

## Report to the Legislature

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## Letter from the ONI Executive Director

Letter to the legislature

The Oklahoma NanoTechnology Initiative (ONI) was created in 2003 by the Oklahoma state legislature with the goal of enabling Oklahoma to become a leader in the national nanotechnology arena.

### **This goal is being achieved:**

The National Nanotechnology Initiative (NNI) has selected the ONI to coordinate and host the regional, state and local Nanotechnology Initiatives National Workshop and Conference on April 1-3, 2009 in Oklahoma City. (See page 2 for more information about National Nano Week.)

The Oklahoma legislature enacted the Oklahoma Nanotechnology Sharing Incentive Act in 2006, which resulted in the Oklahoma Center for the Advancement of Science and Technology (OCAST) implementing the Oklahoma Nanotechnology Applications Program (ONAP) (See page 4 for more info on ONAP). This act and the ONAP implementation had as its goal helping Oklahoma companies become world leaders by utilizing nanotechnology to create new and improved products.

### **This goal is being achieved:**

Since 2006, Oklahoma has grown from six identified companies involved in nanotechnology to nearly 40 companies. (See map of all Oklahoma companies on page 6.)

To see the full extent of nanotechnology in Oklahoma, come to our NanoFocus Conference on March 31-April 1st at the Skirvin Hilton Hotel in Oklahoma City. (See page 3 for more information about the NanoFocus Conference.)

Sincerely



## Oklahoma Honored to Host National Nano Initiative Meeting in April



The National Nanotechnology Initiative has selected Oklahoma to host the national meeting of the regional, state and local Nano Initiatives Conference. The Oklahoma NanoTechnology Initiative is coordinated by The State Chamber of Oklahoma for the Oklahoma Center for the Advancement of Science and Technology (OCAST).

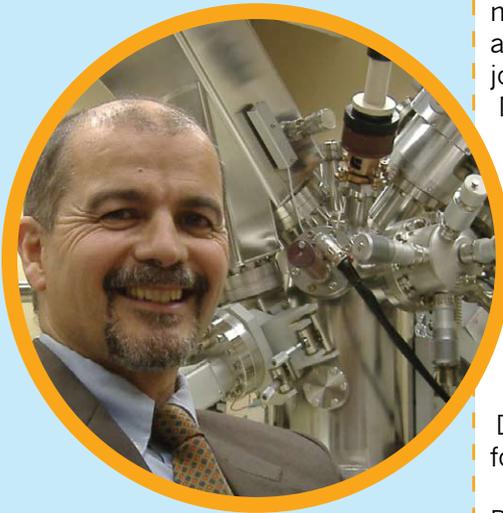
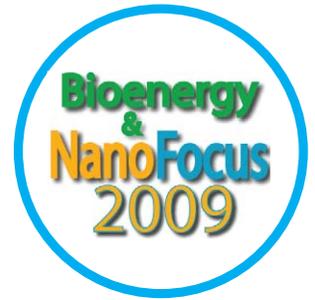
Fifty top-level national nanotechnology leaders will be speaking or serving on panels at the conference, which is anticipated to attract representatives and attendees actively involved in nanotechnology throughout the nation. The ONI is arranging for participants to tour the Presbyterian Health Foundation Research Park and have briefings from several Oklahoma nanotechnology companies. Early arrivals will also be bused to Norman to tour the SouthWest NanoTechnologies Inc.'s, (SWeNT) ultra modern carbon nanotube production factory.

Conference attendees will also be bused to Science Museum Oklahoma for a reception and dinner that will precede the national premier of a new IMAX film titled 'Molecules to the Max.' For more information go to [www.oknano.com](http://www.oknano.com).

# NanoFocus Conference: Nano & Energy

NanoFocus 2009 Conference and the EPSCoR Annual Meeting

The Oklahoma NanoTechnology Initiative (ONI) is partnering with EPSCoR again this year to bring the NanoFocus 2009 conference and the EPSCoR annual meeting together for this year's theme: Bioenergy and Energy Applications of Nanotechnology. The joint event will be held at the Skirvin Hilton Hotel on March 31 and April 1. Key speakers are:



Dr. Debra Rolison of the U.S. Naval Research Laboratory, where her work focuses on portable power sources: batteries, fuel cells, super capacitors, and photo electrochemical cells.

