manufacturing ecosystem... It's a world where all the key economic players understand what the drivers are, and they're all playing

their roles. It really is a Silicon Valley kind of an idea that we're trying to create—one focused on manufacturing technology."

Rumler and Burnett acknowledge that major benefits from this aspect of the Hub may be years away—although Burnett believes "it could happen actually quicker than you think, because there's some really cool economies of scale that can be had. You just have to have somebody to herd the cats."

Technology advancement means "everybody is going 100 miles an hour in the same direction," he said. "What if we had somebody up in the control tower to make sure we're sharing more?"

In the meantime, the Quad Cities Manufacturing Innovation Hub is reaching out to individual companies through entities such as CIRAS, Iowa Innovation Corporation, Iowa Lean Consortium, the University of Iowa, and various community colleges, as well as the Illinois Manufacturing Excellence Center, CIRAS' sister affiliate for Illinois in the federal government's Manufacturing Extension Partnership.

Volkman said CIRAS, following up on questionnaires circulated by the Quad Cities Chamber of Commerce, already has been working with companies to identify various needs. Some want help with Internet sales, he said, while some are being pushed by their business customers to upgrade equipment or achieve higher levels of certification.

"The recognition is that a lot of Iowa manufacturers are not digital ready," Volkman said. "They're not using computer-aided design. Their equipment is not hooked up to the Internet. So, another big push is to get some of these legacy companies up to date."

Burnett believes the next few years will be essential to get Quad Cities manufacturers to take the Manufacturing Innovation Hub seriously and buy into its mission.

"If I can't help you with your everyday problem," he said, "then why are you going to worry when I tell you about a problem that might not occur for a few months or years?"

Inside the Alcoa Davenport Works plant.



➤ **For more information about CIRAS' role in the Quad Cities Manufacturing Innovation Hub, contact Glenn Volkman at gvolkman@iastate.edu or 515-205-3786.**

New CIRAS Advisory Council Members

Curtis Burnett, executive director of the Quad Cities Manufacturing Innovation Hub, works with industry, academia, and government to help regional manufacturers deploy innovation solutions and increase



Curtis Burnett

intraregional sourcing, with the ultimate goal of bringing new manufacturing jobs to the Quad Cities region. Burnett has more than 30 years of experience at John Deere, where he most recently worked as the enterprise manager for industrial engineering and advanced manufacturing and had global responsibility for process standardization, factory master planning, and manufacturing innovation. He holds a bachelor's degree in industrial engineering from the University of Illinois, as well as a certificate in strategy and innovation from the Massachusetts Institute of Technology.

Kirk Bjorland, president and CEO of Iowa Innovation Corporation, has extensive experience in banking, networking, economic development, entrepreneurial ventures, and leadership. He holds a bachelor's degree in business administration from Graceland College. Iowa Innovation Corporation connects start-up companies to the innovation ecosystem in Iowa, including sources of public and private funding, mentors, and other resources.



Kirk Bjorland



The judges of Iowa's Business Specialty Court are (left to right) Annette Scieszinski of Albia, Michael Huppert of Des Moines, and John Telleen of LeClaire.

Iowa Supreme Court Will Continue Special System for Business Disputes

A popular business-specialized court system will continue indefinitely and could be expanded to more cases or other types of complex lawsuits, depending on an Iowa Supreme Court review later this summer.

Iowa Supreme Court justices created the Business Specialty Court Pilot Project three years ago in a bid to streamline Iowa's judicial system and smooth out the handling of certain types of civil lawsuits. The logic was that business cases would proceed much more smoothly if they were heard by specialized judges and using procedures tailored to those types of disputes.

Business court, which had been slated to expire on May 1, was created to resolve disputes founded in one of nine specific subject areas where the argument involved more than \$200,000 and/or a request for injunctive or declaratory rulings. Court records show Iowa's three specialized business court judges heard a total of 21 cases between May 2013 and July 2015, most of them involving business tort claims, internal matters of a business, or accusations of a breached contract. Ten cases were resolved during that period in an average time of 8.75 months—nine of them by settlements.

An annual evaluation report completed last summer by Iowa's state court administrator found strong support among "a substantial majority" of lawyers for continuing the court and no complaints related to the time spent on it by the judges involved.

Chief Justice Mark Cady signed an order in February continuing the business court beyond its scheduled expiration. Justices plan to review the court this summer to see if changes or an expansion are warranted.

Among other things, the judges involved—Michael Huppert, Annette Scieszinski, and John Telleen—have suggested broadening the court to other types of "complex litigation" or creating a "less than voluntary" process for cases to land on the specialized docket.

➤ **For more information about Iowa's Business Specialty Court Pilot Project, visit http://www.iowacourts.gov/About_the_Courts/Specialty_Courts/Business_Court.**



Materials Analysis and Research Laboratory (MARL)

The Materials Analysis and Research Laboratory (MARL) is a core facility of the Office of Biotechnology at Iowa State University. The MARL's function is threefold—research and development, teaching, and service. Its facilities are used for chemical and physical characterization of a wide variety of materials to support research and teaching programs within the university. The MARL also conducts research on unusual material evaluation problems for outside agencies.

Example Uses

- Determine quantitative chemical analysis of alloys to verify composition
- Document migrations of elements in electrical contacts with use
- Characterize concrete microstructures as they relate to concrete durability
- Characterize fly ash chemistry and its impact on mixtures with cement
- Identify contaminants in solder joints
- Measure air void content and distribution in concrete
- Identify corrosion products and mode of attack
- Determine chemical stoichiometry of compounds
- Characterize contaminant particles and unwanted residues to determine their source
- View microscopic morphology for product development

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A Deaf Services Unlimited interpreter assists a Deaf employment candidate during a job interview.

CIRAS and Deaf Services Unlimited—A Partnership in Growth

Diana Kautzky's drive to help her parents ultimately led to a growing business aiding Deaf clients around the country.

As a child of Deaf adults, Kautzky's native language is American Sign Language. She began interpreting as a child, helping her parents interact with business associates and clients.

"There's definitely a personal connection to what I do," she said. "I was the communication link from their lives to the rest of the outside world."

After serving as executive director for Deaf Services of Iowa, Kautzky launched Des Moines-based Deaf Services Unlimited in 1996. Initially the company's only employee, she now works with about 360 interpreters and 30 others who specialize in on-site interpreting and CART (Communication Access Real-time Translation) services.

Today, Deaf Services Unlimited works in 46 states and in a wide variety of settings. Higher education, government, live performances, legal proceedings, political events, and medical appointments are just a few environments where the company interprets on a daily basis. It is a full-service agency that employs on-site interpreters, off-site interpreters through

video remote interpreting, and CART services.

"We like to say, 'Where communication takes place, you'll probably find us there,'" Kautzky said, adding that by providing services for the Deaf and hard-of-hearing populations, her company helps businesses and agencies meet compliance standards. "We see ourselves as partnering with customers to achieve those goals."

Deaf Services Unlimited began working with CIRAS roughly eight years ago, Kautzky said, after the company made a few plays for government contracts and found only mixed success. Now, CIRAS staff play a key role each time the company seeks new clients. "CIRAS became our partner to help us grow," Kautzky said.

