



Iowa State Experts' Analysis Helps Groschopp Improve Products, Satisfy Customers

Stronger manufacturing processes and new materials are anticipated to help Groschopp Inc. retain more than \$800,000 in sales and save its customers \$50,000 annually through avoided repairs.

Groschopp, which is based in Sioux Center, Iowa, manufactures fractional horsepower electric motors to complete a variety of low-powered tasks. The company's products include a full line of AC, DC, brushless, and universal motors, as well as right angle worm, planetary, right angle planetary, and parallel shaft gearboxes.

Groschopp was seeking to improve the quality and reliability of one of those gearboxes when it recently sought help from CIRAS, Iowa State University's Materials Analysis Research Lab (MARL), and IPRT Company Assistance (IPRTCA), a longtime part of Iowa State's now-reorganized Institute for Physical Research and Technology (which formally became part of CIRAS in July 2014).

The gearbox in question is integrated with a motor, and this gearmotor is attached to a vehicle transmission. Groschopp identified a gearbox component that was drying out the gear grease and changed this component by adding oil. The oiled prototypes solved the dry grease issue, but Groschopp sought

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AT A GLANCE

Groschopp

FOUNDED: 1930

LOCATION: Sioux Center, Iowa

EMPLOYEES: About 200

IMPACT: More than \$800,000 in retained sales

OVERVIEW: Groschopp is a manufacturer of highly engineered fractional horsepower electric motors and gearmotors.

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On the Cover: An employee assembles a gearmotor in Groschopp's Sioux Center, Iowa, manufacturing facility.

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

CIRAS is supported in part by the DoC/NIST Manufacturing Extension Partnership, the DoD/DLA Procurement Technical Assistance Program, and the DoC/EDA University Center Program.

CIRAS News is published quarterly by the Center for Industrial Research and Service and edited by the CIRAS publications team. Design and production is by Hobbs Designs, LLC. Please send questions, comments, or address changes to ciras.news@iastate.edu.—January 2015

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Groschopp's products include gearboxes (bottom right) integrated with motors used in vehicle transmissions.

“The goal of this specific project was to better understand the ideal shaft material and heat-treat combination that would consistently handle the life requirements,” said Scott Lundquist, a design engineer at Groschopp and an Iowa State alumnus.

The metallurgical analysis verified that Groschopp had received the correct gear materials from suppliers. But experts found that manganese sulfide stringers—molecular additives used to improve the shaft's machinability—also had created microscopic weak spots on its outer surface. Essentially, the heat-treatment layer that was used to make the part's surface harder was spalling, or falling off.

Adam Boesenberg, who did the testing at Iowa State, recommended Groschopp consider using alternative materials—ones without the molecular inclusions—to improve the part's consistency. Groschopp now is working with its heat-treatment vendor to improve the lifetime quality and reliability of its gearboxes. “We're primarily using the results to find a better material or better heat-treat process, or a combination of both,” Lundquist said.

Lundquist said the project will improve Groschopp's relationship with its customers. He expects the company to retain \$800,000 in annual sales due to the research and changes that the company will make.

In a separate project, Groschopp asked CIRAS and MARL to analyze electric motor parts and recommend improvements to extend the overall life of an electric motor brush. According to Paul Ross, commercial engineering manager at Groschopp, the company theorized that either external airborne contaminants or contamination from something inherent to the manufacturing process was causing brushes to wear inconsistently.

MARL's researchers analyzed Groschopp's brushes and commutator with an electron microscope. Ross said the testing helped eliminate some suspected contributors to the brush's wear, increased Groschopp's awareness of materials used, and sparked more training for operators handling materials on the factory floor.

“CIRAS was a big help,” he said.

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A 2013 report by The Boston Consulting Group estimated that U.S. manufacturers “will capture \$70 billion to \$115 billion in annual exports from other nations by the end of the decade.”

Iowa Manufacturers Should Watch Reshoring Numbers Closely, CIRAS Research Finds

Manufacturing jobs that fled U.S. soil decades ago for cheaper overseas labor might now be poised to come back—but only in certain sectors and only a little at a time, according to a forthcoming white paper from two CIRAS experts.

The upshot for Iowa is that producers in a handful of tipping-point industries should be keeping a close eye on labor and energy prices. In some cases, CIRAS experts say, those numbers could prove that manufacturers are paying too much to foreign suppliers or that U.S.-based suppliers are missing an opportunity.

“If you’re a manufacturer, you need to be reevaluating your costs,” warned CIRAS program manager Mike O’Donnell. “Because other people are doing that and bringing certain work back.”

An analysis of economic data and national “reshoring trends” by CIRAS project manager Marc Schneider and postdoctoral research assistant Ranojoy Basu shows that rising overseas labor prices have shifted the math in certain manufacturing industries. Factory work that used to be cheaper outside the United States now might not be once you also consider costs such as transportation, energy, currency fluctuations, and potential quality issues, among other things.

“In the past, people primarily decided whether to offshore or onshore based on how much the labor cost was or the price they got from the supplier,” Schneider said. “Now, manufacturers are smarter, have had more experience, and have seen that there are other factors.”

A 2013 report by The Boston Consulting Group estimated that U.S. manufacturers “will capture \$70 billion to \$115 billion in annual exports from other nations by the end of the decade.” The report estimated that growth in U.S. exports, combined with production reshored from China, could create more than 2.5 million American factory jobs by 2020.

According to the Boston Consulting analysis, much overseas manufacturing has involved products such as clothing, textiles, and other items that require extensive labor inputs but relatively little in the way of costs for transporting materials. Consultants view that work as unlikely to return to the United States. Meanwhile, production for products with low labor inputs and high logistics

costs—such as food, petroleum, wood, paper, glass, and stone—has never left.

Experts say the stuff in the middle—products with moderate logistics and labor costs—might or might not be ripe for a return.

CIRAS experts advise Iowa manufacturers in the machinery, furniture, and plastics and rubber industries to pay special attention, because Iowa has a relative specialty in these industries and they’re in this middle ground. In addition, Iowa manufacturers purchase disproportionately high volumes of fabricated metals from low-cost countries. Supply chain leaders could find potential cost savings by reshoring.

“There are certain industries that we have a high specialization in—that means Iowa companies know how to do this better than other people in the United States—and they’re tipping-point industries,” O’Donnell said. “That means we need to be going out and trying to win that business.”

➤ For more information about reshoring (or for a copy of the white paper), contact Marc Schneider at maschn@iastate.edu or 563-221-1596.

AT A GLANCE

Ryko Solutions

FOUNDED: 1973

LOCATION: Grimes, Iowa (headquarters); Barrie, Ontario, Canada (tunnel manufacturing facility)

EMPLOYEES: Approximately 500

ANTICIPATED IMPACT: \$2.4 million in new sales, \$1 million in equipment investment, and \$100,000 cascading impact to boost two Iowa-based suppliers; plus saved three to six months in product development time.

OVERVIEW: Ryko Solutions is the largest provider of managed car wash systems in North America, offering an integrated, end-to-end vehicle solution consisting of automatic/rollover equipment through its core Ryko division and tunnel equipment through MacNeil Wash Systems, a Ryko Solutions company.

CIRAS Prompts \$3.4M Economic Impact by Helping Ryko Solutions Build Better Funnel

A new design for handling car wash chemicals is expected to generate more than \$3 million in economic impact for a Grimes manufacturer and its suppliers after CIRAS helped the company use cutting-edge technology to speed its new product to market.