Dr. Daniel Resasco of the University of Oklahoma, where he leads research on nanotechnology and biofuels. (Pictured left)

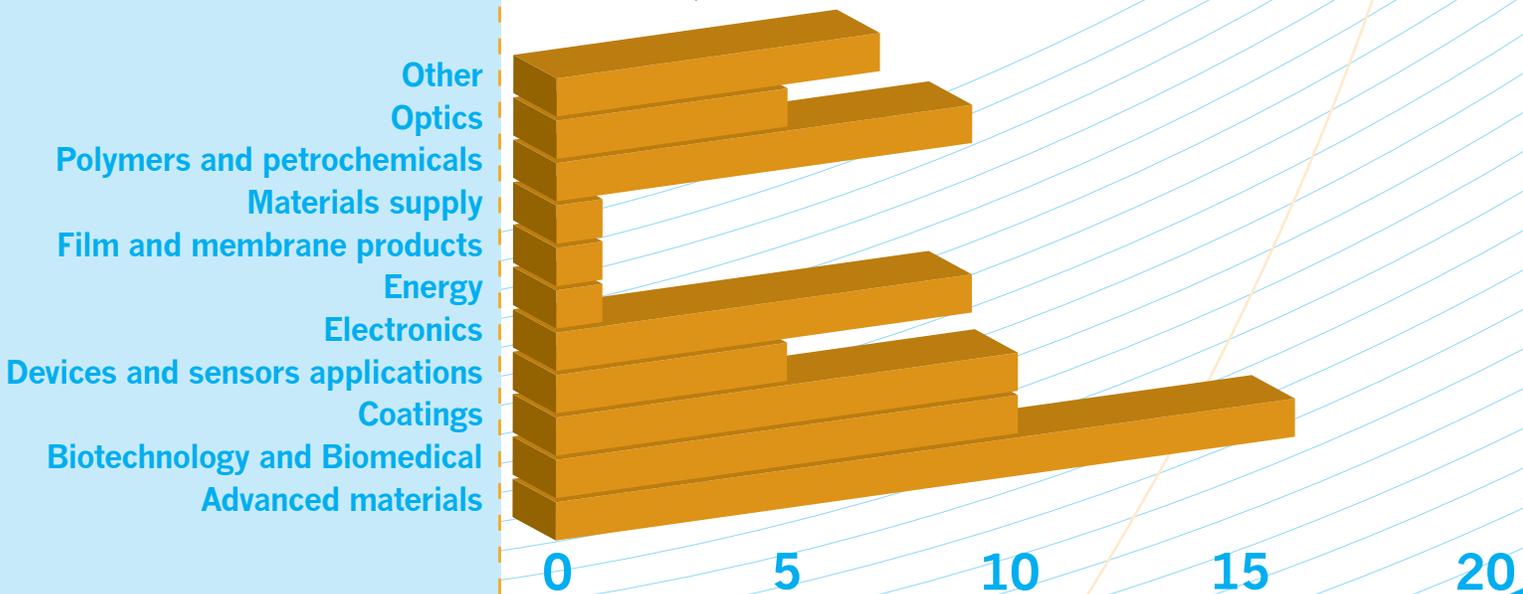
Dr. Ramanan Krishnamoorti of the University of Houston, whose work focuses on carbon nanotubes and composite materials.

Dr. Jeffrey Fagan of the National Institute of Standards and Technology, whose work focuses on standardization of nanotube materials.

In the state conference, various Oklahoma researchers will present their nanotechnology research and Oklahoma companies will present new products they have created or will create. For an agenda and more information go to [www.oknano.com](http://www.oknano.com).

