

OCAST >>

Oklahoma Center for the Advancement of Science and Technology

OCAST >>

755 Research Parkway, Suite 110
Oklahoma City, Oklahoma 73104
www.ocast.ok.gov
phone 405-319-8400
toll free 866-265-2215
fax 405-319-8426

 facebook.com/ocast.ok.gov
 ocastok.instagram.com
 twitter.com/ocast
 vimeo.com/ocastok
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*growing and diversifying
oklahoma's economy*



2016 Impact Report

introduction: board of directors

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introduction: director's message

For almost 30 years the Oklahoma Center for the Advancement of Science and Technology (OCAST) has supported innovations and technologies that impact the world far beyond the borders of our state. We are committed to diversifying the state's economy through science and technology while helping to create jobs and bring greater prosperity to Oklahoma.

It is through our peer-reviewed programs where the OCAST impact is far-reaching. Initiatives such as the Oklahoma Applied Research Support (OARS) program, the Oklahoma Intern Partnerships program and the Oklahoma SBIR Collaborative Resource (OSCR) program are well known among the state's scientific and small business communities.

This past year, each of our program elements made a major impact on the advancement of medical diagnostic and treatment protocols, development of new industrial products and processes and promoting college and career paths for students in our education system.

In this report, you will read about how the OARS program helped HydroHoist, a 50-year-old Claremore company, expand its product line beyond the boating industry and into agricultural applications.

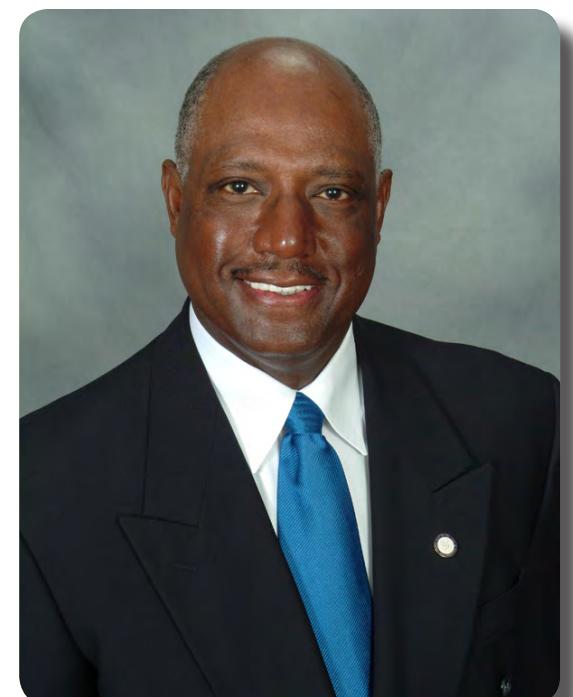
You will also find a report on how OCAST and our partners at the Oklahoma Manufacturing Alliance brought together a unique collaboration involving a pair of Oklahoma businesses and the Samuel Roberts Noble Foundation to manufacture and market the BoarBuster feral hog trap.

We spotlight the contribution of the Oklahoma SBIR Collaborative Resources (OSCR) program that we run in conjunction

with our strategic partner i2E in helping Oklahoma City-based Accele BioPharma win a \$299,000 Phase I grant from the federal Small Business Innovation Research (SBIR) program.

You will also learn how the OCAST Intern Partnerships program helped an Oklahoma City Community College biotech student launch her career at Cytovance Biologics, a biomedical research and manufacturing company in Oklahoma City.

As you look at the numbers and read these short profiles, I am confident that you will gain insight into the positive and far-reaching impact that OCAST has on Oklahoma's economy. As we begin another year, we look forward to continuing to unleash the research and innovation capacity of the people, institutions and small businesses in our state and continuing the growth and diversification of Oklahoma's economy.



overview: what we do

What OCAST Funds

- Basic and applied R&D
- Student and faculty internships in Oklahoma's advanced technology companies
- Commercialization services and investment in advanced technology companies and university spinouts
- Resources to improve manufacturing efficiency and competitiveness
- Inventor assistance and new product development services - engineering analysis

OCAST Model

- Highly Competitive – ensures the best investment of state money
- External Peer Review – ensures the science is sound and the project has market potential
- Catalyst for Collaboration – resources and capabilities to move technology innovations to the marketplace
- Advisory Committees of subject matter experts