Ryko Solutions, based in Grimes, Iowa, describes itself as the “largest manufacturer of managed car wash systems in North America,” selling various forms of rollover car wash systems to gas stations, convenience stores, car dealers, and private entrepreneurs across the continent. One of the company’s newest products (it launched in October) is the patent-pending CleanFill chemical concentrate management system. Until now, the car wash operator, owner, or manager had to find a machine, hire a service, or simply summon the brawn necessary to lift 5-gallon buckets or 15-gallon drums to refill the car wash chemicals. Ryko’s new system changes that by shrinking the size of refill containers to 2.5 gallons.

“Instead of having to move around something that’s 50 or 150 or 300 pounds, the operators can manage a jug that weighs 25 pounds,” said David Simpson, engineering manager at Ryko.

But before the system could use smaller jugs, Ryko needed to develop a special plastic funnel to place atop its large chemical holding tanks so customers could avoid chemical spills. The funnel also needed to have a mechanism to pierce the jugs’ foil seals.

Ryko created an initial design, but the company also wanted to get parts more quickly than normal for developmental testing. Ryko primarily fabricates its car wash machines from aluminum, stainless steel, and carbon steel, but it sought to use rapid prototyping for this project—something not usually done for sheet metal products.

Enter CIRAS.

Chris Hill, CIRAS project manager, helped Ryko navigate the world of rapid prototyping services—from suggesting alterations to improve the part’s design to creating the prototype.

“Additive manufacturing, sometimes referred to as rapid prototyping or 3-D printing, is a method that uses 3-D CAD geometry and various types of technologies to build a part layer by layer,” Hill said. “A technology, typically a laser, is used to cure each layer of material. Using these methods, you can produce very representative and functional parts very quickly.”

To prove out the design, Ryko evaluated the full-scale prototype and tested it—then made a few alterations and tested a second prototype.

“We were able to use 3-D printing to create several design iterations on the receiver unit at full scale to evaluate and field test,” said Simpson. “What this then allowed us to do was settle on a final design before making the investment in the injection mold tooling. Ryko had never done this before, and through our working relationship with CIRAS, we found out they could be a resource to make this happen.”

Simpson estimates that Ryko saved three to six months of development time by using rapid prototyping. The company was able to unveil its 3-D prototype at a trade show and start taking orders several months in advance of the product launch date.

New sales from the funnel are expected to top \$2 million in 2015. Additionally, Ryko is investing \$1 million to upgrade customers’ dispensing equipment on-site and to acquire manufacturing equipment for injection mold tooling and automation. The new product also is

helping boost business at two other Iowa companies—Innovative Lighting Inc., of Roland, and Product Development Partners, of Newton—that Ryko uses to supply its tooling and molding parts.

And the impact doesn’t stop there. CIRAS already is helping Ryko with a second design project using rapid prototyping, this time for a plastic cover so the funnel can be used outdoors or within car wash bays that are exposed to the elements. This product is expected to create an additional \$400,000 in new business for Ryko.



The plastic funnel created via rapid prototyping sits atop a large chemical holding tank and is just one part of Ryko Solutions’ CleanFill chemical concentration management system. The complete tank assembly is shown here.

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

CIRAS Innovation Summit Seeks to Map Future for Iowa Machinery Makers

Iowa machinery manufacturers have seen their share of U.S. machinery exports more than double since 2000, according to a CIRAS analysis of U.S. industry statistics.

The analysis, completed by Iowa State University economist Liesl Eathington for an upcoming CIRAS-sponsored summit on the state of machinery production in Iowa, also shows that Iowans have a competitive advantage over the rest of the nation—especially when it comes to making agricultural and construction equipment.

Government statistics show Iowa has a disproportionate share of U.S. jobs in most subsectors of machinery manufacturing—a sign that expertise exists here. Nationwide data on jobs and gross domestic product (GDP) show machinery makers rank as the second-largest manufacturing subsector in Iowa behind food manufacturing. Compared to the country as a whole, Iowa outpaces its proportional share of machinery manufacturing jobs in all subsectors but mining. The state has nearly 11 times the number of jobs in construction machinery as it should, based on Iowa's share of the U.S. workforce, and 16 times the expected number of jobs in agricultural implement manufacturing (see Figure 1).

What's it all mean?

CIRAS experts are pondering that as part of a five-year project funded by the United States Economic Development Administration's University Center Program. CIRAS spent much of November and December questioning Iowa machinery makers about their businesses and use of technology. The plan is to analyze all the information, develop a strategy and path going forward, then present it all to the machinery makers at a special summit scheduled for April 2 in Ames.

"It all centers around innovation and technology," said Shankar Srinivasan, a CIRAS program manager. "Those are the ropes through which we are trying to control the horse."

Statistics indicate that Iowa's machinery-making horse has wandered

slightly off the path in recent years.

Iowa machinery makers have seen real GDP per job decline almost every year since 2005, despite a gradual upward trend in the national numbers (see Figure 2). Iowa's sustained period of above-average productivity ended in 2011, when state numbers dipped below the national average. Some of the decline might be a normal part of the business cycle, Srinivasan believes. Experts believe Iowa's dominant and highly cyclical agricultural equipment industry is in the early portion of a declining phase—meaning a normal downturn in farm machinery production might be pushing down the sector's numbers as a whole. Or, the drop in GDP per job might

be a more troubling sign of some other problem in declining productivity.

The analysis continues. CIRAS hopes for each Iowa machinery business that participates in the summit to develop a strategy that includes advice on what new technologies or innovative ideas might improve the industry.

"Our goal is to bring that GDP per job number from a state of decline to either a stable or an inclined state," Srinivasan said.

The CIRAS Machinery Manufacturing Innovation Summit is scheduled for April 2 at the Gateway Hotel in Ames. For more details on registration, go to <http://www.extension.iastate.edu/registration/events/ciras/prmis/>.



Figure 1. The ratio of Iowa jobs in various sectors compared to the national average. The chart means Iowa has 16 times its proportional share of the U.S. jobs involved in making agricultural implements.

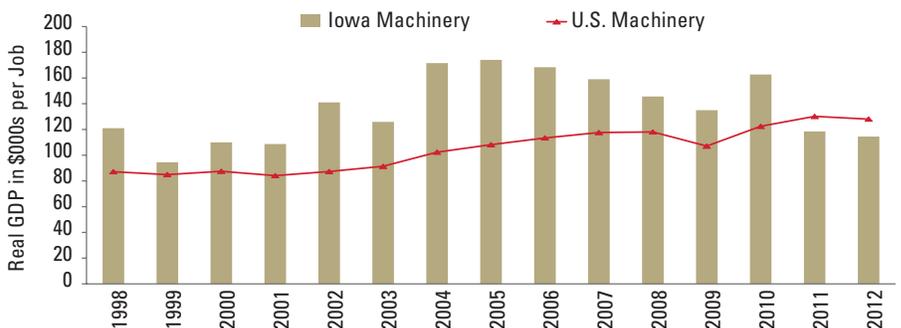


Figure 2. Until recently, Iowa machinery manufacturers had a long history of being more productive than the United States. The chart shows Iowa GDP per machinery job remained above the national average for 13 years before dipping below it in 2011.

Striving for Gender Balance in Production Jobs by Liesl Eathington

Women account for 48 percent of Iowa's workforce but only 27 percent of its production workers. In an era of growing concern over the state's skilled worker supply, can Iowa employers entice more women into production jobs?

The answer may depend on whether or not Iowa women can be convinced to opt for manufacturing instead of some more traditional employment roles.

Male workers have long dominated skilled production occupations in the United States. In 1970, when women accounted for 38 percent of the U.S. workforce, they held only 7 percent of jobs classified at the time as "precision production" occupations. Their share of many skilled production occupations remains low today, even as their share of the overall U.S. workforce has climbed to 47 percent. In 2013, women accounted for just 5 percent of machinists, 5 percent of welders, 5 percent of computer control programmers and operators, and so on. Women's share of production occupations at all skill levels stood at just 28 percent nationally in 2012.