Deaf Services Unlimited has become a strong player in the government marketplace, said Pam Russenberger,

director of CIRAS' Procurement Technical Assistance Program (PTAP). "They are very capable of performing and working on government contracts. We're really there as that resource to help with strategy and just whatever we can do."

"CIRAS is always on our team. They help us quickly get the information we need, and they give us feedback on how to be more competitive when we are submitting a bid."

— Diana Kautzky

Kautzky describes CIRAS as a link between Iowa companies and potential clients. "CIRAS is always on our team," she said. "They help us quickly get the information we need, and they give us feedback on how to be more competitive when we are submitting a bid."

Kautzky said she joined the CIRAS Advisory Council in 2015 as one way to give back to the program that's provided her company with so much support. Board members provide feedback on CIRAS initiatives and gain networking contacts through the process.

"It's really the opportunity for CIRAS to get a pulse on what's going on in Iowa," Russenberger said.

➤ For more information, contact Pam Russenberger at prussen@iastate.edu or 515-509-7814.

Metal 3-D Printer Proving Popular with Iowa Manufacturers

Iowa State University's cutting-edge additive manufacturing technology gained national attention earlier this year when CIRAS staged a formal ribbon cutting for its new metal 3-D printing system.

The metal laser sintering system is part of a \$900,000 investment CIRAS made last fall to help educate Iowa businesses on the benefits of metal additive manufacturing. The machine arrived on the Iowa State campus in October and by the February 11 ribbon cutting had already been used for more than a dozen projects involving Iowa companies.

"This is a game changer," CIRAS Director Ron Cox said at the ceremony. "It allows you to design new types of products, new ways of doing things."

National media eventually picked up coverage of the ribbon-cutting, leading CIRAS to field inquiries about the machine from 12 states.

The new machine, an innovative metal version of increasingly common plastic 3-D printers, was paid for with a combination of money from CIRAS, the College of Engineering, the Iowa Economic Development Authority, and the federal NIST Manufacturing Extension Partnership. Key figures from those agencies were tasked to perform the actual ribbon cutting—with metal scissors printed especially for the occasion.

CIRAS believes metal additive manufacturing is poised to change the way companies make and design many



"This is a game changer. It allows you to design new types of products, new ways of doing things."
— Ron Cox

Top: The actual ribbon cutting involved Chris Hill, director of CIRAS' Technology Assistance Program; Iowa State College of Engineering Dean Sarah Rajala; Beth Balzer, business development manager for the Iowa Economic Development Authority; and Phil Wadsworth, regional manager for the NIST Manufacturing Extension Partnership.

products, tools, and fixtures. Geometric limits imposed by the production process will be greatly reduced, making it possible for some companies to produce complex parts and materials in a matter of days instead of weeks.

Mike Ralston, president of the Iowa Association of Business and Industry, told *The Des Moines Register* that CIRAS' technology has the potential to transform manufacturing for many Iowa businesses, especially small and

medium-sized companies that haven't had access to 3-D printing. "It will save a lot of time and money," he said.

The technology involves powdered metal and a laser that essentially welds the dust into shapes defined by a computerized design. Building one 40-micron-thick layer at a time, the machine can produce nearly any metal part that will fit into a build envelope that's slightly smaller than 10 inches by 10 inches by 12 inches.

➤ For more information, contact Chris Hill at chill@iastate.edu or 515-294-5416.



New CIRAS Road Map Aims to Help Companies Navigate Government Contracting

Want to get the most out of CIRAS' government contracting expertise? A new training schedule launched in January provides companies a step-by-step guide for getting the maximum benefit from CIRAS offerings.

The training program, created by specialists with CIRAS' Procurement Technical Assistance Program (PTAP), includes both new and long-standing CIRAS courses, offered both online and on-site in each corner of the state.

Pam Russenberger, program director, said the new road map arose because CIRAS recognized "a need for some standard training that all clients within the state of Iowa should have access to."

Companies seeking information about government contracting can start with a monthly webinar covering the basics of the topic and its opportunities in Iowa. "There's a lot of variety, and the webinars are a chance to find out if it's right for you," Russenberger said.

In-person sessions generally are free, Russenberger said. Classes will be staged once a year in each of four regions, so business leaders have the opportunity to attend sessions in their home regions or travel to another

location if it works better for their schedules.

Online programs can be taken by anyone, anytime, anywhere—although the CIRAS website suggests certain prerequisites for some. The goal, Russenberger said, is to rapidly provide as much education as possible while maintaining flexibility. Small companies are busy, she said. "People at these businesses wear a lot of different hats."

Small companies, especially, can benefit from the classes, said John Nelson, sales manager for ESCP Corp., a Davenport fabrication company. Nelson's firm has been named the prime contractor on 34 government contracts during an approximate eight-year period working with CIRAS.

Lance Martin, of Calhoun Communications in Sioux City, said CIRAS did "a fantastic job of training us on the intricacies of doing business with the government" and "opened several

doors for us we wouldn't otherwise have gotten through."

Bill Hayes of Straight Shot Express, a Davenport trucking company, said the PTAP courses have been beneficial. "Through many wonderful one-on-one discussions and several training sessions, we have a better understanding of how the government process works and how to work within the process."

Russenberger said the new training is based on ideas from around the country and input from CIRAS surveys of Iowa companies. Five unique classes now are offered on marketing alone, and a greater emphasis has been made on networking.

A business-to-business networking event will be offered at least quarterly in each of the four regions, Russenberger said, with some areas considering monthly events.

➤ **For more information or to sign up, visit the training calendar at www.ciras.iastate.edu/procurement/training. Contact Pam Russenberger at prussen@iastate.edu or 515-509-7814.**

Getting to Know Iowa's Construction Sector by Liesl Eathington

How big is Iowa's construction sector?

The construction sector's 116,000 full-time and part-time jobs accounted for nearly 6 percent of all Iowa jobs in 2014. Most of those jobs are found in very small firms; more than 90 percent of Iowa construction firms have fewer than 5 employees.

Three out of four construction entities are classified as nonemployer firms, with no paid employees other than the owner(s). Of more than 8,400 firms with employees on payroll, about half are organized as S-corporations.

Measured by gross domestic product (GDP), which includes payments to workers and returns to owners and investors, the construction sector contributed more than \$7 billion toward Iowa's economy in 2014, accounting for 4.2 percent of total GDP. (See Table 1.)

What industries and activities are included within the construction sector?

It's a diverse mix of business establishments engaged in the construction of buildings; heavy and civil engineering projects such as roads and bridges; and specialty trades such as masonry, electrical work and plumbing, roofing, painting, and finish carpentry.

Specialty trades firms account for the largest share of activity within Iowa's construction sector, tallying 66 percent of jobs and 48 percent of the value of sales generated. Building construction firms account for 23 percent of jobs and 32 percent of sales. Heavy or civil engineering construction firms account for 11 percent of construction sector

Table 1. Construction Sector Shares of Iowa Totals

	Construction Sector	Percent Share of Iowa Total
Total jobs (2014)	116,000	5.7 percent
Establishments (2013)	34,358	12.1 percent
GDP (2014)	\$7.058 billion	4.2 percent

jobs, but they generate 20 percent of the value of construction sector sales. (See Figure 1.)

