



Upper Iowa Tool & Die Adds Innovation—One Layer at a Time

A Cresco tool-and-die maker's search for diversification has led the company, with CIRAS' help, to stake out new territory as one of the first Iowa businesses of its kind to produce parts for customers via additive manufacturing.

Upper Iowa Tool & Die & Innovations, founded in 1978, purchased a new plastic-based 3-D printer earlier this year after conversations with CIRAS convinced the company to aim higher in its search for a way to differentiate from competitors. Since mid-April, Upper Iowa has been pitching its additive manufacturing capability both to new clients and as an add-on for services to existing customers.

Owner Scott Fortune said the 3-D printer is intended to give his firm new options in a world of rapidly evolving manufacturing technology. Upper Iowa makes tools, dies, assembly and checking fixtures, molds for the plastic injection molding

industry, and specialty manufacturing equipment. The company has lost work over the years as some clients opted to shift various projects to additive manufacturing. But Fortune believes the new machine now positions his firm to fight for that business—as well as to seek new opportunities with new customers.

“This is a way to lengthen the longevity of our company,” Fortune said. “If we don’t diversify into 3-D printing, it won’t be long before we won’t employ eight people any more. We won’t be nearly as large...

“But it could be that 3-D printing grows,” he said. “It could be that it grows to the point that it becomes the company, and

the tool and die business becomes a sideline to that.”

Located nearly across the street from a major Donaldson Company manufacturing plant, Upper Iowa Tool & Die for years has been focused largely on products related to air filtration for the transportation, construction, and agricultural equipment industry. Such business remains valuable, Fortune said. But Upper Iowa realized during the current agricultural down cycle that it needed to make changes for the long-term health of the business.

Fortune said his company by last year had decided to expand its business,

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On the Cover: Owner Scott Fortune removes a mold (close up, right) from Upper Iowa Tool & Die's 3-D printer.

At right: Visitors discuss the technology during a June open house the company held in Cresco.

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, the DoC/EDA University Center Program, and the State of Iowa Economic Growth Committee appropriation for the CIRAS Technology Assistance 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.—July 2016 HD16074

Articles may be reprinted with the following credit line: "Reprinted from *CIRAS News*, Vol. 51, No. 4, a publication of Iowa State University Center for Industrial Research and Service." Please send a copy of the reprint to *CIRAS News*, 1805 Collaboration Place, Suite 2300, Ames, Iowa 50010-9166.

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bring the plastic injection process in-house, and turn Upper Iowa into a one-stop shop for plastic injection molding. Seeking advice, the company reached out to CIRAS (via a regional economic development official) to obtain some additional plastics expertise.

CIRAS account manager Sean Galleger and plastics specialist Shankar Srinivasan met with Upper Iowa officials in late 2015 to discuss the company's "default future"—the most likely way things would go for the business and how that might change under various scenarios. It soon became apparent during that meeting, Fortune said, that the injection molding industry was too price competitive to justify a costly investment in new equipment. Upper Iowa would have been fighting for slim profits against companies with much longer injection-molding résumés.

"Iowa State University and CIRAS were a blessing," he said. "I'm very thankful for the help and guidance that they gave us, because we probably would have muddled down the wrong path and regretted it and struggled. But now, it's all good."

Galleger said the Cresco company "knew that they needed to change and that they needed to do something because of their declining customer base. At the time, really the only viable option they knew of was injection molding. I think one thing that CIRAS did was help lay out a couple of other options."

Srinivasan and Galleger believe the newly purchased technology will allow Upper Iowa to sell multiple services to its customers—from 3-D design and modeling to prototyping, creation of finished parts, and, potentially, serving as the go-to source for seldom-needed replacement parts. At the same time, the company now sees an expanded universe of potential customers.

"Instead of just taking up one extra step in the supply chain (like they would have with injection molding), they've now found three, four, or five different areas in that supply chain—from preproduction work all the way through managing spare components and spare tooling," Galleger said. "They can now turn a new part out in a couple of days that the client can use and assess

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— Scott Fortune



whether that's the direction they want to go. If not, the client can make some changes, and they can get another version in another couple of days."

"They're saving the company just tons of time."

Fortune sees the 3-D printing as partially complementary to Upper Iowa's precision tooling business, since the machine shop will be able to take printed parts and machine them "to provide a surface that challenges the smoothest injection mold surface." He also wants the printer to lead Upper Iowa into new areas, such as making equipment for the medical industry. Opportunities lie in several directions.

"It takes you out of that tunnel vision into kind of a panoramic view all of a sudden," Fortune said. "The problem is, which way do we go? It's a neat problem to have."

Fortune and his son, business co-owner Alex Fortune, selected their 3-D printing system after consulting with a third CIRAS expert—Chris Hill, director of CIRAS' Technology Assistance Program. CIRAS, with help from a wide variety of state, federal, and Iowa State University partners, last fall purchased its own metal 3-D printer to help Iowa companies explore the capabilities of additive manufacturing.

"This is a perfect example of how, if you figure out your business model, new technology can be a game changer for your entire business," Galleger said.

Alex Fortune said traffic on the company's website (which was improved following another CIRAS consultation, with Internet marketing specialist Paul Gormley) has tripled since the 3-D printer arrived. So, "the interest is there."

"This is the future of manufacturing, that's really where it's coming down," Scott Fortune said simply. "We hope we're on the leading edge, so we can get over the hurdles that you have to go through on the learning curve before anybody else does this."

➤ **For more information, contact Sean Galleger at galleger@iastate.edu or 515-290-0181.**



Upcoming CIRAS Innovation Summit Puts the Focus on Food

A program aimed at boosting Iowa industry one sector at a time will turn its attention to food this fall.