## 2008 NANO Survey Says:

*Survey responses show that advanced materials, coatings and biotechnology and biomedical are the most common nanotechnology applications currently used by Oklahoma companies.*

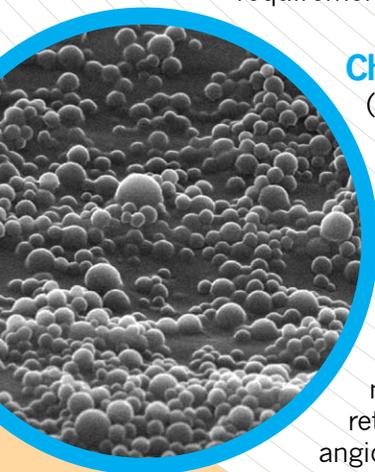


## Eight Oklahoma Companies Receive (ONAP) Funding

### Access Optics (Broken Arrow)

Access Optics is a world leader in optics, thin film coatings and assemblies with technological applications in the endoscopy, biomedical, aerospace, analytical instrumentation, oil exploration, machine vision, and homeland security fields. Access Optics is the first company to solve a specific industry goal problem using nanotechnology. Bob Hogrefe, CEO, indicates they make the lenses for endoscopes and many times after repeated trips through an autoclave sterilizing the instrument the glass-to-metal seal would break down effectively ruining the endoscope. Access Optics' nano coating assures a much better seal which gives them a competitive advantage in the industry.

Access Optics specializes in four main optics areas including specialty, technical, thin film, and catalog optics. Optical instruments designed for operation in the ultraviolet or infrared employ unique optical materials. These same materials provide mechanical properties that are ideally suited to extreme durability and reliability requirements. Their components are fabricated from fused silica, sapphire and rugged borosilicate glass to address these special requirements. Access Optics is able to meet rigorous standards for molded glass components or optical surfaces that call for high speed polishing and satisfy cost constraints or meet unusual form, fit or function requirements.



great promise in these areas.

Ronald Wassel of Charlesson, LLC is working to establish a chemical formulation that can be used to package small molecule drugs in preparation for ophthalmic and neurological treatments. The research has potential benefits for treating age-related macular degeneration which is the leading cause of blindness in adults over age 50. Other benefits include reducing the economic burden of repeated dosings and patient discomfort associated with applications of drugs.

### Charlesson, LLC

(Oklahoma City)

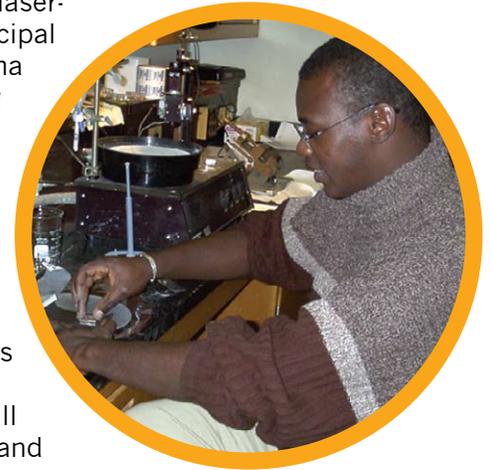
Charlesson, LLC is an Oklahoma City-based company actively engaged in the development of therapeutics for treating numerous human diseases.

Their product pipeline includes pharmaceutical treatments for age-related macular degeneration, diabetic retinopathy, ocular inflammation, angiogenesis, and systemic diabetes. By using nanoparticles to

deliver medication, their research shows

### EKIPS Technologies, Inc. (Norman)

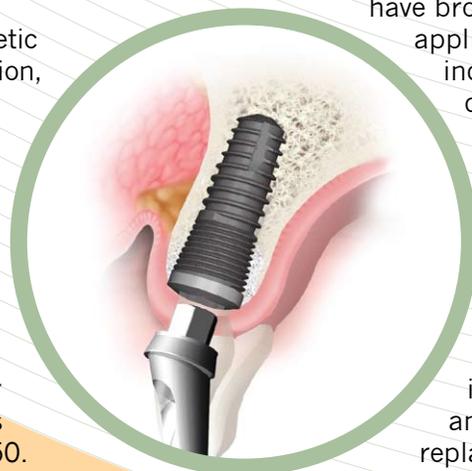
EKIPS Technologies is a Norman-based company that develops innovative laser-based sensors. Principal investigator Pratyuma Kamat is developing improved four-level mid-infrared lasers with low power consumption and room temperature operation by controlling the laser structure parameters at the nanometer scale. The benefit will be smaller, simpler and more cost effective laser spectrometer systems that could help diagnose lung cancer and sepsis.