How are Iowa's construction sector firms and sales distributed geographically?

Iowa's construction firms are split almost evenly between metropolitan and nonmetropolitan territories, with the distribution by county aligning closely with population. Nonmetropolitan counties average nearly 13 construction firms per 1,000 residents. In metropolitan areas, the average is closer to 10.

Based on U.S. Census Bureau data from 2012, construction work performed within Iowa accounts for 80 percent of sales or receipts going to Iowa

construction firms. The in-state percentage is slightly lower for heavy and civil engineering construction (78 percent) and higher for specialty trade contractors (82 percent). Work done in neighboring states accounts for about 9 percent of Iowa's construction sector sales overall. Illinois and Nebraska are the largest markets outside of Iowa, each accounting for 3 percent of sales.

Who works in Iowa's construction sector?

Construction laborers comprise the largest share of the sector's workforce, accounting for 15 percent of workers. Carpenters are second with 8 percent of jobs, followed closely by office and administrative support workers.

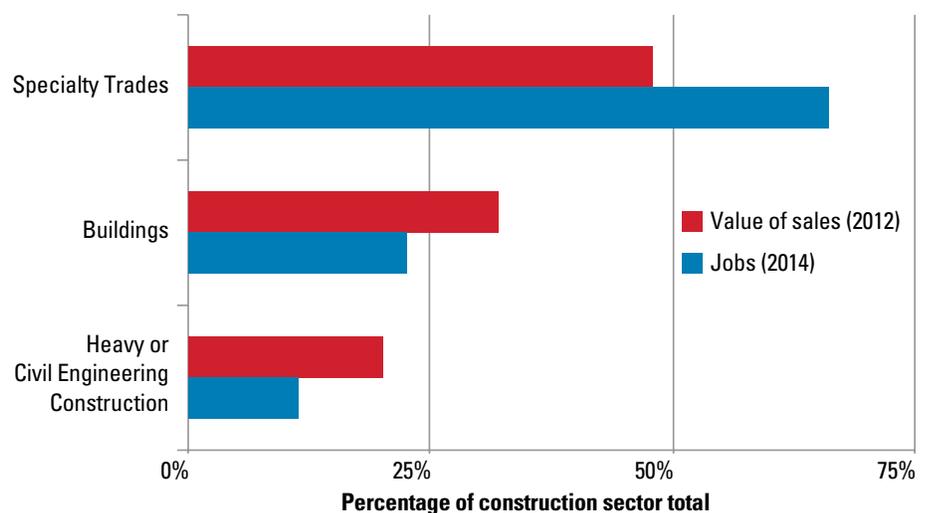


Figure 1. Composition of Iowa's Construction Sector

Multiple versions of these strategies are now being practiced across Iowa:

- **Attract.** Many companies have boosted their workforce by recruiting from groups such as part-time workers, the disabled, stay-at-home spouses with children, or “young” senior citizens. Some programs, such as Home Base Iowa, additionally seek to woo newly discharged military veterans to Iowa, while other programs have pursued immigrants from foreign countries or former Iowans now living in other states. In some sectors, where the workforce traditionally has been dominated by a single gender, companies have found success by recruiting the other, under-represented sex. And some firms have used higher pay or a high-quality workplace culture to lure employees from a nearby competitor (although business leaders are quick to point out that this tactic nets no new workers for a community or region).
- **Educate.** This is another form of expanding the available pool. Widespread activities—such as the Governor’s STEM Initiative (science, technology, engineering, and math), Elevate Iowa, and higher education career fairs—exist to identify new workers on their way into the labor force and direct them toward certain types of jobs. From an employer’s standpoint, the goal is to get youth thinking early about your company, your industry, or a profession from which you hire.
- **Retain.** One of the most cost-effective ways for companies to reduce the need to hire new, quality workers is to keep the workforce they’ve already recruited and taught to be productive. A company’s ability to retain employees can be influenced by training, incentives, corporate culture, higher pay, wellness programs, health insurance, or other benefits. A more complex approach involves designing ways to keep employees during down cycles within an industry. A few firms have found innovative ways to share employees between companies or diversify their product/service portfolios to offset seasonal or recessionary downturns.
- **Reinvent.** Automation likewise can help companies increase output and use existing workers more efficiently. (Automating also can have a secondary benefit of assisting with workforce attraction and retention, since jobs in companies with a high degree of automation tend to pay higher wages with less job tedium and muscle strain.) Another approach to increase output per employee is to incorporate continuous improvement programs like Lean or Theory of Constraints.

What to Measure

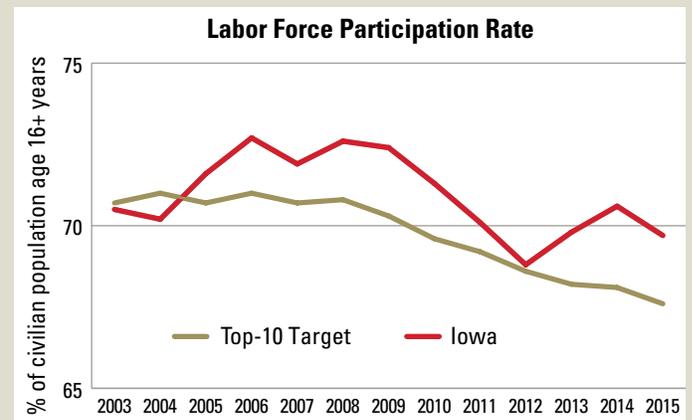
Regardless of what workforce strategy you choose, it’s important to track progress to ensure that investments are leading to the desired outcomes. This article presents just a few of many possible KPIs that can be used.

Which one is best?

We propose starting the conversation with a different question: “What might Iowa gain by becoming a top-10 state in each KPI?”

ATTRACT

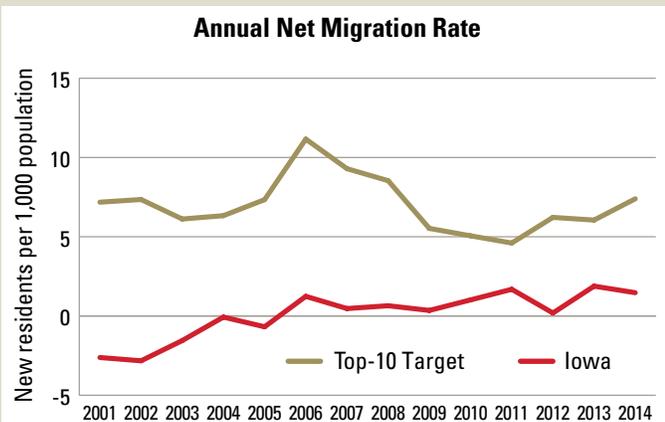
Iowa does an excellent job of attracting its residents into the workforce, with 69.7 percent of its working-age population in the labor force in 2015. The national average was 62.7 percent. Given that Iowa exceeds national participation rates among all racial, ethnic, age, and gender groups, it is unlikely the state can squeeze many more workers from its existing working-age population.



TAKEAWAY: Iowa currently ranks 4th among all states in its total labor force participation rate. Further improvement on this KPI is probably unlikely without a dramatic increase in overall wages.