CIRAS staffers are now working out the details for a November 15 innovation summit in Ames focused on the needs of food, beverage, feed, and grain processors. Similar to previous summits, the day-long event will include a morning session with short, interactive, technology presentations followed by an afternoon session in a tradeshow-like environment. Organizers say this format allows participants to learn about key technologies, then develop specific plans around how to implement them in their businesses.

Previous CIRAS summits, supported through the U.S. Economic Development Administration's University Center Program, have focused on the plastics, machinery, and fabricated metals sectors.

CIRAS program director Pete Nadolny said food processors are a logical next place to focus given the breadth of Iowa's agriculture-connected businesses and the depth of food-related expertise at Iowa State University. To name just a few possibilities, CIRAS believes some businesses will receive great benefit from Iowa State resources such as a recently created food packaging consortium or the pilot production facility at the Center for Crops Utilization Research. Such facilities give processors a quick, reliable choice to experiment with new products or packaging options, which can ultimately lower costs.

"It's a mature industry, and the environment is changing," Nadolny said. "This usually means it's ripe for innovation."

November's summit comes on the heels of a similar March event involving 75 people from the fabricated metals sector.

Nadolny said companies approached CIRAS and affiliates with approximately 20 ideas for potential new projects or processes to improve their businesses. Roughly half of those are now being developed, he said. If the work eventually proves fruitful, it could create an economic impact measured in the hundreds of thousands of dollars.

"Our focus is to help companies grow profits," Nadolny said. "You grow profits through cutting costs, growing sales, or, ideally, both."

➤ **For more information, contact Pete Nadolny at pnadolny@iastate.edu or 515-277-2471. To register for the summit, visit <http://bit.ly/fbfgsummitNOV2016>.**

"It's a mature industry, and the environment is changing. This usually means it's ripe for innovation."

— Pete Nadolny



Iowa State University President Steven Leath, flanked by Iowa Lt. Governor Kim Reynolds and other state and university officials, cuts the ribbon on a new building that, among other things, will serve as CIRAS' home.

ISU's Economic Development Core Facility Is Now the Place for Collaboration

Hundreds of Iowa's economic, government, and academic dignitaries attended a June ribbon cutting for the new \$12 million Economic Development Core Facility, the recently completed building that now becomes a joint headquarters for CIRAS, a half dozen other Iowa State economic development entities, and the Cultivation Corridor.

The building, which opened at the end of June, is the anchor of a potential 180-acre expansion of the Iowa State University Research Park and is intended to create a single point of contact for any business seeking economic development assistance from Iowa State. Ron Cox, CIRAS director, has called it "a service to the client to make it easier for them to do business with Iowa State." University officials also expect increased collaboration to spark new efficiencies and to boost the impact of the assistance Iowa State provides.

"As a gateway to nearly all of Iowa State's economic tools, resources, and expertise, the Economic Development Core Facility is truly a one-stop shop," Iowa State President Steven Leath said at the ribbon cutting. "It enables Iowa State to provide services in a more comprehensive, integrated way—a way many of us have dreamed about, but it's now a reality."

CIRAS' new roommates include the university's Office of Economic Development and Industry Relations, Iowa Small Business Development Center, the Pappajohn Center for Entrepreneurship, Iowa State's Office of Intellectual Property and Technology Transfer, the Iowa State Research Foundation, and the Cultivation Corridor. Those entities and their roughly 100 employees now share a 49,210-square-foot facility built around sustainability, including geothermal heating and plenty of natural light.

Cooperation also has been built into the new building—right down to the address (1805 Collaboration Place) and massive amounts of meeting space, which Mike Crum, Iowa State's vice president for economic development and business engagement, describes as essential in "building the partnerships that drive economic prosperity."

The Core Facility joins several other recent Research Park projects,

including a \$22 million building for Beohringer Ingelheim Vetmedica and Vermeer Manufacturing's new Applied Technology Hub. Ames Racquet and Fitness Center also is constructing a 52,000-square-foot facility, a new restaurant is expected from the owners of The Café, and officials soon will announce plans for a medical clinic and a child care center.

"The Research Park recognizes the cultural importance of attracting talent and our role in helping the companies do that," Crum said. "We are creating a live/work/play environment that is now the expectation of young professionals."

Iowa officials expect great things.

"We're starting at a really great place," Iowa Lt. Governor Kim Reynolds said at the ribbon cutting, noting recent successes. "We have a really great story to tell.

"But watch out for what's ahead."

➤ **For your information: Our new address is 1805 Collaboration Place, Suite 2300; Ames, Iowa 50010.**

Iowa State Working to Educate Food Companies on Looming Food Safety Law

Iowa experts say looming federal food safety regulations are threatening to bring major change to many processors of human and animal food—some of whom may not even be aware that the clock is counting down on new mandates.

A 2011 law called the U.S. Food Safety Modernization Act (FSMA) gave the FDA new powers to prevent outbreaks of foodborne disease. But the impact of new rules largely was delayed as authorities constructed complex standards and procedures. The rules now are beginning to kick in. Exactly how they affect a particular company depends on the size and type of business involved.

“We have a whole variety of companies in the Midwest,” said Angela Shaw, an assistant professor of food science and human nutrition at Iowa State University. “We have some very small companies that are already in FSMA compliance—like this is no big deal. Then we have some very large companies that have to come into compliance this September and don’t have any procedures in place, don’t have an employee training plan, don’t have any training at all...”

“It just depends on the industry. It goes all over the board.”