Using technologies similar to those found in DVD players, these sensors will improve health care by enabling more effective point-of-care diagnostics for disease detection and therapy monitoring. The company's strategic focus is the creation of user-friendly chemical and biological sensors for life science applications. They use some of the latest diode laser, electronics, and software technologies to make instruments for performing a variety of useful measurements. Collaborations for the project include scientists from the Oklahoma Medical Research Foundation and the Oklahoma University Health Sciences Center.

### IMTEC Corporation (Ardmore)

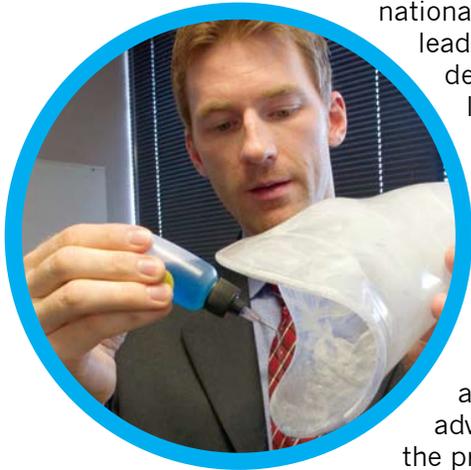
IMTEC, based in Ardmore, embraces and redefines the evolving fields of dentistry and technology. IMTEC's developments in Computed Tomography technology have brought groundbreaking applications to various industries including the dental and medical fields.



Mauricio Sanchez of IMTEC Dental Implants plans to modify the current Endure Dental Implant system already manufactured in Oklahoma. The product is attached to the bone and provides a device for replacing teeth by attaching hydroxyapatite nanoparticles to the implant surface. The benefit is a reduced healing time and a reduced rate of infection.

IMTEC created a revolution in implantology with the introduction of the Sendax® MDI Implant line in the late '90's and quickly grew into the global leader in small diameter implants. IMTEC continues to build an innovative line of implants, supplementary dental products and digital dentistry solutions that reflect expertise in minimally invasive implantology.

**OrthoCare Innovations** (Oklahoma City)  
 Martin Bionics, LLC, a prosthetics research and development company based in Oklahoma City, recently merged with a nationally recognized leader in biotechnology development, OrthoCare Innovations. This merger now forms the largest independent orthotics and prosthetic research and development group in the United States. Together, they research, design, and commercialize advanced technology for the prosthetic industry.



Jay Martin is working with super hydrophobic nanotechnology for prosthetics, resulting in a more hygienic socket, longer life expectancy and better protection of materials. This nano solution can make OrthoCare a world leader in solving problems involving irritation and infection, thus making the prosthetic more comfortable and sanitary.

**Rupture Pin Technology, Inc.** (Oklahoma City)  
 Rupture Pin manufactures pressure relief devices for oil and gas, drilling, pipelines, paper mills, chemical plants, and many other industries. The use of carbon nanotubes in the seal elastomer and a new and improved design, leads Julian Taylor, CEO of Rupture Pin to anticipate significant reliability in their ability to relieve high pressures.

The Rupture Pin valves relieve pressure at a set point with predetermined accuracy and dependability, making them an industry leader. The valves consist of a piston on seat, restrained from movement by a slender round pin known as the buckling pin. The Rupture Pin valve offers substantial savings in operating and maintenance cost by avoiding premature failures and not breaking into the integrity of the system to reset.

**SouthWest NanoTechnologies** (Norman)  
 SouthWest NanoTechnologies, Inc. (SWeNT) is a

privately held independent specialty chemical firm, manufacturing single wall carbon nanotubes for a broad array of specialty products. The 2007 Oklahoma Nanotechnology Applications Project Award winner utilized that funding to help them build perhaps the world's best high quality, high volume carbon nanotube manufacturing factory!

The mission of SouthWest NanoTechnologies, Inc. is to be the leading producer of high quality single wall carbon nanotubes and to be an innovative partner in the continued development and application of carbon nanotubes. Carbon nanotubes have great promise for flat screen displays, fuel cells, memory storage devices, and many other applications.

SWeNT was incorporated in April 2001 to spin-off nanotube research developed by the University of Oklahoma with extensive support from ConocoPhillips, the National Science Foundation (NSF), the National Aeronautics & Space Administration (NASA), the Department of Energy (DOE), the Oklahoma Center for the Advancement of Science & Technology (OCAST), and others.