In-migration flows increase the size of Iowa’s workforce pool at the expense of other states and countries. So net migration (the net increase) is a good aggregate measure of various recruitment tactics, including recruitment of veterans, dislocated former Iowans, and young professionals.

Iowa has shown slight improvement on its net migration rate in recent years, after several years of suffering net losses. We attracted 1.47 net new migrants per 1,000 residents in 2014, ranking 26th among all states.

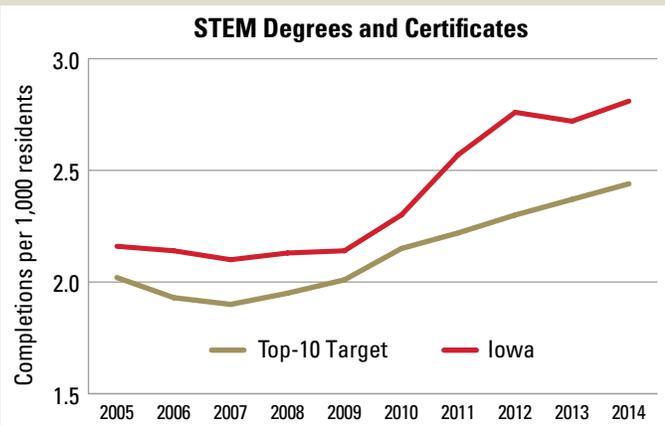


TAKEAWAY: Iowa currently ranks 26th among all states in net migration. Though improvements have been made, no simple solution will likely allow Iowa to reach a top-10 level anytime soon.

EDUCATE

Considering the constraints on the size of Iowa's overall labor force, another avenue for growing the number of skilled workers is to increase the educational attainment of labor force members. We propose two education-related measures. The first is the number of STEM degrees or certificates completed per 1,000 Iowa residents.

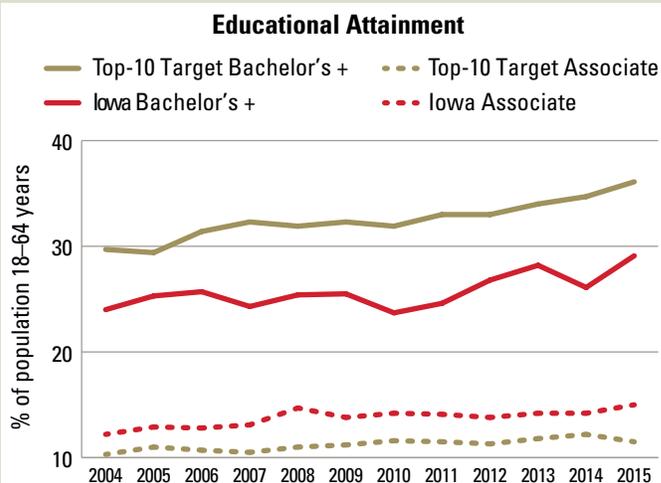
Based on analysis of degree completions at post-secondary institutions, Iowa currently ranks 5th nationally with 2.8 STEM degrees/certificates granted per 1,000 residents. However, analysis by the data firm EMSI shows that Iowa ranks 38th in its percentage of STEM jobs in the economy. The disparity between those rankings suggests that Iowa might already be struggling to absorb all of the STEM graduates produced by its educational institutions.



TAKEAWAY: Iowa currently ranks 5th among all states in STEM-related degrees. Without creating a stronger STEM degree-to-employment pipeline, the benefits from improving on this KPI might spill over to non-STEM industries or to other states.

For more information on how Iowa companies have dealt with the state's workforce issue, see *CIRAS News* archives at <http://ow.ly/ZRV3Y>.

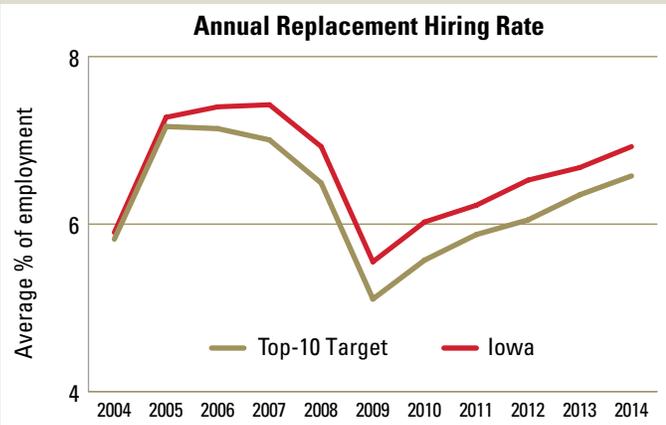
Another pair of education metrics focuses on the educational achievement of Iowans. Iowa currently ranks 4th nationally, with 15.0 percent of its 18–64 population having completed an associate degree. (The national average is 9.8 percent.) In contrast, only 29.1 percent of Iowa's 18–64 population has four-year college degrees, which ranks 25th among the states.



TAKEAWAY: Iowa ranks 4th nationally in percentage of the working-age population with associate degrees and 25th in percentage with bachelor's degrees. Improvements in both metrics have benefits to workers and firms.

RETAIN

Obviously, one of the easiest ways to solve a hiring problem is to keep the workforce you already have. Workers tend to commit strongly to companies with a positive culture and generous benefits (traits that also tend to attract workers from other companies). A common way for individual firms to measure retention is turnover rate—the fraction of your workers who quit and must be replaced each year. At the statewide level, a comparable metric is the replacement hiring rate, which measures the average number of hires (not counting new job creation) as a percentage of employment. During 2014, Iowa's replacement hiring rate of 6.9 percent ranked 18th (lowest) among the states.

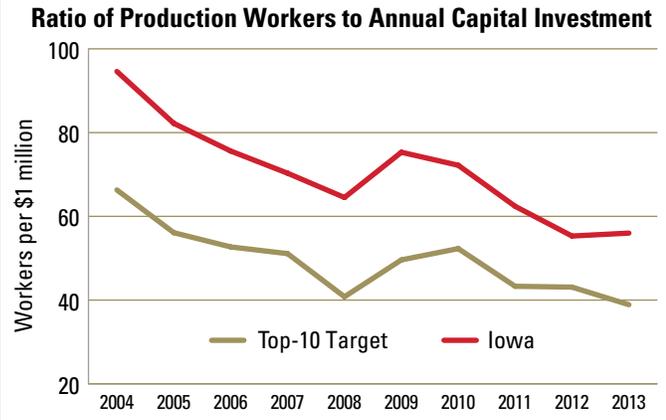


TAKEAWAY: Iowa currently ranks 18th on this measure. Improvement on this KPI could result in substantial cost savings to firms. However, it would not address the needs of expanding firms looking to add new employees.

REINVENT

Firms that are unable to find new workers may ultimately move toward more automated systems. Unfortunately, no metrics are available to describe the level of automation within or across industries. Here we simply compare the number of workers relative to annual capital investment in the manufacturing sector, following the assumption that more automated processes should require fewer workers per dollar of capital.