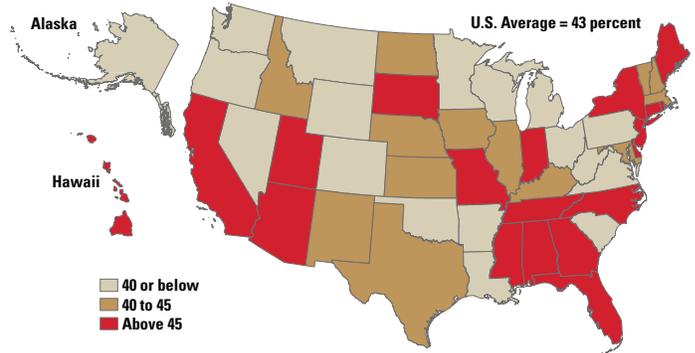
Conditions in Iowa would seem to favor greater gender balance in production occupations. The state's female labor participation is high by national standards: 81 percent of working-age women participate in Iowa's labor force compared to the U.S. average of 73 percent. In addition, manufacturing has a relatively large presence in Iowa's economy. Across all occupations, the manufacturing sector employs 16 percent of Iowa workers compared to just 10 percent nationally. Nonetheless, occupational employment patterns suggest that Iowa actually has greater gender disparity in its production jobs than many other states.*

Gender Equity Index

In Iowa, 5.1 percent of working women and 12.4 percent of working men held production jobs in 2012. The ratio of those two percentages yields a "gender equity index" of 41, suggesting that Iowa women are less than half as likely as men to choose work in a production occupation. An index value of 100 would indicate women in that particular state are equally likely as men to choose a production occupation.

Iowa ranks 31st among states in the gender equity index for production jobs. Figure 1 shows how the various states compare. New Jersey ranks highest with an index of 60, followed by Florida, Mississippi, and New York. Louisiana has the greatest gender disparity in production occupations with an index of 18, followed by West Virginia, Alaska, and Wyoming. For the nation as a whole, the gender equity index for production occupations is 43 percent.

Figure 1. Gender equity index for production occupations, 2012



Production jobs certainly aren't the only occupations with gender imbalance in Iowa. Table 1 shows the percentage distributions of the state's male and female workers by broad occupational grouping. Professional and related occupations, which include teachers and nurses, employ more than one-quarter of Iowa's female workforce compared to just 15 percent of the male workforce. Service occupations, including food service workers, health aides, and personal care workers, claim the second-largest share of female workers, followed by office and administrative support occupations. A woman is more than twice as likely as a man to choose a service occupation and more than three times as likely to choose office or administrative support work. In order to entice more women into production jobs, employers will have to disrupt these dominant employment patterns.

Table 1. Distribution of Iowa workers by occupation, 2012

	% Share of Workers		Gender Equity Index
	Men	Women	
All occupations	100.0	100.0	100
Professional and related	15.4	25.3	164
Service	10.5	21.3	203
Office and administrative support	6.2	19.9	321
Management, business, and financial	17.1	14.7	86
Sales and related	9.4	10.1	107
Production	12.4	5.1	41
Transportation and material moving	12.7	2.5	20
Farming, fishing, and forestry	1.4	0.5	36
Maintenance and repair	7.2	0.3	4
Construction and extraction	7.8	0.2	3

With the continued infusion of technology into manufacturing processes, production jobs increasingly require more brain and less brawn. Yet even as these occupations evolve in Iowa and elsewhere, their staffing patterns remain stuck in an archaic configuration that more closely reflects June Cleaver than Rosie the Riveter. That pattern seems unlikely to change quickly.

*Source data for this article derived from the Current Population Survey, U.S. Bureau of Labor Statistics.

SPECIAL REPORT: WORKING ON WORKFORCE

AT A GLANCE

IOWA'S WORKFORCE SHORTAGE

(Third in a Series of Articles)

THE IMMEDIATE PROBLEM: Iowa has a gap between its share of "middle skill" jobs and the number of people who have those skills.

HOW WE GOT HERE: Decades of lower-than-normal unemployment means fewer available workers. Young people tend to leave rural Iowa, while experienced factory workers now are approaching retirement.

PREVIOUS ARTICLES: Iowa businesses have been reaching out to schools and recruiting from other companies and/or states and countries.

THIS TIME: Gender — Recruiting the people you don't have.



Workers discuss quality procedures on a brand new packaging line at Omnium in Hampton.

Iowa Workforce: Fill empty jobs by wooing women? by Ron Cox and Jeff Eckhoff

To understand what's happening at the Omnium plant in Hampton, Iowa, you have to go back 20 years, to the company's first warm-weather layoffs.

Omnium, a subsidiary of Land O'Lakes that makes crop-protection chemicals, successfully recruited female employees throughout the 1990s by selling the fact that workers could spend summers at home with their children. Production needs long ago halted the summer layoffs. But Omnium still touts its friendly work environment, competitive family benefits, and flexibility when issues of "work-life balance" arise.

The result, according to plant manager Dale Calendine, is a statistical rarity that holds promise for other Iowa businesses trying to navigate a looming shortage of skilled workers: Omnium and other companies have benefitted by attracting a higher-than-normal percentage of female workers.

Nationwide, women make up roughly 47 percent of all employees but only 28

percent of America's manufacturing workforce. In Iowa, the manufacturing figure is slightly smaller, at 27 percent. But at Omnium, the payroll is 38 percent women. And any time an entry-level job is posted, a majority of the new applicants—65 percent for one recent opening—are female.

"When I do have open positions, I typically have more women than men apply at this point," Calendine said. "If we didn't have these women coming in, we'd be in trouble."

Business leaders in Iowa and elsewhere have grown increasingly alarmed about payrolls packed with soon-to-retire baby boomers and a shortage of skilled workers to replace them. Officials estimate that 33 percent of Iowa workers have middle skills-level training, or training beyond high school short of a

four-year degree. But 56 percent of Iowa jobs require such skills.

The problem is only expected to grow. A *USA Today* analysis in October estimated that 40 percent of all job growth during the next four years will be in "middle skills" occupations.

Experts say one way to fill those jobs is to recruit from a new pool of employees—perhaps a gender that traditionally has been underrepresented in that industry. But it's not easy.

A survey released this fall as part of the annual Women in Manufacturing Summit found that women rank compensation the most important factor in seeking a career, followed closely by a desire for "interesting and challenging" work. According to the survey, 74 percent of women now working in manufacturing

Continued on page 8

believe the sector offers women good financial opportunity. But fewer than half of young females outside the industry consider manufacturing interesting. Fewer than 10 percent listed it among their top five career fields.

Industry leaders say women can thrive in modern manufacturing, but there's a decades-old mountain of misperception in the way.

"It's difficult sometimes for younger women to see themselves in an industry that doesn't look like and seem like them," said Allison Grealis, executive director of Ohio-based Women in Manufacturing. Factories are "not the dirty and dingy places that prior generations worked in. They're high tech and modern. Manufacturing really needs a different sales job."

That sales job, according to Grealis and others, should start with businesses providing a flexible, family-friendly workplace.

A 2008 study by the Families and Work Institute found that 85 percent of manufacturing employees believed "flexibility to manage work and personal life" was "extremely" or "very" important when considering a new job.

Visible female leaders at a company also provide proof that a manufacturing career is possible, according to the research, while the lack of women in supervisory ranks sparks perceptions of an unwelcoming employer.