The first step, according to CIRAS account manager Brenda Martin, is to get educated. In April, Iowa State University held its first round of classes on the law’s preventative controls requirements as they relate to food for humans. Two more rounds of classes were held in June, but at press time,

no additional Iowa classes had been scheduled.

“Depending on your company’s size, there’s a timeline where, if you don’t have necessary preventative procedures in place, the government may shut you down,” Martin said. CIRAS can help companies fix problems, but first companies must be aware of the rules.

“We have some very small companies that are already in FSMA compliance—like this is no big deal. Then we have some very large companies that have to come into compliance this September and don’t have any procedures in place, don’t have an employee training plan, don’t have any training at all...”
— Angela Shaw

“The bigger Iowa companies with the September deadline already are fast preparing,” Martin said. “The medium-sized companies, who have until next year, they’re busy preparing, too. They’re asking for help, and they’re getting themselves into preventative controls classes.”

Earlier this year, Iowa State University was awarded a \$950,000 FDA grant to create the North Central Regional Center for Food Safety Training. A group led by Shaw now will spend three years educating food processors and growers in 12 midwestern states.

Most of those who attended the preventative controls class in April appeared to be ready.

Lori Flugum, director of quality compliance at Diamond V Mills, an animal feed supplement company in Cedar Rapids, said her firm faces a farther-out compliance deadline but appears to be in good shape. She attended the class, she said, because “it’s always better to know what you’re getting into than to go into things blindly.”

Dr. Angela Shaw during a class in April.



➤ For more information, contact Brenda Martin at bkmartin@iastate.edu or 515-570-5282.



AT A GLANCE

Calhoun Communications Inc.

LOCATION: Sioux City

FOUNDED: 1986

EMPLOYEES: 9

FOCUS: Founded as a radio broadcast consulting and contracting firm, Calhoun also provides microwave and broadband wireless services and networking.

Calhoun Communications Uses CIRAS' Help to Communicate with Government

A Sioux City communications company is working to build on its success as a local government vendor by seeking federal contracts with the help of CIRAS staff.

Calhoun Communications Inc., founded in 1986 as a broadcast radio consulting and contracting firm, had one of its strongest-ever first quarters in 2016, according to operations director Lance Martin. A key reason? More than \$400,000 in new government contracts.

Martin began working with CIRAS government contracting specialist Andy Alexander late last year after spending roughly eight weeks researching the system on his own.

"He demystified the whole process," Martin said. "We, for quite some time, had wanted to break into the federal market. This has opened the door to a much broader reach for us."

The company recently hired a new sales director (with a history of securing government contracts) to help keep that door open.

Roughly half of Calhoun's business involves point-to-point and multipoint wireless communications, with the rest focused on broadcasting support. Clients include both public and private entities—including governments (approached before CIRAS joined the picture) in areas around Sioux City, Sioux Falls, and Council Bluffs.

With CIRAS' help, Calhoun is partnering with Nebraska-based All Native Systems to seek a contract involving McConnell Air Force Base in Wichita, Kansas. Among other things, Calhoun sells equipment that bridges the gap between pre-Internet systems and current technology, allowing clients to modify and expand their existing system rather than fully replace all their equipment. "And that kind of thing is really attractive to the military," Martin said.

He praised an Alexander-hosted workshop on capability statements as especially useful in helping Calhoun approach new customers.

"It's been amazing how powerful the capability statement has been for marketing our business."

— Lance Martin

"It's been amazing how powerful the capability statement has been for marketing our business," he said.

Calhoun Communications has been successful at every level of government contracting, from local entities to larger organizations. That's unusual, Alexander said. "It's a really

well-rounded example of what a small business can do and achieve."

➤ For more information, contact Andy Alexander at andyalex@iastate.edu or 402-547-0333.

Local Government Contracting *by Andy Alexander*

When business owners hear the words “government contracting,” many think of landing colossal agreements with federal agencies. Local governments often are overlooked, even though they likewise can provide reliable, lucrative opportunities. Companies who haven’t yet secured a federal government contract may find better odds landing a local one.

The process generally starts with making yourself known, registering as a vendor with that particular government, and sharing your capability statement:

Town—There are 945 incorporated places in Iowa, most of them small. Start with the city clerk, who can guide you to the person who handles purchasing and contracting. Remember also to ask for the buyer of your particular product or service.

County—The largest few of Iowa’s 99 counties may have purchasing officers. For the rest, start with the county auditor.

City—Iowa’s largest cities (only 11 have a population greater than 50,000) normally have appointed purchasing officers and advertise their bids on government websites. But, as elsewhere, you should start by registering your business and making sure officials know what you can do.

State—

- Visit <https://das.iowa.gov/procurement/vendors/how-do-business> to register as a viable vendor with the Iowa Department of Administrative Services. Bidding opportunities can be found at <https://das.iowa.gov/procurement/vendors/how-do-business/bidding-opportunities>.
- The state also has a Targeted Small Business (TSB) program that certifies businesses owned, operated, and actively managed by women, minority group members, persons with disabilities, or service-disabled veterans. Certified TSBs may be eligible for microloans of up to \$50,000 through the Iowa Center for Economic Success. For more information, see <https://dia.iowa.gov/tsb>.
- Iowa’s Department of Transportation purchases products ranging from pencils to heavy equipment and takes bids for construction projects. Register at http://www.iowadot.gov/purchasing/vendor_registration.html. Bid announcements can be found at <http://www.iowadot.gov/purchasing/lettingschedule.htm>.
- The Board of Regents for the State of Iowa handles purchasing for three universities, as well as special schools for the deaf and blind. Purchasing departments can be found at <http://www.uiowa.edu/ap-purchasing/tools-vendors> for the University of Iowa, <http://www.purchasing.iastate.edu/vendors/process.html> for Iowa State University, and <http://www.uni.edu/obo/> for the University of Northern Iowa.