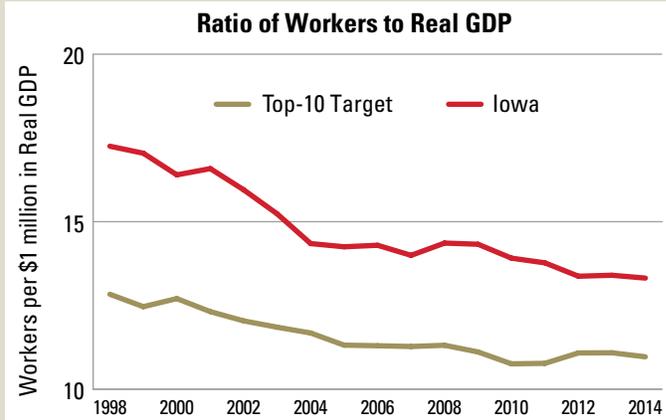
Iowa's manufacturing sector had approximately 56 workers per \$1 million in capital investment in 2013.



TAKEAWAY: Iowa has improved its ranking on this measure from 42nd place in 2003 to 26th place in 2013. If this metric is a real indicator of the level of automation in Iowa industry, then there likely is significant room for improvement.

Another way to grow sales without increasing the number of employees is to implement continuous improvement strategies and then move the employee resource to areas of sales growth.

Absent any economy-wide measure of productivity strategy adoption, we examine the number of workers required to produce every \$1 million of gross domestic product (GDP). This metric is not ideal because industries vary in their productivity levels and states vary in their industrial mix. It does, however, give a general sense of a state's relative position and whether or not it is improving over time. Iowa had 13.3 workers per \$1 million in GDP in 2014, down from 17 workers in 1988.



TAKEAWAY: Iowa currently ranks 33rd on this KPI. Though not a perfect comparative measure, it might still provide an overall sense of the degree to which continuous improvement strategies have been successfully implemented.

The Bottom Line

Regardless of which strategy you choose, metrics must be tracked and evaluated to make certain you're making the right decision. None of the measures we've presented above are magic bullets. They will not have the same impact on all companies or all regions, because companies and regions can be different in key ways. Company leaders should follow key metrics and make decisions based on the implementation cost of each strategy and what potential yield may come from the result.

From a statewide perspective, we believe the data strongly suggest a potential area of focus. Iowa already ranks among the top 10 states in three KPIs: STEM degrees/certificates, percent of population with an associate degree, and labor participation rate. Protecting rather than improving on these strengths may be a reasonable goal. For instance, if Iowa dropped from 4th place to 10th place in labor force participation rate, the loss to its overall labor force would be more than 50,000 workers.

In contrast, Iowa does not rank as high as many other states in net migration, replacement hiring rate, and ratios comparing employment to capital investment and GDP. Developing new strategies in these areas might be a reasonable goal.

Focus Recruitment Close to You, because Most Iowans Aim for Short Commute

by Liesl Eathington

No discussion of Iowa’s workforce is complete without acknowledging the intense competition for workers among Iowa communities. As the state’s industrial structure diversifies, its occupational mix diversifies as well. That translates, in some communities, to a shrinking pool of available workers for manufacturing firms and other companies with specialized needs.

Employers in small communities, drawing from a comparatively small local labor pool, may face challenges in matching open positions to available people. Commuting statistics bear this out: In Iowa’s small cities (with populations under 2,500), only 13 percent of jobs are filled by local residents. That figure jumps to 28 percent for medium-sized cities (2,500–49,999 residents) and 35 percent for large cities (50,000 or more). Statewide, only 27 percent of workers are employed within their city or township of residence.

With nearly three quarters of Iowa workers commuting across political jurisdictions, communities are in constant competition. Many cities have commissioned “laborshed” studies to define the geographic territory from which local employers are likely to compete effectively for workers. While individual city laborshed profiles have their uses, an understanding of the state’s broader commuting dynamics

may prove useful for worker recruitment efforts. This article summarizes Iowa commuting patterns in 2013.

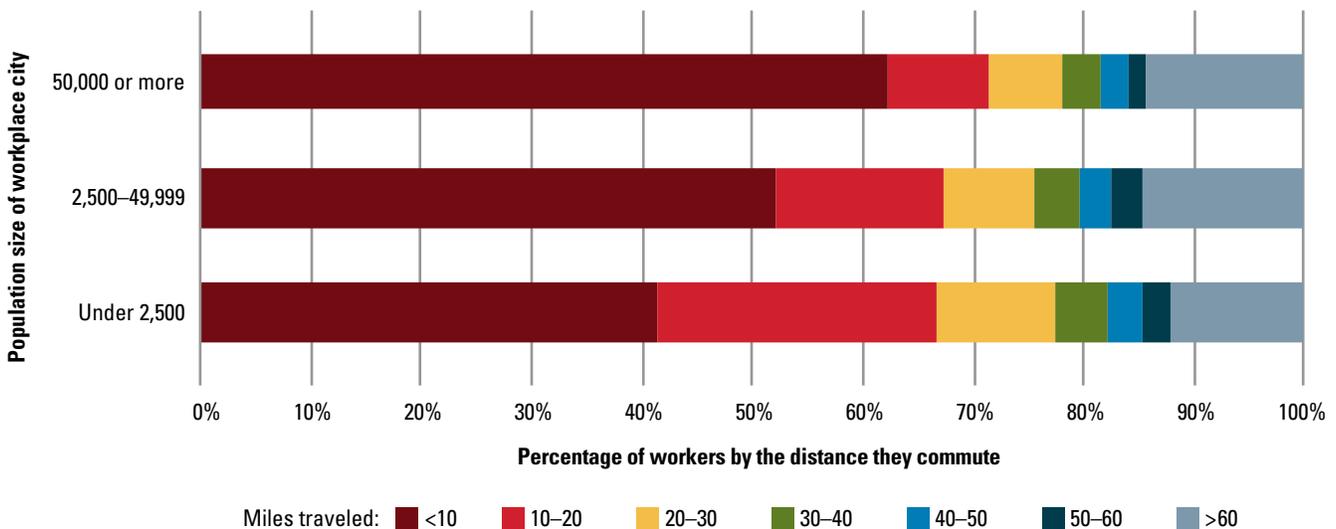
The figure below illustrates aggregate commuting flows by distance and workplace city size. It shows that Iowa’s largest cities draw a much higher share of their workers from within close proximity. In cities with 50,000 or more residents, 62 percent of workers live within 10 miles. Small and mid-sized cities draw only 41 percent and 52 percent of their workers from within a 10-mile radius, respectively, while relying more heavily on workers who live 10–30 miles from their jobs.

The distinctions by city size tend to even out as distance increases, and most workplace locations in Iowa draw at least 80 percent of their workers from within a 40-mile radius.

Laborshed studies foster a dangerous temptation to focus on geographic reach, or “draw,” as if long commuting

distances by workers somehow quantify workplace desirability. Such a focus overlooks an important reality—a worker’s willingness to commute decreases rapidly with distance. Statewide commuting patterns reveal an undeniable preference among Iowans to work close to home: 56 percent of workers live within 10 miles of their workplace, while fewer than 15 percent commute more than 60 miles.

Commuting preferences may help explain some of the recruitment and retention challenges faced by Iowa employers, particularly in smaller communities. Employers who rely on distant workers face stiffer competition for those workers, especially as commuting costs to workers in time and money take their toll. Employers and communities who inflate the size of their commuting territories risk diluting their recruiting efforts with diminishing returns.