A 2012 study by Deloitte Consulting found that 70 percent of women currently working in manufacturing were likely to recommend the industry as a future career for their sons, but only 55 percent planned to do so for their daughters. One anonymous woman auto executive explained that "female executives are still not accepted by their male colleagues."

Others share the view: 51 percent of respondents to the Deloitte survey blamed a gender-biased culture for keeping women out of manufacturing leadership roles. Bias also was cited in

a May 2013 report on *Women in Manufacturing* by Democratic staffers on the U.S. Senate's Joint Economic Committee. Staffers cited "male-flavored culture" as "the factor contributing most to women's underrepresentation in manufacturing."

Male-dominated Iowa companies with success in hiring women cite prevailing opinion—about the workplace environment and the company's receptiveness to females—as a key factor in their favor when it comes to filling empty jobs.

Former Rubbermaid employee Bob McDanel estimates that 60 to 65 percent of the workforce at Rubbermaid's now-defunct plant in Centerville, Iowa, was female—largely because the work was not physically demanding and the environment was welcoming.

"A lot of the gals, their husbands maybe were on the farm, and they came to town to get a job after the kids were out of the house," said McDanel. Rubbermaid wanted "anybody and everybody they could get."

Lee Container, a maker of plastic bottles for holding agricultural chemicals (among other things), bought the Centerville building after Rubbermaid left and now operates it with a staff that's roughly two-thirds female. Many of Lee's production jobs involve spotting defects in bottles that are moving past at a rate of three bottles every 28 seconds. Company officials, while unable to cite any scientific evidence to back up the claim, said they believe women are simply better suited for the work.

"If I have a preference, I'd take a woman over a guy," said Claire Cleaver, Lee's human relations manager. "We'll take anybody. But females do a better job than males, because they have a better attention to detail."

Roughly 15 to 20 percent of the employees at Ranco Fertiliservice Inc. in Sioux Rapids are women, but they're unusually concentrated on the manufacturing floor—welders, machinists, drafters, and assemblers—instead of in office jobs. Ranco has an on-site child-care service and is flexible



Theresa Vickroy started as a line operator for Lee Container in 2010. She was promoted to forklift operator in October.

with employees who need to leave during the day for family or other needs.

On-site child care "certainly doesn't hurt anything," said company president Pat Reno. Ranco has not specifically recruited women, she said. But the company works to make female employees welcome and has tried to encourage young women "in the schools" to consider potentially lucrative careers such as welding.

"In northwest Iowa, where we're sitting, our unemployment rate is very low," Reno said. "If we have a job opening, we don't have 20 people to choose from. If someone with good qualifications walks through our door, we don't particularly care how old they are or what their gender is. We're going to hire them."

Calendine, the plant manager at Omnium, said his company has benefited tremendously from its female employees.

"It's a good thing, having the diversity by gender," he said. "Women have a different skill set, and they have a different way of seeing things... It's a much more balanced work environment."

Women occupy some of the most physically intensive labor positions in the plant and tend to thrive in those jobs, Calendine said, because they're

AT A GLANCE

Lee Container

LOCATION: Headquarters in Homerville, Georgia, with plants in Centerville, Iowa, and Nacogdoches, Texas.

BUSINESS: Maker of plastic bottles for agricultural chemicals, pet foods, and other items

FOUNDED: 1989 in Georgia. Iowa plant opened in 2008.

EMPLOYEES: 142

RECRUITMENT: Company has a long history of seeking out women for detailed factory work. Centerville location, a former Rubbermaid plant, also had a majority female payroll.

Omnium

LOCATION: Hampton, Iowa

BUSINESS: A Land O'Lakes subsidiary that produces crop-protection chemicals

FOUNDED: 1994

EMPLOYEES: 75

RECRUITMENT: Women make up 38 percent of the payroll and the majority of applicants for most jobs.

Ranco Fertiliservice

LOCATION: Sioux Rapids, Iowa

BUSINESS: Maker of fertilizer blending and handling equipment

FOUNDED: 1961

EMPLOYEES: 90

RECRUITMENT: No specific effort to recruit women, but have reached out to young women in schools. There's also an on-site child-care facility.

also the most focused on work as a team. "The men tend to gravitate toward the more independent positions," he said.

A 2010 report by The Sloan Center on Aging & Work at Boston College said 42.4 percent of women who worked in manufacturing did so as part of a self-managed team. That compared to 28.4 percent of men.

Calendine believes female sociability could be one part of the path to success for short-handed Iowa manufacturers.

"No matter how you get women in the door initially, if they see it as a good place to work, they [will be] more social than men," he said. "If it's someplace they want to work, they will bring in good recruits to your business."

Book by Iowa State Professor Probes History of Discrimination against Women Studying Engineering

The comparative dearth of women in U.S. engineering schools reflects our long tradition of viewing those areas as the exclusive province of males, according to a recently published book by an Iowa State University professor.

Women who sought to become engineers faced discrimination and suspicion as recently as the 1960s, according to *Girls Coming to Tech!: A History of American Engineering Education for Women* by Amy Bix, an associate professor of history at Iowa State.

For decades, the prevailing opinion in American higher education was that engineering—a manly field of study born from work in construction and the military—was too complicated for any real woman. Therefore, those females who pursued it were deemed to be either unwomanly or not serious and simply on the prowl for husbands.

Bix's book chronicles decades of struggle against sexism, including case studies of how women fought stereotypes to join engineering schools at MIT, Cal Tech, and Georgia Tech. (The former Iowa State College allowed women in its engineering program from its opening in 1869, reasoning that women should be educated so they might "properly understand and discharge their duties as wives of farmers and mechanics.")

According to Bix, females gained more prominence in engineering during World War II, but many later retreated to more culturally acceptable fields of study once soldiers returned home.

"You always had a few women who were interested, perhaps because they had fathers who were engineers, or they grew up working on cars with their brothers," Bix said. "You always had a few women who were interested in defying the stereotypes... At the end of the day it comes down to climate—how much encouragement



In her book, Iowa State's Amy Bix looks at the obstacles women have faced to gain acceptance to engineering programs. *Photo by Amy Vinchattle*

or discouragement they get from coworkers and supervisors."

Cal Tech, for example, did not really welcome female students until the 1960s—and then only after protests from males, who were concerned that the single-gender environment was producing graduates who were "social idiots" and "unable to talk to real women."

Bix acknowledges parallels between difficulties in finding a home for women in engineering and in recruiting females to industries such as manufacturing. No easy solutions exist.