CIRAS government contracting specialists help guide you through the process of thinking local. For more information, contact Andy Alexander at andyalex@iastate.edu or 402-547-0333.

Engineering—LAS Online Learning Makes Improvement Easier

Flexibility for both on-campus students and far-flung professionals is translating into growth for Iowa State University’s Engineering-LAS Online Learning program.

The web-based classrooms offer graduate degree programs for engineering, as well as certificate programs that let online students take some graduate-level courses. “It gives them a chance to earn credits and a certificate and, at the same time, see if a graduate degree may be right for them,” said program director Mark Woolley.

These learning opportunities continue to be popular with professionals looking to expand their skills. Department leaders said roughly 250 to 300 distance students sign up each term for online engineering courses.

Participants may take up to nine credit hours—or three classes—without declaring a major.

Students with a standard engineering degree can now use the engineering management program, for example, to take high-level business courses and expand their skills. This new partnership between the Colleges of Engineering and Business is drawing about a dozen students each term.

Online interest is rising across colleges, Woolley said. The number of student credit hours earned through both liberal arts and engineering divisions has jumped by about 70 percent since 2012, he said. The number of online courses has expanded by 20 percent to serve distance students better and to ease crowding in traditional classrooms.

“Our demand has picked up over the last year,” Woolley said. “I think the increased numbers will continue for the foreseeable future.”

Online professional development courses on specific business-related topics are available anytime. Approximately 100 students enroll in the two most popular courses annually. One focuses on a group of methods time management courses and the second covers cost engineering.

➤ **For more information, visit www.elo.iastate.edu.**



Snapshot of Iowa's Professional and Business Services Sector

by Liesl Eathington

What industries and activities are included within the professional and business services sector?

The professional and business services “supersector” comprises three smaller sectors: professional, scientific, and technical services; management of companies and enterprises; and administrative support and waste management and remediation services.

Professional, scientific, and technical service firms provide an array of services including legal, accounting, engineering, advertising, and research and development.

The management of companies and enterprises sector includes holding companies and other establishments that oversee or administer planning and operations for firms.

Administrative support and waste management and remediation businesses provide routine services to other firms including personnel services, security, collection, cleaning, and waste disposal.

Administrative and support services have the largest employment share in the supersector, with 47 percent of the jobs.

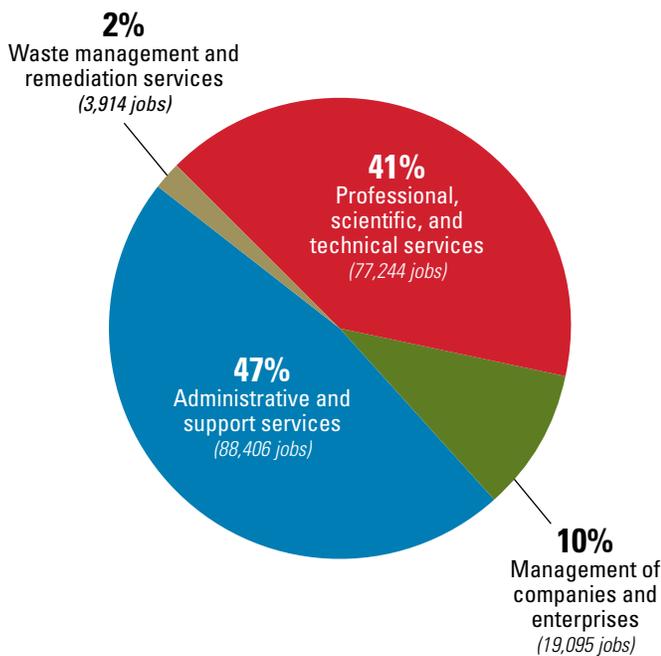


Figure 1. Composition of Iowa's Professional and Business Services Sector

How many of these types of firms are located in Iowa?

Iowa had 10,366 professional and business service firms with employees on payroll in 2014 and another 34,258 firms operating as “nonemployer” establishments with no paid employees other than the owner(s).

Nearly half of the 10,366 firms with employees on payroll are organized as S-corporations, followed by regular corporations at 22 percent.

How does the professional and business services supersector compare in size to the rest of Iowa's economy?

The professional and business supersector's 188,659 full-time and part-time jobs accounted for 9.3 percent of all Iowa jobs in 2014. In terms of establishments, the supersector accounted for roughly 16 percent of all firms.

Measured by gross domestic product (GDP), which includes payments to workers and returns to owners and investors, the professional and business services sector contributed \$10.6 billion toward Iowa's economy in 2014, accounting for 6.3 percent of total GDP.

Table 1: Professional and Business Services Sector Shares of Iowa Totals in 2014

	Professional and Business Services	% Share of Iowa Total
Total jobs	188,659	9.3 percent
Employer establishments	10,366	12.9 percent
GDP	\$10.62 billion	6.3 percent

Who works in Iowa's professional and business services supersector?

Given its broad definition, the supersector employs a diverse array of workers in both high-paying and low-paying jobs. Key occupations within the professional, technical, and scientific services sector include business and financial occupations, computer and mathematical occupations, and architecture and engineering occupations. Median annual pay for all occupations in that sector was \$46,950 in 2014. Management and office and administrative occupations comprise the largest share of the management of companies and enterprises sector. Median pay for that sector was \$50,550. In the administrative and support and the waste management and remediation sectors, key occupations include office and administrative support and building and grounds cleaning and maintenance jobs. Median pay within this sector was \$25,800.