Chenhall's Staffing Finds Long-term Adviser in CIRAS

Business owners in search of customers understand intuitively that government agencies need materials and equipment. But one Davenport firm has used CIRAS' help to break into an often-overlooked area for government contracting: providing people.

A government market exists for all types of personnel services, including security, design, IT, or administrative employees, said CIRAS government contracting specialist Beth White. Chenhall's Staffing & HR Network matches companies with talented candidates while helping workers find permanent positions.

When White joined CIRAS five years ago, Chenhall's already was a client and was gearing up to apply for the 8(a) Business Development Program offered through the U.S. Small Business Administration. Certified businesses are given special preferences for federal government contracting, but the application process is complicated and can be frustrating, White said.

The small business program requires that a "socially and economic disadvantaged" person own the applying company, and the owner of Chenhall's is of Cherokee ancestry. White said Chenhall's obtained status approval in 2012 (it's good for nine years) and is enjoying many benefits.

The program permits the federal government to offer contracts directly to these companies without competition. It also allows member companies to partner with larger businesses through mentoring agreements, something that White believes Chenhall's has taken advantage of with great success.

"What we have learned... is that there is always more to know about government contracting," said Chenhall's President Bob Hickman. "The most valuable lessons we have learned may be when to walk away from pursuing an opportunity, as well as how to make the most of the limited resources we, as a small business, have available. CIRAS has taught us how to be smart about defining what makes a 'good' opportunity for Chenhall's, and when it makes sense to develop partnerships as opposed to trying to compete on our own."

CIRAS staff now serve mainly as a support system for Chenhall's contract applications, White said—"a second set of eyes." Among other things, the business has landed a staffing contract with the USDA and a multimillion dollar contract (shared with a mentor) with the Rock Island Arsenal to provide IT and staffing services.

AT A GLANCE

Chenhall's Staffing & HR Network

LOCATION: Davenport, Iowa

EMPLOYEES: 7

FOUNDED: 1950

FOCUS: Provides temporary and temporary-to-permanent employees, as well as help with recruitment, pre-employment screening, employee training, career counseling, and payroll transfer services.

GovTalk—Direct Federal Contracting

by Beth White

So, you think it's a pain to deal with the government? You think there's too much red tape? And you're certain that there's nothing the government could ever want to purchase from your business?

You probably should rethink that.

Government contracting might be a phenomenal opportunity for your business—one you've never even considered; or one that you, like others, previously abandoned based on an untested perception that it's not worth the hassle.

CIRAS thinks you owe it to yourself to find out for sure.

The potential is enormous. The U.S. government spent approximately \$24 billion on goods and services in 2015 (not counting an estimated \$60 billion in credit card charges that fell below the \$3,500 reporting threshold). Roughly \$779 million of that money went to businesses right here in Iowa.

But, of course, that all went to a few "Big Dog" military-related companies, right?

Nope.

The federal government includes more than two dozen distinct agencies, each with multiple layers and diverse missions. That \$779 million spent in Iowa went to buy lawn care, furniture, paint, welding gasses, and computer/IT services, among other things.

Remember also that small businesses play a huge role in federal government procurement—so much so that every agency is assigned its own goal for how much business should be given to small companies. Certain purchases are set aside exclusively for small businesses and disadvantaged businesses, such as those owned by women or minorities. Special offices exist in each agency for this purpose alone.

Yes, the government has its own language and plenty of rules. But so do other companies with which you already do business.

CIRAS government contracting specialists understand why you're worried. We're here to help. CIRAS will educate and advise you as you work through the steps and processes for the government market. We can be your partner and show you that it doesn't *have* to be a pain.

For more information, contact Beth White at whiteb@iastate.edu or 563-370-2166.

Look closely at Iowa's rolling landscape and you may be surprised to discover what is made here. Hawkeye State companies create everything from machinery and pastry to software and bridges. Each issue, CIRAS News tries to provide a sampling of some of the Iowa businesses you can support.

Webster City Custom Meats, Inc.

Overview: The company makes bacon, ham, loin, and sausage products. One of their newest product lines is a pork patty made in a variety of flavors.

Founded: Incorporated in 1973 as Webster City Custom Meats, Inc.

Employees: 160

Website: www.webstercitycustommeats.com



SPM Gaskets, LLC

Overview: SPM Gaskets, LLC, is a family owned and operated manufacturer making a wide range of gaskets and sealing devices, from embossed metal to injection molded thermal polyurethane. The company uses in-house design, proprietary materials, coatings, and processes. It sells to businesses of many different sizes in the automotive, heavy duty, industrial, and marine markets.

Founded: 1976 (under current ownership since 2011)

Location: Spencer, Iowa

Employees: 24

Website: www.spmgaskets.com



Taylor Construction Inc.

Overview: Taylor Construction Inc. is a bridge building company with 44 years of experience providing customized solutions to customers on building new bridges; rehabilitating bridges; building whitewater recreation parks, boat ramps, and fishing piers; and doing deep foundation concrete work. The company also recycles old bridge beams and parts for private sector use.

Location: New Vienna, Iowa

Founded: 1972

Employees: 45

Website: www.taylorconstr.com



Manufacturing Day

Planning is now under way for an effort to repeat last fall's huge Iowa celebration of national Manufacturing Day.

CIRAS is again working with Iowa industry, educational, and civic leaders to schedule public events in each of the state's 99 counties. Plans are being led by a steering committee that includes CIRAS, the Iowa Association of Business and Industry, Elevate Iowa, Iowa Area Development Group, and Iowa State University Extension and Outreach. Organizers hope to exceed the 139 activities held last year, which itself was a significant celebratory upgrade from the 20 events held in 2013 and 24 in 2014.

Last fall CIRAS spearheaded a month-long, county-by-county approach in a bid to boost awareness of Manufacturing Day across the board, said CIRAS account manager Paul Dunnwald. "Manufacturing is critical to the well-being of every county in Iowa, so we need to make sure that everybody is involved."

The result? Iowa ranked fifth nationwide in terms of the total number of events held and drew national attention, including praise from the U.S. Secretary of Commerce.

Manufacturing Day, or "MFG Day," was created as a unified, national effort to promote the benefits of a manufacturing career. Schools, companies, and civic groups combine to educate about the potential rewards that industry offers.

"We did not do this by ourselves," said CIRAS account manager Glenn Volkman. "If it wasn't for our partners, this would not have happened."

CIRAS and those partners expect roughly 75 percent of 2016's activities will focus on high school and college students and their parents. Other events will highlight what's new at Iowa's manufacturing companies. Some businesses plan to offer tours, and some company representatives may visit events outside their plants to ensure that all Iowa residents have easy access to MFG Day activities.

One of the first events on the schedule so far is this fall's Taking the Road Less Traveled conferences, a twice-yearly event at Iowa State University to educate girls in 8th through 10th grades about STEM careers.

"There's a bias that manufacturing is a dirty, grungy job, and it's not," Dunnwald said. "A lot of times kids don't make that connection."

Thombert Inc., a maker of polyurethane wheels in Newton, hosted a Manufacturing Day event last year and plans to participate again this October, said manufacturing manager Maureen Lockwood.