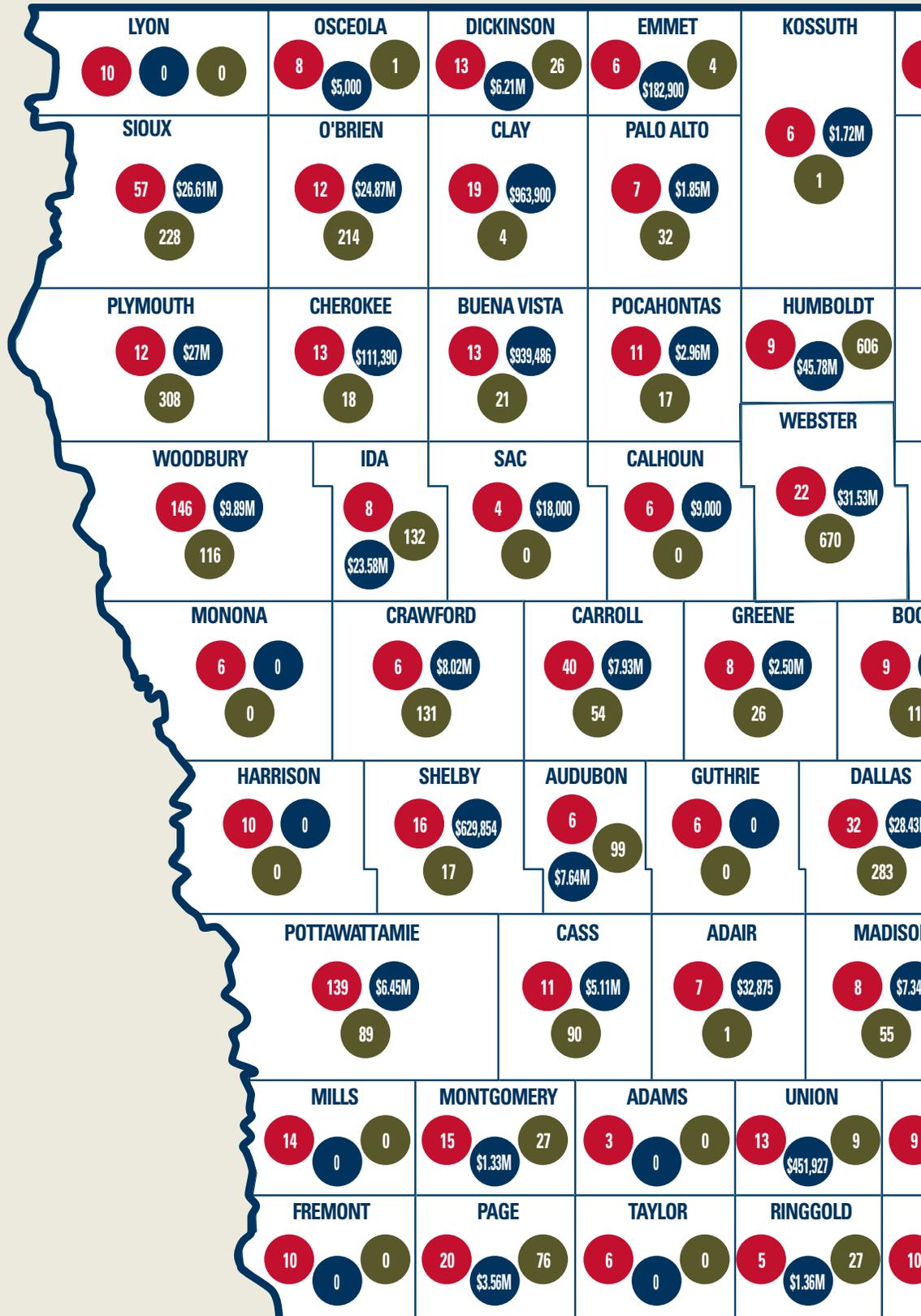
"There's not one single factor," Bix said. "Society and culture are more complicated than that. It's not like you can change one single thing and all of a sudden your workforce will be half women.

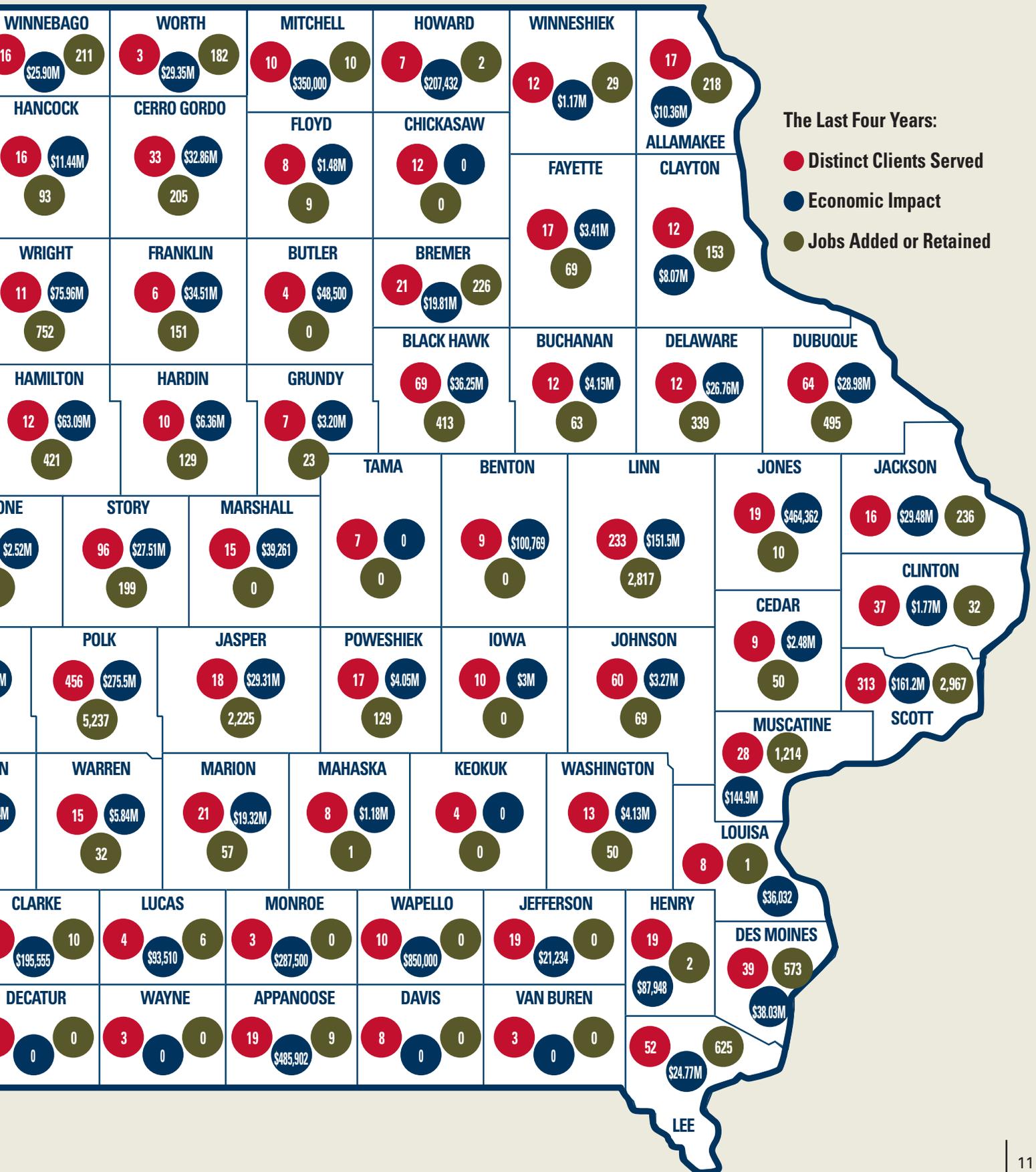
"Humans are complicated."

Engaging, Educating, and Embedding— Everywhere

CIRAS and its partners provided assistance to 2,773 distinct Iowa businesses in fiscal years 2011 through 2014. Clients reported an economic impact of more than \$1.6 billion during that period and estimated that 24,136 jobs either were created or retained because of CIRAS' involvement.

In 2013 alone, CIRAS and its partners helped 1,280 Iowa businesses in 94 counties. According to company surveys, an estimated 6,795 jobs were added or retained due to work that had an estimated economic impact of \$446 million. The numbers include \$50 million in new investments, \$383 million in new or retained sales, and \$13 million in saved or avoided costs.







AT A GLANCE

NIVC Services Inc.

LOCATION: Mason City, Iowa.

BUSINESS: Supplier of job training for the mentally and physically disabled throughout northern Iowa. Clients may work in one of two Affordables second-hand stores, in a Java Works coffee shop, or by completing a variety of outsourced tasks at NIVC headquarters.

