2018 IMPACT REPORT

Oklahoma Center for the Advancement of Science and Technology

Executive Director's Message

At OCAST, we like to hear from scientists and entrepreneurs like Michael Eilts, co-founder and CEO at Norman-based Weather Decision Technologies (WDT). Founded 17 years ago by Eilts and three other weather industry professionals, WDT has grown into an industry leader that employs 85 people and has clients around the world. Eilts and his team own six U.S. patents.

OCAST awarded WDT a $300,000 Oklahoma Applied Research Support (OARS) grant just as it was getting started back in 2001. That original grant continues to yield benefits to this day, Eilts recently told us.

You can read about the long-lasting impact of that OARS grant on WDT in this edition of our annual OCAST Impact Report, along with stories on three other companies that have benefited from our support.

For the team here at OCAST, our 30th year of operation brought expanded public-private partnerships in which we were among the key stakeholders.

For example, OCAST helped bring to life the Innovate Oklahoma initiative announced by Governor Mary Fallin in September. Innovate Oklahoma is a collaborative project in which private citizens can suggest ways to solve state government problems, and Oklahoma's technology community can actually bring those ideas to life.

Other 2017 projects in which OCAST was involved with government, industry, academia and non-profits included a joint initiative with the U.S. Economic Development Administration in "Project Diversify Oklahoma," a program to help small oil and gas companies expand their markets and revenue streams.

We also are pursuing STEM initiatives that will expand interest in and access to science, technology, engineering and mathematics education across Oklahoma. And we are working to increase research capacities at our research and regional universities and organizations such as the Oklahoma Medical Research Foundation and the Samuel Roberts Noble Foundation.

These activities contribute to the diversity and growth of Oklahoma's economy and are reflected in the strong historical return on state investment in OCAST.

Even as we reflect on the ways we've worked to diversify our state's economy over the past year, OCAST is constantly looking forward, planning and pursuing initiatives that promise even more positive returns.

It is 2018, and the future is now. We're continuing to push the envelope of what's possible for Oklahoma.

- C. Michael Carolina
Executive Director

Fiscal Year 2017 Impacts

16
NEW COMPANIES FORMED

2,274
JOBS CREATED OR RETAINED

29 : 1
RETURN-ON-INVESTMENT

$22,200,000
VALUE OF PATENTS

$105,421,801
IMPACT ON GROSS SALES

396
STUDENT INTERNS HIRED/RETAINED

OCAST

$51,756
AVERAGE ANNUAL WAGE

$358,066,951
TOTAL FINANCIAL IMPACT

$126,173,972
FOLLOW-ON TO INVESTMENT

$32,867,002
TOTAL PAYROLL

23
PATENTS GRANTED

Worth the Wait

UCO scientist Chen pioneers new approach to cancer treatment

Wei R. Chen, Ph.D., spent the past two decades developing a novel treatment for late-stage, metastatic cancers that combines laser irradiation and immunotherapy.

"Metastasis causes 90 percent of cancer-related deaths," said Dr. Chen, professor of biomedical engineering and dean of the College of Mathematics and Science at the University of Central Oklahoma. "We are still searching for an effective method for treating metastatic cancers."

Dr. Chen and his collaborators developed a treatment method known as laser immunotherapy (LIT). LIT uses the combination of local laser irradiation and the local administration of an immunological stimulant to treat tumors. This induces system-wide, anti-tumor responses within the immune system.

Laser immunotherapy shows so much promise as an effective metastatic cancer treatment that the National Institutes of Health (NIH) is funding his research.

The NIH, through its National Cancer Institute, awarded Dr. Chen a five-year R01 grant in 2017, totaling $1,374,355, to support the continuation of his work on his cancer treatment method.

As a scientist at a non-research university such as UCO, the NIH grant, awarded in mid-2017, was an extremely rare show of confidence in his research. He is the first Oklahoma scientist at a non-research university to receive a prestigious R01 grant.

Dr. Chen's laser immunotherapy treatment has been used successfully to treat breast cancers in clinical trials in Peru, as well as in a well documented case involving an Oklahoma man with late-stage metastatic cancer.

"He was diagnosed four years ago with late-stage melanoma," Dr. Chen said of the patient. "He was given three to six months to live. Then by chance he learned that I'm working on a new method for treating melanoma. He called me and I arranged for my collaborator to treat him with our methodology.

"After several sessions, we not only removed the melanoma on his head, but also destroyed the metastasis in his lungs," Dr. Chen said. "Now after four years, he is healthy and tumor free."