"Each year we strive to improve the experience," Lockwood said. "We would like to identify a hands-on activity for students this year regarding something with automation or technology they can interact with."

For more information or to participate in Manufacturing Day, contact Paul Dunnwald at dunnwald@iastate.edu or 515-509-1377.

Manufacturing in Iowa

- Iowa has **approximately 6,110 manufacturing firms.**
- Manufacturing contributed **\$31.2 billion** to Iowa's economy in 2014, representing **18.3 percent of GDP.**
- More than half (**52.7 percent**) of Iowa's manufacturing jobs are located in rural counties.
- The average Iowa manufacturing job paid **\$54,420** in 2014.

Registration Open for 2016 Manufacturing Leadership Program

Spaces are filling up quickly for this summer's CIRAS Manufacturing Leadership Program following the success of last year's inaugural session.

Just 20 spots are available in the week-long program, and interest already is running high, said Mike O'Donnell, Manufacturing Extension Partnership director for CIRAS. The session is July 31 through August 5 in Ames.

"We've had outstanding feedback from the people who were in the program," O'Donnell said. CIRAS has remained in contact with last year's participants, and several members already have taken on new leadership roles. "It's showing that it's getting them moving very quickly."

Martina Bockenstedt, general manager for FarmTek and Growers Supply, said the program inspired her to think differently.

"Based on what I learned, I have changed my own personal strategy and how I go about making decisions and performing my work," she said. "I believe that focusing on strategy in all areas will lead our company toward higher profits and sales growth."

The program was created to help participants learn leadership skills and build business acumen to become more effective senior leaders. The curriculum is based on challenges faced by managers as they move up through their careers.

Fifteen participants from across Iowa, ranging from front-line managers to company vice presidents, took part in last year's program. Morning sessions focused on broad business skills. The afternoon sessions focused on critical leadership skills, such as communication, culture development, and talent development. Session leaders included CIRAS staff members, Iowa State faculty, and consultants.

About 80 percent of the curriculum for this year's program will echo the first year, O'Donnell said. The few changes expected will address current trends in the manufacturing industry.

Bockenstedt said she still uses communication skills she learned at last year's session "on a weekly basis," and she tries to perfect her public speaking "each and every time."

Program participants remain in contact with each other, O'Donnell said, thanks partly to a private LinkedIn page created by CIRAS staff.

"That was one of the goals," O'Donnell said. Networking with others in the industry provides ongoing relationships that can jump-start business contacts as well as provide personal support.

"Not only do they understand how to lead a business, but they find other people like them," he said. "Developing a trusted network is crucial to success."

"We've had outstanding feedback from the people who were in the program."

— Mike O'Donnell



CIRAS Wins National Recognition for Government Contracting Road Map

The CIRAS Procurement Technical Assistance Program (PTAP) was recognized by its national peers in April for its extraordinary efforts to educate Iowa companies on the intricacies of government contracting.

Iowa received the Outstanding Project of the Year award April 6 at the spring conference of the Association of Procurement Technical Assistance Centers (APTAC) in St. Louis. APTAC represents more than 90 government contracting assistance organizations throughout the United States, Guam, and Puerto Rico. According to APTAC, the annual award is meant to recognize an accomplishment "that stands out from the usual conference, event or other activity that all PTACs organize and undertake" — especially, one that is unique, innovative, and creative and can serve as a role model for other PTACs to emulate in their own programs.

CIRAS, after much groundwork and planning throughout 2015, earlier this year launched a comprehensive training program designed to standardize the way Iowa companies learn about government contracting. The new training road map includes a series of webinars that companies can take from any place at any time, as well as in-person events scheduled yearly in each of four regions around Iowa. The goal, according to program director Pam Russenberger, is to rapidly educate as many people as possible while maintaining maximum flexibility for busy companies. "This award recognizes the hard work contributed by each member of the team. I could not be more proud of the team and honored that APTAC acknowledged these efforts."

For more information on the program, see a story on Page 7 of this edition of *CIRAS News*.

➤ **For applications for the Manufacturing Leadership Program, contact Mike O'Donnell at modonnll@iastate.edu or 515-509-4379.**

AT A GLANCE

Valent BioSciences Corporation

LOCATIONS: Osage, Iowa; plus Libertyville and Long Grove, Illinois

EMPLOYEES: 100 at Osage plant

OVERVIEW: Produces a variety of low-environmental-impact substances for the agriculture, plant growth regulator, public health, and forestry sectors.

Iowa State University and Valent BioSciences Corporation Contribute to Fast-growing Biorationals Industry

Karen Richards sits at a prominent Iowa outpost in a portion of the biochemical industry that's seen double-digit growth in recent years, and she sees bright potential ahead.

It's a future, experts say, that could be shaped substantially by innovative organizations such as Richards' employer, Valent BioSciences Corporation (VBC), and Iowa State University.

"Iowa has the agricultural capacity to be a significant industry influence through the usage of biorational products," said Richards, manager of the VBC plant in Osage, Iowa. "Biorationals" refers to pesticides and other substances designed to have a low environmental impact.

"Iowa farmers are focused on making technology a central driver of their agricultural production," Richards said. "Simultaneously, VBC is developing technologically advanced, next-generation pesticides and plant growth

regulators that partner well with the innovative spirit of today's farmers."

Bryony Bonning, an Iowa State professor of entomology and director of the National Science Foundation's Center for Arthropod Management Technologies (CAMTech), estimates that the global microbial pesticide market was worth \$900 million in 2012.

Growth has come partly via consumer demand for

organic products, Bonning said—but also from an increasing demand for biorational pesticides to use in parallel with conventional pest control.

"The use of multiple agents with different modes of action . . . significantly reduces the likelihood of resistance," Bonning said. The market

"Iowa has the agricultural capacity to be a significant industry influence through the usage of biorational products."

—Karen Richards

An analyst at Valent BioSciences dispenses mosquito larvae for bioassay testing. (Note the use of technology to avoid neck strain.)



currently needs biopesticides for controlling problems such as mosquitos that spread the West Nile, Dengue, and Zika viruses, she said, because "the use of chemical insecticides for mosquito management has been restricted in Europe because of extensive problems with insecticide resistance."

Valent BioSciences Corporation makes a variety of mosquito-control products, Richards said—as well as other microbial insecticides, nematicides, and plant growth regulators that are used in production agriculture.

The Osage plant opened in 2014, touted as the first plant in the world built from the beginning for biorationals.

Two years later, Richards says VBC, with help from CIRAS, has benefited from a pipeline of well-trained Iowa State University graduates. The company hired seven Iowa State grads and interns when it opened and later added nine more.

In addition, some of Valent's 100 full-time employees have participated in Iowa State/CIRAS workshops on microbiology, food safety, and changes to ISO 9001, and the company has worked with mechanical engineering students on a capstone project.

Bonning said Iowa State faculty continue to develop (and patent) new biorational pesticides, as well as promoting the products' use in integrated pest management approaches. CAMTech also provides industry-supported research as a National Science Foundation Industry/University Cooperative Research Center.

For more information, visit camtech.ent.iastate.edu.