FOUNDED: 1969

EMPLOYEES: 49 employees; 456 clients trained in FY2014.

CIRAS-Led Innovation Process Leads Mason City Nonprofit to Seek Stability in Cremation Urns

David Crowe made the announcement without warning, his wife recalls. They were in the car one day, and he simply turned to say, "When I die, I want to be cremated."

One week later, Crowe's widow would become the first customer of a new business seeking to give Iowans a novel, low-cost burial alternative. The hope is that this new line of handmade wooden cremation urns, conceived with help from CIRAS by the nonprofit training center where Crowe worked before his death, will create new financial stability for the mentally and physically disabled folks who used to be Crowe's coworkers. It also may solve problems for a few families along the way.

"The fact that we are helping people learn and earn money while they make these urns and helping people who are in a state of need, that's a real win-win," said Sherry Becker, director of the North Iowa Vocational Center (NIVC), a nonprofit training center for the disabled in Mason City. "It lets us advance our mission, it lets us generate some dollars that we can use to do that, and it meets an emerging need. It really is a win-win."

Crowe, 66, left his job at NIVC early on the afternoon of May 21. He was heading home on his motorcycle, with plans to work on a busted lawnmower, when a 70-mph car ran him down from behind as he attempted a right turn near his Nora Springs, Iowa, home.

Honoring the Life of



David Lee Crowe
1948 † 2014

"I went past the accident, but I didn't know it was him," Nancy Crowe said in an October interview. "When I got home, he wasn't there, so I went back. The sheriff met me halfway."

For the widow, life changed immediately. Nancy Crowe quickly switched homes so she wouldn't have to drive daily past the crash site. She found herself awash in the sudden

torrent of unplanned expenses and new, suddenly necessary decisions.

Except for one.

"This is what he wanted, so this is what we did," she said, tapping the top of one of the urns. "I think it meant more

because it was the people he worked with who had done it."

If he had lived, Crowe would have been NIVC's supervisor for a four-person project that now is poised to turn out as many as 200 wooden cremation urns each year.

The urns, square wooden boxes roughly 12 inches on a side, were launched for sale in November out of NIVC's Mason City headquarters and at www.UrnsNorthIowa.com. The business was created after NIVC officials early last year approached CIRAS for help in replacing a money-losing can-and-bottle recycling business.

NIVC Services Inc. last year provided 456 disabled Iowans with various forms of job training, mostly through businesses run by the agency or via contracts made with multiple north Iowa companies. The businesses—two thrift shops, a pallet-production operation, and a parts-packaging facility—provided more than 60 percent of NIVC's revenue in the most recent fiscal year. But in the past, the volume of work has been inconsistent.

"Because we outsource work from other businesses, our workflow is dependent on other businesses," Becker said. "If we have a lot of contracts that get slow, then

there's nothing for people to do. We need some sort of work that we can do when there's a [lower] demand, so we can manage it ourselves."

CIRAS, which had done multiple previous projects with NIVC, led officials through a wide-ranging Innovation Cycle discussion. Talk quickly centered on ways that the nonprofit could broaden its long-held expertise in doing hands-on work with wood.

"When we work in ideation, we help people focus on what they do great, and then try to expand on that," said CIRAS project manager Paul Gormley. "So you will have a very long list of ideas, and you have to narrow that list down. We helped them narrow their ideas down, then we helped them vet them."

"We try to help companies focus on who the client is and if that need is really real," Gormley said. "In this particular case it was."

Conversations with local Veterans Administration officials convinced NIVC of a growing need to provide cheap alternatives for the funerals of indigent veterans. Public assistance exists to pay for a veteran's funeral, Becker was told,

but not for a container to hold cremated remains. With expensive urns financially out of reach, families frequently must carry cremated loved ones home or to a cemetery in shoeboxes or plastic bags.

NIVC plans to sell its hardwood urns for \$96. The goal is to create a quality product that also will fill a financial need—both for NIVC and, on the other end, for cash-strapped veterans' families.

Becker said the agency will promote its urns both to the general public and among military veterans. (NIVC had a table at the November meeting of the Iowa State Association of Counties in a bid to make local veterans' officials aware of the urns.) But veterans alone will not keep the urn business financially viable.

"We've got to count on the bigger part being the website," she said. "We don't have enough veterans here in northern Iowa for this to take off."

But David Crowe was a veteran, and his widow still takes comfort in his former work.

"They're creating a job for these people, and they're doing [the work] well," Nancy Crowe said. "It's just a good fit all around."

Jackson Manufacturing Values Work of Disabled Individuals

Jack Hasken could have made a different decision, but there are plenty of people in Maquoketa who believe he made a good one in February 2013.

That's when Hasken, president and chief executive officer of Jackson Manufacturing, purchased a struggling plastic injection molding company from DAC Inc., a nonprofit agency that serves more than 200 people with mental, intellectual, and developmental disabilities in the Jackson County area. DAC had owned the manufacturing firm, then called A-DAC Industries, since 1996 and operated it as a for-profit company to provide DAC clients with jobs at a competitive wage.

Hasken took over the manufacturing business but kept DAC employees on board—with support from Jackson Manufacturing's main customers.

"Our two largest customers know their products are assembled by people with disabilities, and they are extremely happy knowing these individuals help make a difference," Hasken said. "It's been that way for years, and I was proud to continue this once I took over."

While Hasken and 12 staff members drum up sales and update outdated equipment, about 20 DAC employees rotate through eight positions at Jackson, creating parts using a special assembly table with eight stations. On an average day, the DAC employees assemble 5,000 roller pieces.

"For Jack to value our mission and keep it going was perfect for DAC," said Lenae Owen, DAC's director of vocational services. "Jackson Manufacturing gives our employees the opportunity to truly integrate in a work setting and be part of the larger community."



➤ For more information about the Innovation Cycle or other programs, contact CIRAS account manager Derek Thompson at 515-419-2163 or thompson@iastate.edu.

Partnerships Can Be Worth More Than the Sum of Parts *By Beth White*

A 2010 study and report by American Express OPEN “Victory in Procurement” found that small businesses that paired with other small firms won 50 percent more contracts than those that tried it alone.

Four-plus years later, developing partnerships remains almost a necessity to finding long-term success in the government sector. There are many reasons why two can sometimes be stronger than one:

- Forming a team can help close any gaps in a company’s capabilities or knowledge base, thereby allowing it to pursue more business.
- Past performance is a key factor in many government solicitations. So the more experience you can demonstrate, the better.

Partnerships come in many forms:

- Formal partnerships set up as a separate legal entity
- Joint ventures formed for a specific contract
- Traditional prime contractor-subcontractor relationships

Any partnership requires certain considerations:

- What is the purpose of the partnership?
- What are both parties bringing to the table? Are roles and responsibilities clearly communicated?
- Do core competencies and capabilities align with the potential contract’s scope of work? Is the proposed partner a good extension of your firm?
- Can you meet the contract expectations as a team?

In short, partnerships should be a consideration for any business plan that involves pursuit of government sales. Partnerships can boost your capabilities, your performance history, and your ability to bid on projects, all of which could translate to increased sales.

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



Iowa Partnership and Networking Events Help Companies Find Allies in Government Contracting

Sometimes, one plus one equals a lot more than two.

Partnering with another business can increase government contracting opportunities. In one situation, two Iowa companies may be competing against each other to win a bid, but in another situation, they may team as contractor and subcontractor to more strongly position themselves in the bidding process.

Before any mutual relationship can develop, the two companies have to connect. That’s why CIRAS recently launched its Iowa Partnership and Networking Event series. The roundtable meetings allow Iowa companies to discover the capabilities available at other firms and to help them learn how to maximize those available relationships.