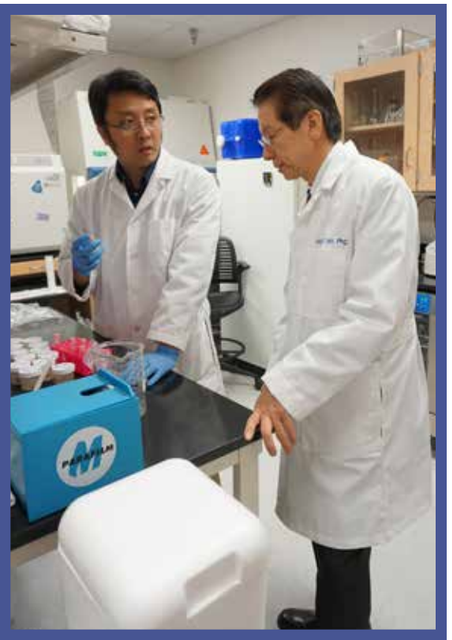
Support from OCAST has been critical to Dr. Chen's research.

"OCAST funded me with an Oklahoma Applied Research Support grant in 2000, which supported my research and allowed me to perform critical experiments to test the concept of LIT and lay the foundation for further study," he said.

In 2016, OCAST awarded Dr. Chen a Health Research grant as "gap" funding while he applied for the NIH grant.

"OCAST is not only my funding agency, but really a partner in my research," he said.

"This R01 grant demonstrates the recognition by biomedical research peers of the importance of laser immunotherapy, of my research network in Oklahoma, as well as of the research capacity at UCO," Chen said.



- Dr. Chen and a collaborator

Click here to watch the video

Forecast: Continued Growth

Oklahoma-based Weather Decision Technologies has global impact

Let's say a storm is brewing in southwest Oklahoma. Lightning flashes. Clouds are spinning. A tornado warning is issued.

Now the challenge becomes quickly communicating the warning to hundreds of thousands of Oklahomans who may be living and working in the tornado's path.

Norman-based Weather Decision Technologies (WDT) owns patented technology that alerts users of warnings using its innovative capabilities within seconds of the imminent threat.

"If a large city is in a tornado warning, we can send a million alerts out in 22 seconds," said Michael Eilts, WDT's co-founder and CEO. "That's all based upon our patented capability."

In fact, WDT has been issued six patents since it was founded 17 years ago, three of which focus on how fast it can send alerts.

Founded in 2000 by Eilts and three other weather research veterans on the OU campus, Weather Decision Technologies today employs 85 people, including 79 at its Norman headquarters. Thirty-one of them possess master's – or Ph.D. – level degrees.

As an industry-leading provider of weather-related projects, WDT offers expertise that applies to hazardous weather detection and prediction, forecast modeling, analytics, mobile apps and interactive mapping. Its worldwide customer base includes oil and gas industry clients, agriculture, marine, health care and data scientists.

For Oklahoma, WDT is a high-paying employer that brings millions of dollars in revenue annually into the state. Only 5 percent of its income is generated in Oklahoma, while 15 percent comes from international clients and 80 percent from the continental United States.

"WDT is a local company; it has grown here and has added $350 million in wealth affect to the state of Oklahoma over the 17 years of our lifetime," Eilts said. "I think that creates a huge value in Norman and Oklahoma."

Click here to watch the video

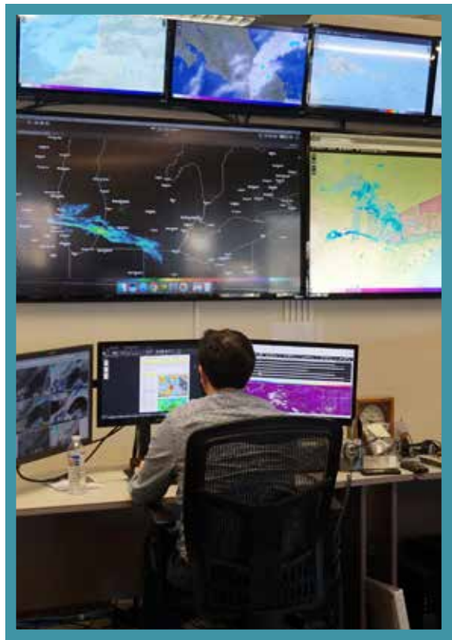
WDT's early growth was aided by Oklahoma grants and investment. It received a $300,000 grant from OCAST in 2001 that still yields benefits today.

"That helped us start a number of products, helped us license some things from the university and get them run operationally," Eilts said. "Two of the employees we hired with that grant are still WDT employees. It's really made a great bridge for us."

WDT also participated in the OCAST Intern Partnerships, a program that allowed it to bring in interns on a cost-shared basis.

Another factor in WDT's growth has been the large weather industry presence on the OU campus, Eilts said. More than 1,200 people work in the weather industry in Norman.

"One of the key things for WDT is that we have been a leading tech company in the industry for a long, long time," Eilts said. "And the reason for that is we are here in Norman, OK, on the South Research Campus. We have friends over there. We license technology from the University of Oklahoma and from the National Severe Storms Laboratory."



- World-wide monitoring of weather events

The MaxQ Strongbox

Stillwater company's insulated boxes used to safely transport blood for hospitals, blood banks nationwide

Stillwater's MaxQ develops advanced, insulated, high strength systems for safe transportation of temperature-sensitive products such as blood collected from donors throughout the United States, Canada and abroad.