Brenda Martin
Same Work, New Employer

Longtime CIRAS account manager Brenda Martin transitioned from her role as an Iowa Central Community College employee to become an Iowa State University employee at the beginning of 2016. Martin has worked as an account manager with CIRAS since 2002 and continues to do so. Her role has changed over the years, from supporting a territory in north central Iowa to supporting a statewide community college collaboration to supporting industry. Since 2013, Martin has focused on the food industry. She has traveled statewide calling on processors of food, feed, pet food, and nutraceuticals, as well as their supply chain.

Martin describes her primary focus as “listening to the processors in Iowa so I can connect them to the best-fit resources to help their industry progress, putting new opportunities within their reach, improving profitability, and creating sustainable growth.”

Martin’s background includes more than 20 years in manufacturing foods and pharmaceutical products as a quality and operations manager. She has expertise in gap analysis, long-term planning, management of people, consumer response programs, line expansions involving technology transfer, supplier validation, and product stability protocols. Martin also has an extensive background in regulatory compliance.

Third Annual Conference Showcases Opportunities to Grow Through Government Contracting

Want to better understand how to do business in the government sector? The third annual Iowa Vendor Conference on August 23 at Hy-Vee Hall in downtown Des Moines is a full-day event that can help you and leaders in your business tap into the wealth of opportunities that federal, state, and local government contracting offers. Through a variety of workshops, you can learn to identify new potential customers, find opportunities called Simplified Acquisitions, actually understand the various questions in www.SAM.gov registration, and network with key contracting personnel, buyers, and exhibitors. Key-note speaker Guy Timberlake, chief visionary officer and CEO of The American Small Business Coalition, will discuss “Getting Your Foot in the Door” during the conference and will provide a free half-day “Competitive Intelligence Bootcamp” on August 24.

“Procurement staff from various city, state, and federal agencies are dedicating this time to meet with Iowa businesses, so we hope that businesses take advantage of this unique opportunity,” said Jodi Essex, CIRAS government contracting assistant.

Space is limited, and preregistration is required for this free event. Visit www.ciras.iastate.edu/events.asp for details and to register. Additional questions should go to Jodi Essex at jodir@iastate.edu or 515-509-0769.

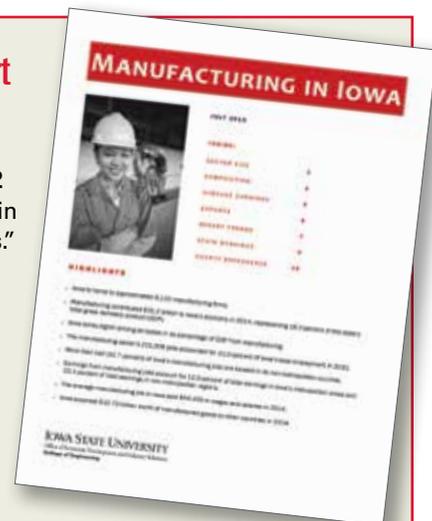
- **2016 ABI Taking Care of Business Conference**
June 14–16, 2016
8:00 a.m. to 5:00 p.m.
Sioux City
- **Bid Proposal Writing Success, Part 2**
June 22, 2016
8:30 a.m. to 9:30 a.m.
Bettendorf
- **GovCon 101**
July 12, 2016
9:00 a.m. to 10:30 a.m.
Webinar
- **Sausage and Processed Meats Short Course**
July 18–22, 2016
8:00 a.m. to 5:30 p.m.
Ames
- **Theory of Constraints, What Is the Goal?**
July 20, 2016
9:00 a.m. to 3:00 p.m.
Decorah
- **Marketing to the Government**
July 26, 2016
9:00 a.m. to 10:00 a.m.
Webinar
- **Manufacturing Leadership Program**
July 31–August 5, 2016
8:00 a.m. to 5:00 p.m.
Ames

For more information, visit www.ciras.iastate.edu/events.asp.

Updated Manufacturing in Iowa Report

Iowa’s 6,040 manufacturers contributed \$31.2 billion to Iowa’s economy in 2014, representing 18.3 percent of the state’s GDP. Manufacturing is the second largest sector in Iowa’s economy, behind “financial activities.”

These and other facts can be found in CIRAS’ annual *Manufacturing in Iowa* report. A partially updated version of the report was recently posted on our website, and more updates (to different data) are slated to come in July. **For more information, check out the lower right-hand corner of the page at www.ciras.iastate.edu.**



CONTACT INFORMATION



Since 1963, we have delivered proven services to enhance the performance of industry. Our approach—Engage. Educate. Embed.—creates specific solutions that allow each business and its community to prosper and grow. Coupled with a satisfaction guarantee, our typical client has achieved a 200% ROI. Clients have reported an economic impact of more than \$2 billion over the past five years.

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CIRAS PARTNERS

Center for Crops Utilization Research
 Center for Nondestructive Evaluation
 College of Engineering
 Community and Economic Development

Iowa State University

Department of Environmental Health and Safety
 Engineering Career Services
 Engineering-LAS Online Learning
 Extension and Outreach
 Industrial Assessment Center
 Meat Science Extension

Des Moines Area Community College
 Iowa Area Development Group
 Iowa Association of Business and Industry
 Iowa Business Council
 Iowa Central Community College
 Iowa Farm Bureau

Iowa Innovation Corporation
 Iowa Lean Consortium
 Iowa Sustainable Business Forum
 North Iowa Area Community College
 Northeast Iowa Community College
 Quad Cities Manufacturing Innovation Hub

IOWA STATE UNIVERSITY

Office of Economic Development and Industry Relations

College of Engineering

Center for Industrial Research and Service

Extension 4-H Building

Ames, Iowa 50011-3632



www.ciras.iastate.edu

THE INNOVATION CYCLE

What Is a Failure Analysis? *by Adam Boesenberg*

CIRAS' Materials Group exists to help the many small- and medium-sized manufacturers in Iowa who work with materials every day but don't have the in-house expertise necessary to solve every problem or make all decisions about their materials or metallurgical issues.

We're a resource to turn to for help.

A lot of what we do is called failure analysis. A "failure" involves more than just a broken part. We generally find ourselves trying to uncover a root cause so that preventative measures can be taken and future similar failures can be prevented.

In many ways, it's akin to being a forensic investigator. Great effort must be taken to preserve evidence and gather information—via photographs, engineering drawings, standards, materials certifications, and supplier information, among other things. Understanding the part and its function is also important, so we look at product history, failure rate, service conditions, and environmental conditions.

We often conduct on-site visits to better understand the product and assembly process. The more we know, the

better able we are to formulate the right plan of attack, and the better opportunity we have to resolve any issue.

Collection of properly labeled samples is one of the most important processes in a failure analysis. Clients often find that they can ship all the parts we need to get started. But great care must be taken to get failed parts to the laboratory in the best condition reasonably possible. Don't try to reassemble. Human instinct frequently makes us want to put broken things back together again, but the practice can make failure analysis more difficult.

Many clients report that they've been able to lower production costs after a failure analysis by selecting or processing materials in a more efficient manner to improve product performance. Other companies claim they continuously improve the quality of their products by identifying failure root causes. Others use failure analyses to improve the safety and reliability of their product and increase service life.

➤ **For more information about a materials problem or concern, contact Adam Boesenberg at aboesenb@iastate.edu or 515-294-5903.**