The networking events are scheduled throughout the year, with past events focusing on one of three business sectors—manufacturing, construction, or professional services. Attendees at these events represent businesses from each of those sectors, as well as support services in other industries.

Collaboration among supply chain companies—partners known in some circles as “compe-ti-mates”—is happening more often. Unique and unexpected alliances between competitors may be necessary to optimally serve complex needs for a particular contract. CIRAS networking events allow businesses to rethink who their competitors are and how everyone might benefit from a partnership. With collaboration, companies may be able to capitalize on their strengths while minimizing their weaknesses.

Jeremy Riniker, a buyer and estimator at Geise Manufacturing, attended the October networking event. “We had some very constructive conversations with companies that have capabilities we need,” explained Riniker. “The idea of compe-ti-mates is exactly what we were there to find, and now we are broadening our relationships by leaps and bounds.”

Pam Russenberger, a program director at CIRAS, said the partnering and networking events “provide a unique opportunity for companies to share their experiences in government contracting and learn from other companies’ experiences...both good and bad.”

“The success of these events is evident through the expanded networks and the number of companies working together in new ways,” she said.

Russenberger said CIRAS could not be happier with the results of these events and looks forward to continuing them in the future. The next scheduled networking event is February 20 in Cedar Falls and will focus on the construction industry.

➤ **For additional information or to register for these free events, contact Beth White at 563-370-2166 or whiteb@iastate.edu, or Julie Fagle at 319-310-8612 or jafagle@iastate.edu.**

Look closer at Iowa's rolling landscape and you may be surprised to discover what is made here—everything from refuse trucks and powered machinery to buckets and pastries. When you buy products manufactured in Iowa, more money stays in our local communities.

American Pop Corn Company

Overview: American Pop Corn Company, makers of JOLLY TIME Pop Corn, is an independent and family-owned company that offers a variety of traditional and microwave popcorn products in grocery stores nationwide and in nearly 40 countries around the globe.

Location: Sioux City, Iowa

Founded: 1914

Employees: 165

Website: www.jollytime.com



Conner Athletic Products, Inc., dba: Power Lift

Overview: Power Lift began in 1999 to manufacture Olympic lifting platforms for athletic and sports performance facilities. Today, thanks to precise engineering and high-quality manufacturing, it's the preferred choice for athletic programs around the world—from high school and collegiate to professional and military/government agencies. Power Lift offers a high-quality selectorized and plate-loaded weight equipment line and prides itself on being innovative. The equipment is popular for its unique design and appearance, recruiting appeal, and safe, multifunctional training capabilities.

Location: Jefferson, Iowa

Founded: February 1999

Employees: 65

Website: www.power-lift.com



Life Line Emergency Vehicles

Overview: Life Line is a true custom ambulance builder founded by the Leicher Family, with a 155,000-square-foot production facility. They provide their customers with an ambulance that is built exactly as they wish, with the quality and attention to detail that's hard to find in a mass-produced assembly-line-type ambulance.

Location: Sumner, Iowa

Founded: 1985

Employees: 170

Website: www.lifelineambulance.com



New CIRAS Advisory Council Members

Marc Meyer is president and founder of Inteconex, a nationwide provider of services that integrate physical security and information technology systems. Under Meyer's leadership, the company (formerly part of Fastek International Ltd.) has experienced an average of 25 percent annual growth.

Prior to Inteconex, Meyer was the managing director and cofounder of Fastek, an engineering development and solutions provider, where he helped grow the business from start-up to \$5 million in annual revenue. Meyer also spent 15 years in business analysis and financial management with Rockwell International.

He holds a bachelor's degree and an MBA in finance and international business from the University of Iowa.

Noel Rudie has developed numerous products for the pasta, dairy, baking, and beverage industries over the past 20 years. Since 2009, he has been the director of research at Harvest Innovations, an Indianola-based manufacturer of non-GMO, chemical-free, gluten-free, and organic food ingredients used by some of the largest food manufacturers in North America.

Previously, Rudie led the research and development group, as well as the operations group, at Soy Link, LLC, where he developed products for the dessert, pasta, beverage, nutritional bar, and gluten-free industries. He also worked in development at Hershey Foods Corporation; Kraft Foods, Inc.; and Opta Food Ingredient, Inc.

Rudie holds a PhD in biochemistry from the University of Georgia.



Marc Meyer



Noel Rudie



Changes Coming Soon to ISO 9001 Quality Standards

The International Organization for Standardization (ISO) is expected to release updated guidelines for its ISO 9001 certification later this year, and CIRAS will be watching to advise companies on how to prepare. The still-in-process rewrite is expected to bring major change to a quality management system that is used by a wide variety of businesses, including manufacturing and service-oriented firms.

“The working draft is a totally different ISO 9001 than we’re familiar with,” said Tom Gordon, project manager at Missouri Enterprise, a CIRAS partner in coaching Iowa companies to develop systems and processes that meet the requirements of ISO 9001. “It places a lot of emphasis on handling risk to the organization. It’s more of a business system you’ll use. The requirements for documentation are different, and you need to understand the context in which your organization operates.”

Organizations that complete ISO 9001 certification typically do so because they want to be better able to compete internationally. Such companies in theory operate more efficiently because of having a set of good business management, planning, monitoring, measurement, and corrective action systems in place.

“Many manufacturers are too busy with the alligators to deal with the swamps,” Gordon said. “But what if the computer system goes down? What if you can’t do purchase orders or complete orders? Ultimately, companies get this certification because it makes them money and makes them a better organization.”

Having the certification makes your company more reliable to other businesses because you have a process in place to ensure quality and sustainability.

ISO 9001 “is a documented system—repeatable, measureable, and predictable,” Gordon said. “An undocumented system is totally unpredictable from one day to the next.”

The next version of ISO 9001 will change on multiple levels. In some cases, content simply shifts from one section to another or gets renamed. Other anticipated changes could add details on certain topics or change the focus of entire sections.

Highlights include the following:

- a stronger emphasis on understanding needs and expectations of interested parties, including shareholders, employees, labor unions, society, customers, and regulators
- a shift from a focus on management commitment to leadership purpose and direction
- a new section on planning to address risks and opportunities, as well as operational preparedness for emergencies

- a revised competency section that addresses communicating with stakeholders
- additional details related to outsourcing and control of external processes on products
- a separate section on postdelivery activities
- additional improvement emphasis on conformity and corrective action, rather than preventive action

To transition smoothly, Gordon and CIRAS recommend that companies start thinking now about their stakeholders and strategic plans. For example, begin thinking about leadership purpose and direction, contingency and succession plans, disaster recovery plans, organizational sustainability, ways to mitigate risk, and developing (or updating) a five- or ten-year strategic plan.

Once the new standard is released, companies likely will have a grace period to adopt it while ISO auditors are trained. Adapting to change can be an inconvenience, but Gordon believes the standard itself won’t require a lot of extra work. It just may require some time and effort to understand the new rules.

➤ For more information, contact Rudy Pruszko at rpruszko@iastate.edu or 563-599-0645.

Iowa State's Spring Season of Career Fairs Kicks Off in February

It's an annual ritual: thousands of Iowa State students spend their spare time during spring semester seeking full-time jobs, internships, and co-ops before they leave the university either for the summer or for good. It can be a nerve-racking task, but it's made easier by having large groups of potential employers and employees congregate in a single place.

For employers, making that connection can be the first step in landing a valuable employee. Registration for most fairs began in November, but space may still be available. Check out the spring career fair schedule below for information on how your business can get involved.