Other Services and Activities

- Technical support for federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) applications
- Collaboration-building assistance for internships – matching interns with companies
- Service-provider collaborations in support of high-tech business development
- Public/private research collaborations

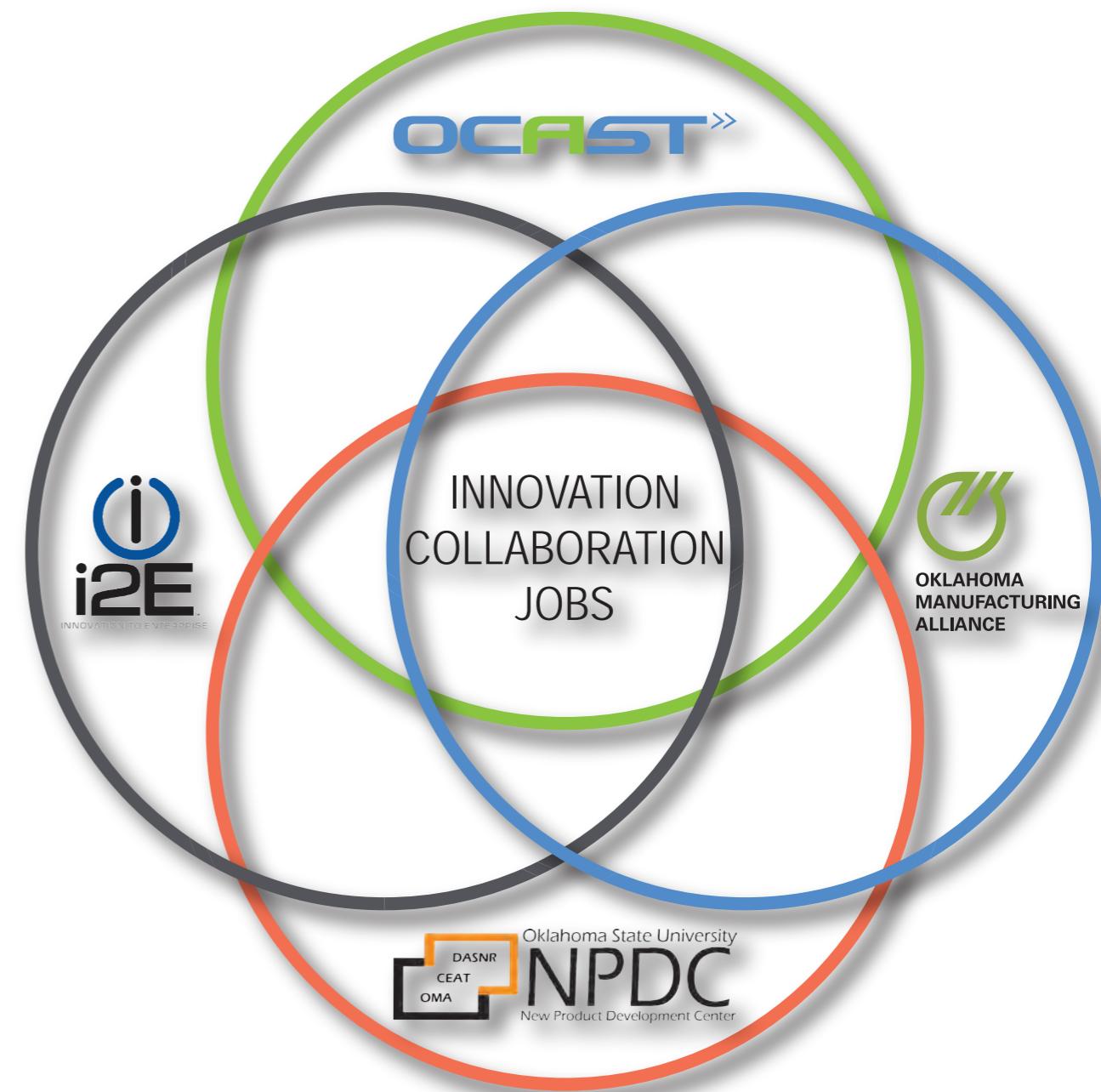
Benefits

- Creating new or improving existing products/processes
- Plugging the talent "brain-drain" in Oklahoma
- OCAST-funded interns are more likely to remain in the state
- Growing high-tech startups with internal or contracted R&D capabilities
- Moving research and technology innovations to marketplace applications
- Attracting new companies to the state
- Helping form short- and long-term partnerships and collaborations
- Offering technology solutions to private-sector needs
- Creating and retaining high-wage jobs
- Using state funds as seed investment to attract federal and private-sector R&D dollars