Capstone Teams Help Companies Probe New Projects, Untested Ideas

Fresh eyes brought new insight to Webster City Custom Meats.

Webster City has worked several times with Iowa State University College of Engineering students via capstone course projects—and has benefited tremendously from the students’ study of how the company functions, according to president Connie Ingraham.

“The process makes you think differently,” Ingraham said. “They’re a neutral party. They didn’t have any invested interest or emotion in one direction or another.”

Each year, student teams at Iowa State work with 40 Iowa businesses like Ingraham’s company on capstone projects that span one or two semesters. Students use the projects to demonstrate that they’re able to apply what they learned over three years of study, while businesses get an outsider’s look at issues and processes that employees may be too close to see.

CIRAS coordinates with engineering faculty and the businesses to match students to company needs. CIRAS also can help bridge any subsequent gaps, such as helping a promising idea find the needed research.

At Webster City Custom Meats, students proposed redesigns of a bacon production facility to increase capacity, improve product flow, and better use limited inventory space. Student analysis of a bacon slicer ultimately led to a \$450,000 investment in a new slicer that helped increase production by 25 percent in an area that had been working a lot of long hours.

“It was a valuable process,” Ingraham said. “A lot of things weren’t new, but the students were able to quantify it and make it an easier sell to our board of directors.”

The team’s work led to projected savings totaling millions of dollars over the next five years through increased production and sales, fewer injuries, and reduced overtime, she said.

“They were able to quantify that our cooling processes were overloaded, so we (recently completed) a large cooler addition to our plant,” Ingraham said. “When we saw the data, if we were going to have more business, we had to do it.”

Meanwhile, Marco Laubach, director of product development for Legacy Manufacturing in Marion, said capstone students helped his company do several things that the company wasn’t otherwise staffed to explore. “It’s a great opportunity to get some legwork done on some of these designs,” he said.

Student teams have worked on capstone projects at Legacy twice. One involved a design problem with an existing product, and another involved redesigning existing high-pressure hose fittings.

After some refining, Legacy eventually modified some designs to incorporate student concepts for field-repairable hose fittings for one of the company’s flagship lines, the Flexzilla hose.

“When we saw the data, if we were going to have more business, we had to do it.”
— Connie Ingraham

➤ **For more information, contact CIRAS project manager Carey Novak at cenovak@iastate.edu or 515-408-4257.**



Rapid Manufacturing and Prototyping Laboratory (RMPL)

The RMPL facility is used to develop new methods for rapid prototyping and rapid manufacturing for industrial applications. A major goal of the laboratory is to eliminate the preprocess engineering time and skill required to create a custom component. This entails fast and easy process planning, fixture planning, and setup planning for making single or multiple functional parts.

Example Applications

- Rapid machining technology for fully automated rapid manufacturing of spare parts
- Push-button machining without the cost and time associated with typical programming and associated setup costs
- Rapid manufacturing processes involving machining porous metals used in biomedical implants
- Rapid pattern manufacturing for metal casting
- Rapid machining of bone fragments for orthopedic trauma research
- Setup, process planning, fixturing, and machinability analysis software development

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CIRAS Strategy Coach Helps Facilitate Answers, Action

There are countless paths that a company can take in pursuit of growing revenue and increasing profitability. Every decision made along the way tends to matter: Should you invest in equipment upgrades, employee training, new technology, or better marketing? Should you push for better quality or new product features? How different are you, really, from your competitors? How do you identify and successfully navigate your most effective strategic path?

CIRAS project manager Joy Donald has been working with Iowa companies for the past year to find answers to some of those questions. Donald functions as a coach for strategy development and implementation, helping companies both chart the right course and do what's necessary to steer in the right direction.

Here's Joy Donald explaining some of the basics about CIRAS and strategy:

Q: Where do businesses typically struggle with strategy?

A: Companies tend to follow the customers that they're familiar with. This sometimes results in a bit of a random return on investment. Success is both more likely and greater if a company takes the time to conduct market research and competitive analysis, to think through their strengths/weaknesses/opportunities/threats, to identify three- to five-year goals, and to develop a robust plan to realize those goals.

Q: Is that where you come in?

A: Typically, I start by having a series of conversations with the company president/CEO to assess the situation, learn about the company's challenges, and develop a customized approach. I help them figure out what their big picture "end goal" is and how to get there. It may be as simple as asking if they're making enough money for the long term. Or maybe the money is fine right now, but there's a threat looming that the business needs to prepare for, such as a technology shift or a new competitor.

Once we understand where things should be going, I work with company leaders to start moving forward. Sometimes companies have clearly articulated goals, but they see they're falling short on achieving them. In those cases, I help the team identify and remove barriers to implementing the vision.

Q: How long does the process take?

A: Engagements typically last six to twelve months. That's a significant investment, but the impact on the health of a business can be huge.



HOW IT'S WORKING

"Joy is adding tremendous value as we expand sales throughout North America...."

In the long term, we anticipate that our engagement with Joy and CIRAS will result in significant growth in both our sales and our profitability."

—Maximilian Droste, Chief Operating Officer at Group Schumacher North America

"If you are struggling to make traction with your strategic plan, we would highly recommend the services of Joy Donald through CIRAS."

—Michael Johnson, President of Timberline, Inc.

➤ For more information, contact Joy Donald at jdonald@iastate.edu or 319-359-0206.