Agricultural Career Day

February 4, 10 a.m.–2 p.m., Memorial Union
The College of Agriculture and Life Sciences hosts this fair for students seeking ag-related careers. For details, visit www.career.cals.iastate.edu/ag-career-day or contact Mike Gaul, director of career services in the College of Agriculture and Life Sciences, at mikegaul@iastate.edu.

Engineering Career Fair

February 10, Noon–6 p.m., Hilton Coliseum and Scheman Building
The College of Engineering expects about 5,000 students to attend this career fair. Reserve your company's space by contacting Engineering Career Services at ecs@iastate.edu. Visit www.engineering.iastate.edu/ecs/career-fair for more information.

Junior Ann McLoughlin, of Fort Dodge, said students who attend career fairs are "a step ahead of the competition" because "if you make a connection (with a company) here, they are more likely to hire you."



"Career fairs are a great way to get your name out there and explore several career opportunities," Rajiv Bhoopala, a freshman mechanical engineering student, said while participating in Iowa State University's Engineering Career Fair last fall.



Business, Industry, and Technology Career Fair

February 11, Noon–6 p.m., Hilton Coliseum
This career fair is sponsored by the Colleges of Business, Liberal Arts and Sciences, and Human Sciences. Reserve your space through CyHire at <https://cyhire.iastate.edu/employers>. More information is available at www.business.iastate.edu/careers/career-fair.

People to People Career Fair

February 11, 1–5 p.m., Scheman Building, Iowa State Center
The Colleges of Human Sciences and Liberal Arts and Sciences hold this fair for students studying human/social sciences, education, health/wellness, government, and hospitality. Reserve your space through CyHire at <https://cyhire.iastate.edu/employers>. More information is available at www.hs.iastate.edu/career-services/career-fairs.

Design Career Expo

February 19, 1–5 p.m., Memorial Union Great Hall

Meet students seeking careers in art, graphic design, interior design, architecture, landscape architecture, medical illustration, and more. Companies can reserve booths through CyHire at <https://cyhire.iastate.edu/employers>. More information is available at www.design.iastate.edu/CareerServices/designcareerfair.php.

"Attending the career fair is a great way for students to network with their favorite companies," agreed Eric Mootz, an Iowa State senior from Neenah, Wisconsin, studying mechanical engineering. "The face-to-face contact allows students to practice their communication skills and hopefully gain some interview experience."





CIRAS' Internet Boot Camps Build Stronger Online Presence for Your Business

Surveys have shown that nearly everyone looking to purchase a product or service uses the Internet as a key starting point for making that decision. Where does that leave any business that lacks a strong online presence? With limited opportunities.

CIRAS is seeking to help with that by hosting a series of boot camps in Johnston this spring on Internet Marketing Strategy (April 7–9) and Video Marketing (April 13–14).

The boot camp curriculum provides a mix of interactive breakout sessions, case studies, and exercises—all led by certified experts. The goal is to give participants the tools they need to assess an organization's digital marketing strategy and to identify any areas that need improvement. In short, participants learn how to align their Internet strategies and video content with the goals of their companies.

Traditional marketing practices today are taking a backseat across all industries as experts focus more on using the Internet to reach potential customers through websites, social media, web applications, video production, and a proliferation of other new platforms. The shifting environment presents new challenges and opportunities both for business leaders and marketing professionals alike. CIRAS boot camps are designed to teach you how to take advantage of them.

For more information about the upcoming video and Internet marketing boot camps, please contact Paul Gormley at 319-721-5357 or gormley@iastate.edu. Space is limited and preregistration is required.

- **BizTalk Mastermind Group: Business Resource Speakers**
February 19, 2015
7:00 a.m.–8:00 a.m.
Webinar
- **BizTalk Mastermind Group Conference**
March 19, 2015
9:00 a.m.–Noon
Bettendorf
- **Innovation Summit for Machinery Manufacturers**
April 2, 2015
8:00 a.m.–5:00 p.m.
Ames
- **Iowa Vendor Conference**
April 7, 2015
8:00 a.m.–4:00 p.m.
Ankeny
- **Internet Marketing Strategy Boot Camp**
April 7–9, 2015
8:00 a.m.–5:00 p.m.
Johnston
- **Video Marketing Boot Camp**
April 13–14, 2015
8:00 a.m.–5:00 p.m.
Johnston
- **HAACP Short Course**
April 23–25, 2015
8:00 a.m.–5:45 p.m.
Ames

STAFF NEWS



Melissa Burant—Government Contracting Assistant

Melissa Burant recently joined CIRAS as a government contracting assistant. She was a federal government contracting officer for the Army Contracting Command Rock Island, specializing in contingency contracting in Afghanistan, Iraq, Kuwait, and Qatar from 2008 to 2014. Responsibilities included soliciting, awarding, and administering requirements ranging from Security Services during the Iraq drawdown in 2011 to the Intelligence Support Services in Afghanistan. She previously worked as a contract specialist in the Army Sustainment Command (ASC) and Tank Armament Command (TACOM), focusing on a wide variety of purchase orders and long-term contracts. Burant earned an MBA from St. Ambrose University in 2008 and a bachelor's degree from Arizona State University in 1996.



Jodi Essex—Government Contracting Assistant

Jodi Essex joins CIRAS as a government contracting assistant. For the last seven years, she had worked in public procurement in the purchasing department at Iowa State University. She has extensive knowledge of travel and moving industries and has experience procuring a variety of other professional services. Essex previously worked in the private sector as a buyer in the travel and event management industry. She earned a BA in business management with an emphasis in marketing at Benedictine College in Atchison, Kansas.

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 \$1.8 billion over the past five years.

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CIRAS PARTNERS

Iowa State University

Center for Crops Utilization Research
 Center for Nondestructive Evaluation
 College of Engineering
 Community and Economic Development
 Department of Environmental Health and Safety

Engineering Career Services
 Engineering-LAS Online Learning
 Extension and Outreach
 Industrial Assessment Center
 Iowa Innovation Corporation
 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
 North Iowa Area Community College



THE INNOVATION CYCLE

Common Language, Framework Make It Easier for New Ideas to Grow by Paul Gormley

The end goal of the definition phase is to develop ideas for solving a target customer's problem. CIRAS encourages clients to make this process easier by adopting a common language and a standardized concept documentation form.

Communicating about innovative ideas requires giving them room to develop. A common language provides a way to discuss ideas in a manner that builds them up rather than tears them down. For this phase, the focus should be on making ideas more beneficial, believable, and different for the customer.

The first element to the common language is Dramatic Difference. If a customer cannot easily see what is different about your offering from what they already have, they will not pay attention. Team members should help the idea generator make it unique enough to matter.

The second element is Overt Benefit. Be empathetic. Think from the customer's point of view, and work to articulate what's really in it for them.

Last is Real Reason to Believe. When customers hear of the benefit brought to them by an innovation, they often

are skeptical. You must prove that your innovation truly is better than any alternative.

Once an idea has grown strong enough to face the scrutiny of the discovery phase, the team must document the innovation. One option is to allow everyone to write about their ideas in any way they feel is correct. CIRAS favors a more structured approach. We provide a documentation form that we believe has the key elements necessary to communicate an idea. Every organization must decide which method would work best in that particular system.

We have found that once team members understand the common language and the documentation form that supports it, they can produce better, more understandable ideas more quickly and effectively than ever before.

For more information on The Innovation Cycle and the definition phase, please feel free to contact Paul Gormley at 319-721-5357 or gormley@iastate.edu.



To participate in the innovation discussion, join our LinkedIn group at [linkd.in/12tVLy1](https://www.linkedin.com/company/ciras-iastate).