Founded in 2012 by a small team of then Oklahoma State University students, the company developed patented light-weight, insulated boxes that are now used by 36 hospital systems and three blood banks across the country.

OCAST and its partner organizations have provided strategic support for MaxQ's growth since the beginning.

"Support from OCAST provided seed funding for our startup in the early days," said Saravan Kumar, Ph.D., MaxQ co-founder and CEO. "We got our first OARS grant in 2014 to get the R&D off the ground through applied research and advance the idea from a promising invention to high value proposition products."

Since then, MaxQ has added interns through the OCAST Intern Partnership program, received a second OARS grant in 2016, as well as an investment round led by i2E and manufacturing assistance from OMA.

"I think we have a very active startup support ecosystem right here in Oklahoma, especially for technology startups," Kumar said. "OCAST offers not only grant support but guidance on the back end. That is super helpful. We were able to leverage the OCAST support to acquire National Science Foundation Phase I and Phase II funds to accelerate technology transition and commercialization milestones."

The OCAST Intern Partnership provided another boost to the company's growth, said Balaji Jayakumar, co-founder and chief operating officer. One intern was a mechanical engineer who will be starting full-time in January, while another – an electrical engineer – has already transitioned into a full-time employee.

"The OCAST Intern project has helped us significantly, not just to use the intern pool for R&D or product development, but also to build a high technology workforce here in the state of Oklahoma," Jayakumar said. "We appreciate the opportunity to retain local graduates with advanced degrees in science and engineering."

Today, MaxQ operates with six full-time employees and five part-time. The company recently moved into 8,400 square feet of manufacturing/warehouse space on the western edge of Stillwater.

MaxQ recently added a national sales manager in Will Mitchell, an OSU graduate. The company also gained a strategic investor in Bob McGregor, another OSU alum.

Kumar and Mitchell recently went on the road to see how MaxQ's insulated boxes were working for one of its hospital clients. They discovered that in the last eight months of using the MaxQ technology, the hospital had lost zero blood products.

"It has been a humbling experience to see how our solutions facilitate efficiency in the transfusion blood supply chain and directly enable healthcare service providers in saving somebody's life," Kumar said. "That has reaffirmed our mission of generating sustainable value through innovations that could save lives locally and abroad."

- Assembly of a temperature-sensitive blood transport box

Click here to watch the video

Trail Blaster

Inventors Assistance Service, New Product Development Center provide equipment, services that bring unique hunting product to life

The Trail Blaster was conceived by Patrick Delehanty as a timed aerosol spray device designed to cover a hunter's scent and attract wild game in the woods.

The idea is that a timed-release masking agent and pungent attraction odor such as deer urine would lure trophy game in close enough for a shot.

First, however, Delehanty had to turn his idea into reality.

Delehanty followed a familiar product development path that required market and patent research, as well as creation of a prototype to prove that a timed aerosol blaster would actually work.

Where are those types of services available in Oklahoma?

Delehanty turned to Oklahoma State University's New Product Development Center (NPDC) and the OCAST-funded Inventors Assistance Service (IAS) to bring the Trail Blaster to life.

The NPDC provides education, guidance, technical engineering assistance, resources and referrals to inventors and entrepreneurs from across Oklahoma. It has design laboratories both in Stillwater and Tulsa.

"OCAST's Inventors Assistance Service and the New Product Development Center really helped us get started on this product," said Delehanty, founder of a Broken Arrow-based new product development and marketing firm called Delco Products.

"They helped us with the mechanical components and what components were going to work and what wasn't going to work," he said. "We started with the Trail Blaster project, and it has spun into several other projects down the road."

In fact, Delehanty is currently on its 16th development project with the NPDC through his Delco Products.

Tyler Worden is a design engineer who oversees operations of the Tulsa NPDC in the Helmerich Research Center on the OSU-Tulsa campus. The NPDC offers prototyping equipment and a staff of engineering student interns to help turn ideas like those of Patrick Delehanty into working products.

"Our clientele is anyone from an inventor-entrepreneur through small and medium manufacturers up to global companies that have a presence in Oklahoma," he said. "We're here for the economic development of Oklahoma."

The NPDC Tulsa office offers a variety of 3D printers, electron microscopes and other tools that facilitate the development of prototypes to precise specifications.

Products developed in NPDC's Tulsa laboratory using 3D printers have included a device that helps aerospace companies precisely insert rivets into airplane wings, a movable rotary engine model and even a 1/10th-scale crane.

"At the Inventors Assistance Service and the New Product Development Center, I found a niche where we can develop a product from design up," Delehanty said. "The IAS is a fantastic way to start. They will do the patent research for you and that's the most important thing. You need to know if this project is even feasible."

- Prototype of the Trail Blaster scent dispenser system

Click here to watch the video

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