Replenishing Iowa's Manufacturing Workforce by Liesl Eathington

The U.S. Bureau of Labor Statistics (BLS) projects job reductions of 6.7 percent in the U.S. manufacturing sector and 3.1 percent in production jobs from 2014 to 2024. Despite this bleak forecast, BLS projects more than 2 million production jobs will open because of worker replacement needs and growth within specific occupations.

This seemingly contradictory job outlook highlights a particular challenge for manufacturers—how to market themselves to a new generation of workers under the shadow of past and potential future job losses. In Iowa, with its high dependence on manufacturing, high fraction of older workers, slow population growth, and perennial challenges in attracting young adults, the issue of replenishing the manufacturing workforce is especially germane.

Figure 1 illustrates an important dynamic in the recruitment challenge. The manufacturing sector's shrinking employment footprint has disproportionately impacted workers with lower levels of educational attainment. Evolving skill demands make it harder for these workers to transition into new jobs, lowering the likelihood that job openings are filled from within the sector's own ranks. Even now, many employers lament their troubles in finding workers with desired skills. Younger workers, who often possess greater familiarity and ease with today's technologies, are highly prized.

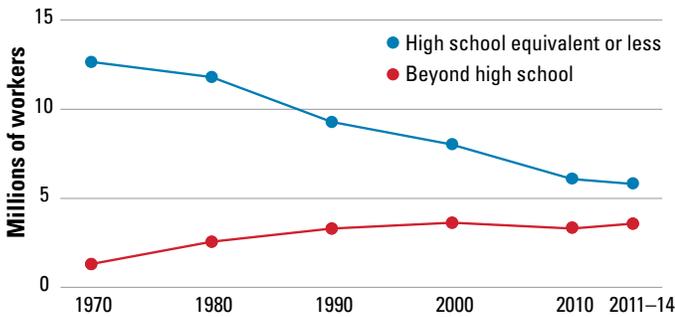


Figure 1: U.S. Production Workers by Educational Attainment, 1970–2014

In efforts to reshape perceptions about manufacturing careers, industry proponents often point to the growing importance of

educational attainment in production jobs. While this is true in context of the overall production workforce, the number of production workers educated beyond high school has remained essentially flat over the last 20 years, despite that group taking a larger share of remaining production jobs. Averaged data from 2010 to 2014 show that production workers actually constitute a smaller share of U.S. workers with post-secondary education than in 2000 and previously.

This trend is mirrored among young workers. Figure 2 shows changes in key components of Iowa's labor force for 2000–2014, highlighting the small fraction of young workers with some college experience who are employed in production occupations.

Iowa's total labor force grew by 6 percent between 2000 and 2010–2014. The number of young workers (ages 16–34) grew at just half the rate of the overall labor force. Notably, however, the number of young workers with one or more years of college jumped by 28 percent. Among these young workers with college experience, the portion in production occupations grew by only 1 percent.

Figure 2 highlights two important trends: (1) Iowa's younger skilled workforce is growing, and (2) production jobs represent just a small and declining fraction of opportunities available to these sought-after workers in Iowa.

Many employers have called for greater investment in the worker "pipeline" from schools to jobs in Iowa's manufacturing sector. Pipelines, however, can branch off in many directions. Successful strategies to entice a new generation of manufacturing workers must acknowledge the many competing career opportunities available to young adults with technical abilities.

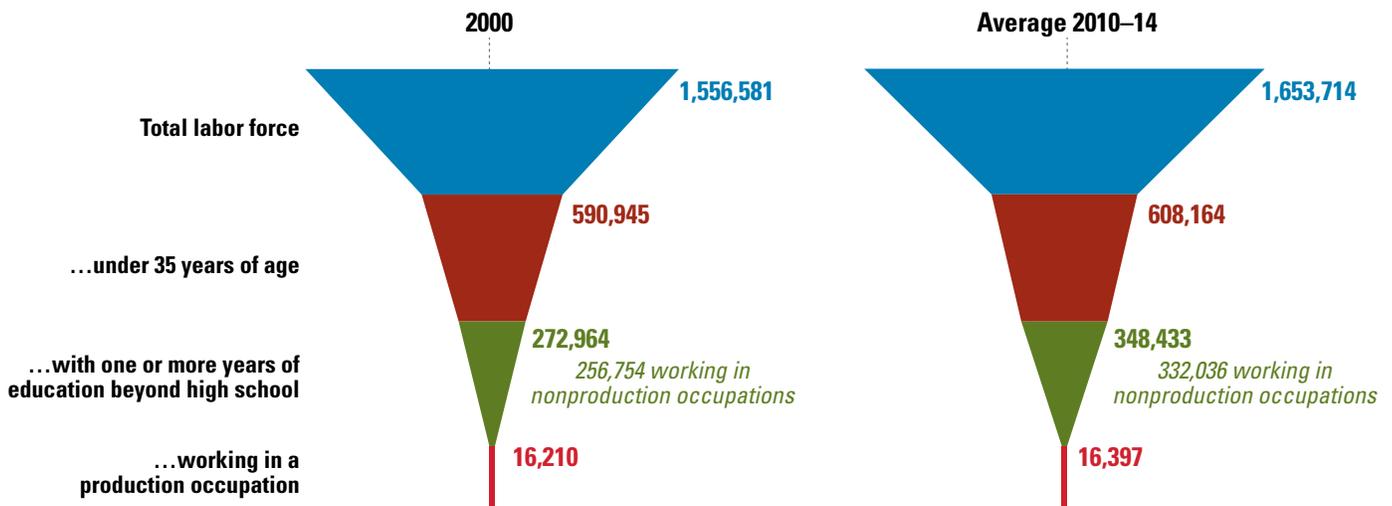


Figure 2: Iowa Workforce

On-campus Interviewing Saves Companies Money and Time, and Broadens Applicant Pool

Each year, Iowa State University career fairs draw thousands of students seeking jobs and hundreds of companies recruiting new talent. This year, for companies looking to hire engineers, the only difference may be one of the settings—a new spot to conduct on-campus interviews.