overview: how we do it

OCAST is uniquely positioned to serve as the bridge between research activities and business needs. Through its network of strategic partnerships, OCAST creates a continuum of services that enables and accelerates the transition of ideas from the

laboratory to the market. It is through this continuum of services that OCAST is able to carry out its mission of fostering innovation throughout Oklahoma's economy and generating a significant economic impact that is resultant of such an endeavor.



results: by the numbers

2,092

jobs created



283

student interns supported



\$536M (33:1)

2015 return on investment



\$206M

deal leads to acquisition
of cytovance



new product

boarbuster goes
into production



64

patent applications
filed



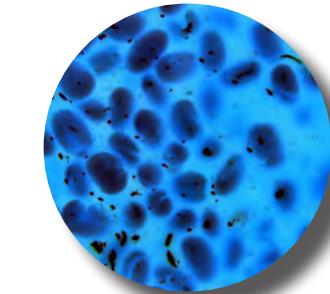
\$90,513,141

total payroll



investment capital

accelerate biopharma
portfolio expands



\$306M

direct impact on gross sales
of participating companies



33 ocast interns

gain employment,
remain in Oklahoma



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2015: another successful year of growing and diversifying oklahoma's economy

SUCCESS: oklahoma city community college

Alayna Trujillo had it all mapped out. She would earn her Associate's degree in the Biotechnology program at Oklahoma City Community College (OCCC), then move on to a four-year university to earn a Bachelor's degree before pursuing a biotech industry job.

The OCAST Intern Partnerships program disrupted those plans in the very best of ways.



As a biotech student at OCCC, Alayna participated in the OCAST program almost four years ago as an intern at Oklahoma City's Cytovance Biologics, a contract manufacturing for biotechnology industry clients nationwide.

After the eight-week internship ended and she had earned her Associate's degree, Alayna never left Cytovance. The company hired her as a full-time employee.

She's still there three and a half years later.

"The internship really opened my eyes as to what I wanted to do," Alayna said. "Once I was at this internship and found this job and what I wanted to do, it just fell into place that I wanted to stay here and gain experience."

Today, she has a great position as Downstream Manufacturing Associate, Level 2, which means she leads projects for Cytovance and also serves as a trainer for what is called downstream manufacturing.

OCAST's innovative Intern Partnerships program provides up to \$30,000 a year to participating Oklahoma businesses that are interested in pursuing innovative R&D projects and teaming up with undergraduate students who help accomplish project goals.

Directed by Dr. Fabiola Janiak-Spens, the OCCC Biotechnology Program has won numerous OCAST Intern Partnerships grants over the last decade, placing students in

labs at businesses like Cytovance or in research settings at the University of Oklahoma Health Sciences Center.

In the most recent two-year Intern Partnerships grant, Dr. Janiak-Spens has placed students in seven internships. She has placed 33 individuals through the OCAST grants during her tenure at OCCC that dates back to 2007.

Of those, 20 are currently working in biotechnology or technician jobs in Oklahoma and 12 former students went on to receive advanced degrees. The Intern Partnerships benefit the students, the college and the participating companies, Dr. Janiak-Spens said.

Call it a win-win-win!

For OCCC, the program shows potential future employers that students who emerge from the school's program are well trained, familiar with lab equipment and ready to go to work from Day One.

For participating companies, there is no long learning curve in which they have to train incoming interns.

And for students, it's a chance to showcase what they learned in the OCCC classroom in a real-world environment.

"To be honest, without the internship experience that the students are getting, they would not have the employment success rate," Dr. Janiak-Spens said. "It gives them this direct contact with employers for an extended period of time."

For Alayna, the internship paid an immediate dividend at Cytovance.

"They loved the fact that they didn't have to walk me through step-by-step on how to actually do things," she said. "My favorite part of the internship was actually finding out what I had a passion for. I love what I do."

The Intern Partnerships benefit the students, the college and the participating companies. Call it a win-win-win.