Recently remodeled space for Engineering Career Services (ECS) in Marston Hall now has 10 meeting rooms available to employers for conducting interviews. Interviews can be scheduled any day of the work week (whether Fall or Spring semester) at any point from the career fair through finals week.

“On-campus interviews make it very convenient for busy college students to schedule interviews around their classes and eliminates the transportation issues that some students face,” said Brian Larson, director of ECS. “It also makes it possible for employers to meet with a significant number of job candidates in a single day, simplifies the scheduling of interviews, and eliminates the cost of reimbursing candidates for travel expenses.”

Employers can request use of the new space via Iowa State’s free CyHire career management system at cyhire.iastate.edu/employers. The employer establishes a schedule and links the interview sessions to one or more position descriptions. Students then apply for the positions. Once employers decide who to interview, those students automatically are invited to sign up for an interview time.

“Interviewing on campus is a great way to initially connect with the students,” said Terry Frederickson, human resources generalist at Lennox Industries, which

interviews 120+ students on campus each year.

Sarah Erikson, recruiter/diversity coordinator at Emerson in Marshalltown, said Emerson annually interviews about 100 students on campus for its internship/co-op program. It hired 32 interns/co-ops from Iowa State in 2016. On-campus interviews are “convenient for all involved,” Erikson said. “It’s an excellent way to interview for a broad range of roles.”

Ryan Henderson, a mechanical engineering student who graduated in May 2016, interviewed with multiple companies on campus in his final year. One of those, 3M, eventually hired him as a manufacturing engineer. “For me, interviewing on campus was convenient,” Henderson said, adding that the process allows students to “interview for many jobs and increase their chances of finding the *best*” match with an employer.



“It’s an excellent way to interview for a broad range of roles.”

— Sarah Erikson,
Emerson



“For me, interviewing on campus was convenient.”

— Ryan Henderson,
student

Upcoming Iowa State Career Fair Dates

Engineering Fall Career Fair

September 20

Noon–6 p.m.

Hilton Coliseum and Scheman Building

Business, Industry and Technology Fall Career Fair

(business, liberal arts and sciences, and human sciences)

September 21

Noon–6 p.m.

Hilton Coliseum

People to People Fall Career Fair

(human/social services, education, health/wellness, government, and hospitality)

September 21

Noon–6:00 p.m.

Scheman Building

Agriculture and Life Sciences Career Day

October 11

9 a.m.–3 p.m.

Lied Rec Center

Find more details about campus career fairs at www.career.iastate.edu.

Plastics Unlimited—Positioned for Many Different Possibilities

Perhaps the best way to think about the Kieffer family is to picture them with fishing poles, staring longingly into a lake. The owners of Preston, Iowa-based Plastics Unlimited seem ready, and they talk as if dinner is inevitable.

"We're working very hard to get new sales, but we're in a waiting mode on many different projects that we recently have quoted and made prototypes for," sales manager Dakota Kieffer said in describing millions of dollars in pending bids for work. "It's not like these projects are unsuccessful. The companies aren't saying 'No.' But they're not saying 'Yes' either. They're just waiting."

"We're at the point where we could double in size in a month," Kieffer said. "Or we could not grow at all."

Plastics Unlimited, a 50-employee thermoforming company, has been in transition for several years. The company was founded in 1993 by Terry Kieffer, a then-farmer in search of a new business.

"I just decided that I wanted to find something that took some expertise," he said. "Plastics was something that was not going away."

Kieffer and his wife, Nancy, formed a company and spent years developing new applications for the work—

including making panels for agricultural equipment. Along the way, the company discovered CIRAS, which facilitated many different layers of business and technical assistance, including vital lab testing for the company's patented process of bonding plastic and fiberglass. Plastics Unlimited later estimated in surveys that work done between 2010 and 2013 by CIRAS and its partners had an economic impact in the tens of millions of dollars.

"One of the things we did was help them transition from plastics contract manufacturing into a company that's more engineering based, diversified, and willing to step into other markets," said CIRAS account manager Sean Galleger. "They've taken off from there. They no longer need that basic business or engineering technical expertise—they've got some of that in their two sons."

Travis Kieffer, who graduated with an industrial engineering degree from Iowa State University in 2012, now serves as chief operating officer for Plastics Unlimited. His brother, Dakota, received an Iowa State business management degree in 2013.

Terry Kieffer currently plays a prominent but lessened role in the company and remains excited about its future. Long dominated by agricultural clients, Plastics Unlimited is working on such diverse products as making skins for passenger rail cars and packaging for a toothbrush maker. The company also recently won a bid to provide parts for European forklifts.

"We're taking it to the next phase now," Terry Kieffer said. "The next phase really looks to be a lot more exciting."

"One of the things we did was help them transition from plastics contract manufacturing into a company that's more engineering based, diversified, and willing to step into other markets."

— Sean Galleger

➤ For more information, contact Sean Galleger at galleger@iastate.edu or 515-290-0181.



Help Us Make the *Manufacturing Day* Schedule

Wanted: Any and all school districts interested in scheduling visits to Iowa factories as part of a national celebration of American manufacturing.