SUCCESS: hydrohoist

HydroHoist Marine Group in Claremore began more than five decades ago with a need to lift and store a boat out of the water on Oklahoma's Grand Lake. Founder Henry Rutter was inspired to create a mechanism that consisted of inverted fiberglass tubs placed beneath the hull and filled with air to lift the boat.

We were not aware of the program until OCAST made us aware of it. It was a lot of work to win the grant, but OCAST encouraged us through the process.

Rutter called his invention the HydroHoist. He was awarded the first patent for a hydro-pneumatic boat lift in 1964.

The company Rutter founded never stopped innovating.

HydroHoist Marine Group has since become the world's premier boat lift manufacturer and operates three divisions that continue to expand its reach. HydroHoist owns five patents relating to boat lift technology and electric power pedestals.

- HydroHoist boat lifts have evolved into a sophisticated method of total boat care that is used worldwide.
- The company's HyPower division provides a line of easy-to-maintain power pedestals suited for marina and RV applications.
- And its RotoMoldUSA operation provides superior plastic rotomolding services for both HydroHoist and for several Fortune 100 companies ranging from pharmaceutical to transportation to agriculture.

Today, HydroHoist Marine Group is led by CEO Mick Webber, who leads a sophisticated manufacturing and sales operation.

"I'm so proud we are an ISO certified company at all three of our facilities," Webber said. "No other boat lift or power panel companies are ISO certified companies."

A Claremore native, Webber began working for HydroHoist during the summers as a high school student. He was then hired as sales representative and progressed through sales,

marketing, then to chief operating officer and eventually became president and CEO.

Webber also took an ownership stake in the company in 2006, and in May of this year completed purchase of the business.

HydroHoist employs 75 people in Oklahoma and at five regional offices in Texas, Tennessee, Missouri and California. Two mechanical engineers drive its R&D.

"We really listen to our customers, we listen to our dealer accounts and we listen to our regional managers," Webber said. "They really direct the product needs for the future."

Through an \$80,000 matching Oklahoma Applied Research Support (OARS) grant, OCAST is facilitating development of innovative recyclable polyethylene trays that expands the company's reach into the agriculture industry. The trays are designed to replace wooden trays currently used by the mushroom growing industry.

"We were not aware of the program until OCAST made us aware of it," Webber said. "It was a lot of work to win the grant, but OCAST encouraged us through the process."

HydroHoist also participates in OCAST's Intern Partnerships and currently employs a student from the University of Tulsa through the cost-sharing program.

Innovation keeps happening at HydroHoist. In-ground storm shelters, a product to reduce wind drag and reduce fuel consumption on semi-trucks, sturdy pallets for the pharmaceutical industry and an improved free-floating port for personal watercraft. Three major product releases are planned for 2016.

"We want to innovate, and we want to lead and dominate the market," Webber said.



SUCCESS: accele biopharma

Oklahoma City's Accele BioPharma Inc. was founded as a life science accelerator in 2010 to identify, fund and manage promising early stage biopharma companies developing therapeutics across diverse challenges to human health.

Through strong scientific and managerial expertise, Accele supports new life science companies that show promise in dramatically improving human healthcare and have a strong potential for commercial success. The firm's venture capital arm, Accele Venture Partners, provides seed funding for the programs.

Startups Under the Accele BioPharma Umbrella

- Synereca Pharmaceuticals addresses the growing problem of bacterial resistance to current antibiotics;
- Jortan Pharmaceuticals develops novel approaches to treating diabetes;
- Otolologic Pharmaceuticals develops novel therapeutics to both prevent and restore hearing loss; and
- Pamlico Biopharma Inc. develops antibodies for the diagnosis and treatment of infectious diseases and cancer.

The four biopharma startups in Accele's portfolio are developing new treatments that tackle the growing threat of antibiotic resistance, treat diabetes, restore hearing loss and diagnose and treat infectious diseases including pneumococcal pneumonia. However, the development of new drugs can be a long and expensive process.

"Our goal is to accelerate the formation and growth of promising biopharma companies in a capital-efficient manner," said Clayton Duncan, Accele's founder and chief executive officer. "We identify early-stage biopharma companies or help spin them out of a university or research institute, provide experienced management and core facilities and support them with seed capital necessary to complete some early stage – but important – milestones."

Accele BioPharma collectively manages the startups, spreading costs over the portfolio, which allows the research teams to focus on advancing their therapeutics.