Manufacturing Day, a day created to celebrate manufacturing and inspire a new generation to join it, is scheduled for October 7 this year—but CIRAS again will be working with other Iowa agencies to coordinate a month-long celebration with events across the state. Last year's Manufacturing Day celebration ultimately involved 139 events stretching through all 99 Iowa counties. The approach earned Iowa praise from the U.S. Secretary of Commerce and made CIRAS the national standard for "MFG Day" outreach.

CIRAS once more is working with Iowa industry, educational, and civic leaders to schedule all the statewide events. Organizing agencies include the Iowa Association of Business and Industry, Elevate Iowa, Iowa Area Development Group, and Iowa State University Extension and Outreach. Plans call for Iowa businesses to open their doors throughout the month of October for tours intended to show young people and their parents that manufacturing is no longer dirty, dangerous work. Some factory leaders will end up visiting schools during the month. Other presentations may focus on the future of manufacturing technology or the impact that manufacturing has had on Iowa communities.

"At the end of the day, I think it will be bigger than last year," said CIRAS account manager Paul Dunnwald.

To see a list of finalized events, search for Iowa at mfgday.com. If your company or school would like to participate, send an email to ciras_mfgday@iastate.edu.

CIRAS EVENTS

- **Iowa Vendor Conference**
August 23, 2016
9:00 a.m. to 3:00 p.m.
Iowa Events Center, Des Moines
- **Fall CIRAS Video Marketing Boot Camp**
September 10–11, 2016
10:00 a.m. to 3:00 p.m.
Cedar Rapids
- **GovCon 101**
September 13, 2016
9:00 a.m. to 10:30 a.m.
Webinar
- **Packing Innovations and Technology**
September 28, 2016
10:00 a.m. to 2:00 p.m.
Iowa City
- **ABI Advanced Manufacturing Conference**
October 4, 2016
8:00 a.m. to 5:00 p.m.
Altoona
- **Food & Beverage, Feed & Grain Processors Innovation Summit**
November 15, 2016
7:00 a.m. to 4:00 p.m.
Ames
- **Government Networking Group**
November 18, 2016
9:00 a.m. to 10:00 a.m.
Bettendorf

For more information on these and other similar events, please visit www.ciras.iastate.edu/events.asp.

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

Bush Construction Company, Inc.



Overview: Bush Construction is a commercial contractor providing preconstruction, construction management, design-build, general contracting, and LEED services in a variety of market sectors. Bush, which was named the third-fastest-growing private company in Iowa by *Inc. Magazine* in 2014, describes the way it operates as "Building on a Foundation of Integrity."

Location: Davenport, Iowa

Founded: 2008

Employees: 38

Website: www.bushconstruct.com

Sky Factory

Overview: Sky Factory is an award-winning fine art and digital technology studio that designs the only research-verified virtual skylights in the world. These architectural illusions of nature are unique for their ability to engage spatial cognition (depth perception). Research indicates that views to nature promote healing in healthcare settings, improve productivity and satisfaction in the workplace, and reduce stress in all environments.

Location: Fairfield, Iowa

Founded: 2002

Employees: 38

Website: www.skyfactory.com



Todd's BBI, Inc.

Overview: Todd's BBI, Inc. is a food and pet treat manufacturing company that specializes in custom bulk-blending and product design. The company has provided private label, custom manufacturing, and signature blends to meat lockers, grocery stores, restaurants, hunters, and others for more than 90 years.

Location: Des Moines, Iowa

Founded: 1926

Employees: 50

Websites: www.toddsbbi.com and www.toddsbpantry.com (to order)



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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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THE INNOVATION CYCLE

Leveraging the Innovation Cycle *by Mike O'Donnell*

Innovation is complex—there is no easy set of instructions every company can follow to become innovative.

Successful innovation systems, however, do have a variety of common activities that can improve the reliability of innovation within your company. CIRAS describes this process as the innovation cycle and divides these activities into four key phases: definition, discovery, development, and delivery.

In the definition phase, companies create, refine, and document many ideas. This can include using proven, repeatable ideation techniques to generate unique ideas for any business. Ideas are then reviewed by a cross-functional team and the best concept(s) is/are selected for pursuing. In this stage, strong problem statements and goal definition are critical since this information will be used to develop a concept with an initial value proposition.

Discovery is a frequently overlooked step in the innovation cycle. Many companies do not have a robust way to decide whether to invest, shelve, or kill a concept. Executed well, companies not only further define and quantify the opportunity, but they also understand how their capabilities can create a sustainable competitive advantage that justifies investment. Typically, cost-effective pilot studies are executed to validate major assumptions, which results in a valued concept that drives commitment of resources.

In development, the goal is to evolve the valued concept into a ready solution. This phase focuses on up-front planning, solution design, and verification/validation. A key step in this process is to establish the infrastructure to deliver the ready solution—preparing the business and supply chain to integrate the innovation into daily efforts. When the concept is a product, this phase also includes traditional product development processes.

The final phase, delivery, is where the company executes the ready solution and produces business value. When the previous three phases are executed well, this phase requires minimal effort. Many businesses, however, have gaps in the previous three phases that lead to significant problems in this phase. Poor transition to manufacturing, incorrect sales forecasts, and supplier delays are often experienced at this time. The remedies to these issues are usually found by improving the processes and decisions in the previous phases.

Companies who want to improve their ability to innovate on a systematic basis should evaluate their internal processes, searching for gaps in the innovation cycle. Sometimes adding simple tools and checks to key points in the cycle can be the strategy to nurturing an innovation culture and achieving profitable growth.

➤ **To participate in the innovation discussion, join our LinkedIn group at [linkd.in/12tVly1](https://www.linkedin.com/groups?gid=12tVly1).**