"These are very early stage research programs," Duncan said. "Having a discreet management team for each of them would be too expensive. With the Accele model, we can move these companies through various preclinical milestones, and then once those early questions are answered, bring in

outside investors and partners. It's been successful for us so far."

Accele BioPharma was co-founded by Clayton Duncan, chairman and CEO, in partnership with the Oklahoma Medical Research Foundation, the Presbyterian Health Foundation, and i2E Inc. Richard Gammans, Ph.D., is chief operating officer. Clayton and Dr. Gammans have worked together previously at biotech companies in North Carolina and came to Oklahoma to found Accele.

Today, the biopharma accelerator employs nearly 20 people and its portfolio companies have secured \$25 million in aggregate funding. Accele Venture Partners LP provided initial funding and was subsequently joined by other funding sources, including i2E and Seed Step Angels, grant funding from the OCAST Oklahoma Applied Research Support (OARS) program and federal funding sources.

With the aid of the Oklahoma SBIR Collaborative Resources (OSCR) program managed by OCAST, Jortan was recently awarded a \$295,000 Phase I SBIR grant to advance research on enzyme inhibitors that show promise in restoring insulin-producing beta cells in diabetics.

"I think OCAST has a fantastic grant support program," Duncan said. "We couldn't have gotten this SBIR without the assistance of OCAST and the OSCR program. We look forward to working with them again in the future. This SBIR award for Jortan will validate our early proof of concept research and be the foundation for progressing on to clinical trials." There are important milestones on the long journey from lab to the marketplace.



SUCCESS: boarbuster

An all-Oklahoma collaboration between the Samuel Roberts Noble Foundation and companies from Broken Arrow and Thomas resulted in an innovative new trapping technology that promises to reduce the feral hog population and the damage they cause nationwide.



The BoarBuster™ feral hog trap was conceived and designed by the Ardmore-based Noble Foundation and is manufactured by W-W Livestock Systems of Thomas and enhanced with high tech electronics from Tactical Electronics of Broken Arrow.

The rooting, wallowing and nesting by wild hogs destroy cropland, spread disease and pollution and endanger native wildlife. Unfettered, their population grows rapidly.

Current trapping technology and hunting does little to reduce the numbers of feral hogs and the damage they cause. The situation is most serious for farmers, ranchers and landowners in southeastern Oklahoma and across the southern U.S.

That's why the Noble Foundation stepped up to create a solution to the feral hog problem.

"The BoarBuster trap system demonstrates how the Noble Foundation and agriculture research provides tangible solutions to the real-world problems facing farmers, ranchers and consumers affected by this problem," said Jeff Moen, director of business development for the foundation. "Feral hog populations have been expanding their zone of destruction for years. Our wildlife researchers identified and created a solution to the problem."

The BoarBuster combines a fully suspended, rigid trap enclosure with motion detection technology, streaming video and wireless communications to alert landowners, who

monitor in real time and remotely trigger the trap.

The Noble Foundation turned to Ardmore-based Oklahoma Manufacturing Alliance extension agent Kay Watson to help identify potential manufacturers for the BoarBuster.

"They contacted me and said 'here's the prototype; we need a metal manufacturer to make them,' Watson said. "We came up with three that they interviewed, and they picked W-W Livestock Systems."

W-W Livestock, a manufacturer of livestock handling equipment, also had its own nationwide distribution network that could facilitate sales.

When it was determined that an electronics supplier was needed, OCAST was there to help. Tactical Electronics, a collaborator with OCAST, was brought in as a partner on the project.

Research gathered during years of testing showed the BoarBuster system is unmatched in its ability to help control the feral hog population. Marc Popejoy, general manager of W-W Livestock systems says the trap is so effective because of its unique approach to snaring the animals.

"The fact that the trap is suspended makes a big difference in trapping the hogs," Popejoy said. "They walk right into it and start eating the bait. Whoever has the BoarBuster set up can trigger it remotely and trap the animals inside."

With sales launched in July, the BoarBuster already is bringing revenue into the state and creating jobs for Oklahomans.

"It's an all-Oklahoma technology and that's what I'm thrilled about," Watson said.

The BoarBuster trap system demonstrates how the Noble Foundation and agriculture research provides tangible solutions to the real-world problems facing farmers, ranchers and consumers affected by this problem.