**XetaComp** (Lawton)  
 A wholly-owned subsidiary of NanoBioMagnetics, Inc.®, XetaComp is a nanobiomaterials company focusing on the manufacture and commercialization of sunVex™ sunscreens that are broad-spectrum UVA/UVB attenuators. Charles Seeney, CEO of XetaComp is the principal investigator for a 2007 ONAP award to create a clear, non-oily, non-greasy commercial sunscreen. That product is now in production in their Lawton plant and is soon to be in the marketplace. In 2008, the XetaComp proposal to create a new a range of dermal care products to the personal care industry, also won an ONAP award.



Based on novel process technology developed by NBMI scientists, sunVex™ formulations can be used directly in sunscreen applications or as components of a range of personal care products. sunVex™ formulations are based on nano-scaled titanium and zinc oxide particles that have been surface treated for non-photoactivity. Because of their nanoscale properties, sunVex™ formulations are clear on application.

# Oklahoma Companies Involved in Applications of Nanotechnology

## Ardmore:

Amethyst Research, Inc.  
IMTEC Corporation  
Southwest Silicon Technology

## Bartlesville:

ConocoPhillips

## Broken Arrow:

Access Optics  
ARC Outdoors  
Da-Pro Rubber, Inc.  
RL Hudson

## Chickasha:

Industrial Compounding Inc.

## Duncan:

Halliburton Duncan Manufacturing Center

## Edmond:

NanoBioMagnetics, Inc.

## El Reno:

Gemini Industries, Inc.

## Inola:

Artison Corporation

## Lawton:

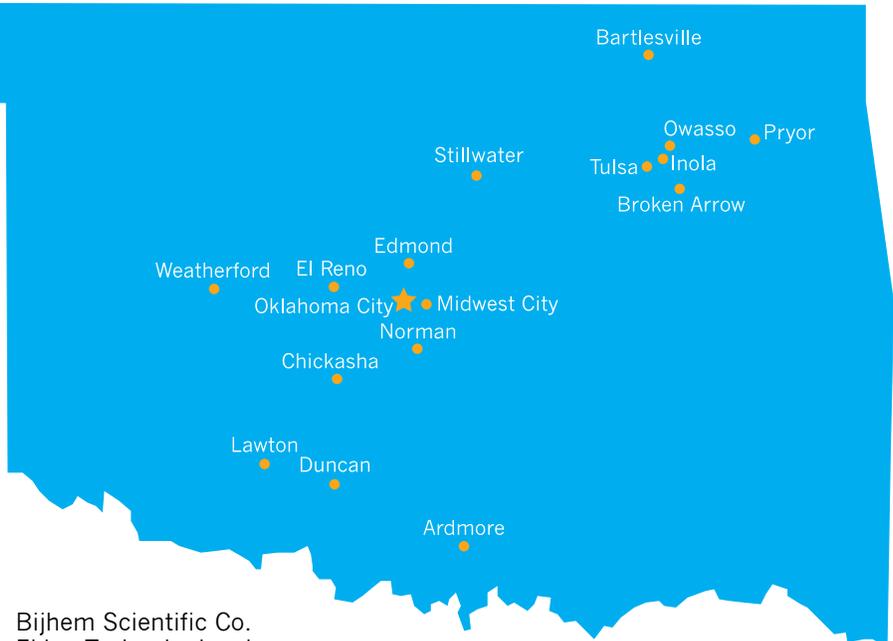
XetaComp Technologies

## Midwest City:

SensorCorr, LLC

## Norman:

3DICON, Inc



Bijhem Scientific Co.  
Ekip Technologies, Inc  
Glomics  
NanoLight, Inc.  
OncoBio Tech, LLC  
SouthWest NanoTechnologies  
SyntheSized Nano Coatings

## Oklahoma City:

Anautics, Inc.  
Cass Polymers  
Charlesson, LLC  
Halliburton Energy Services  
Nantiox Pharmaceuticals Corp.  
OrthoCare Innovations  
Rupture Pin Technology, Inc.

## Owasso:

Advanced Plastics

## Pryor:

Non-Metallic Sciences, Inc.

## Stillwater:

AIM Technologies  
ICx/Nomadics, Inc.  
Pioneer Builders/Nanosulate

## Tulsa:

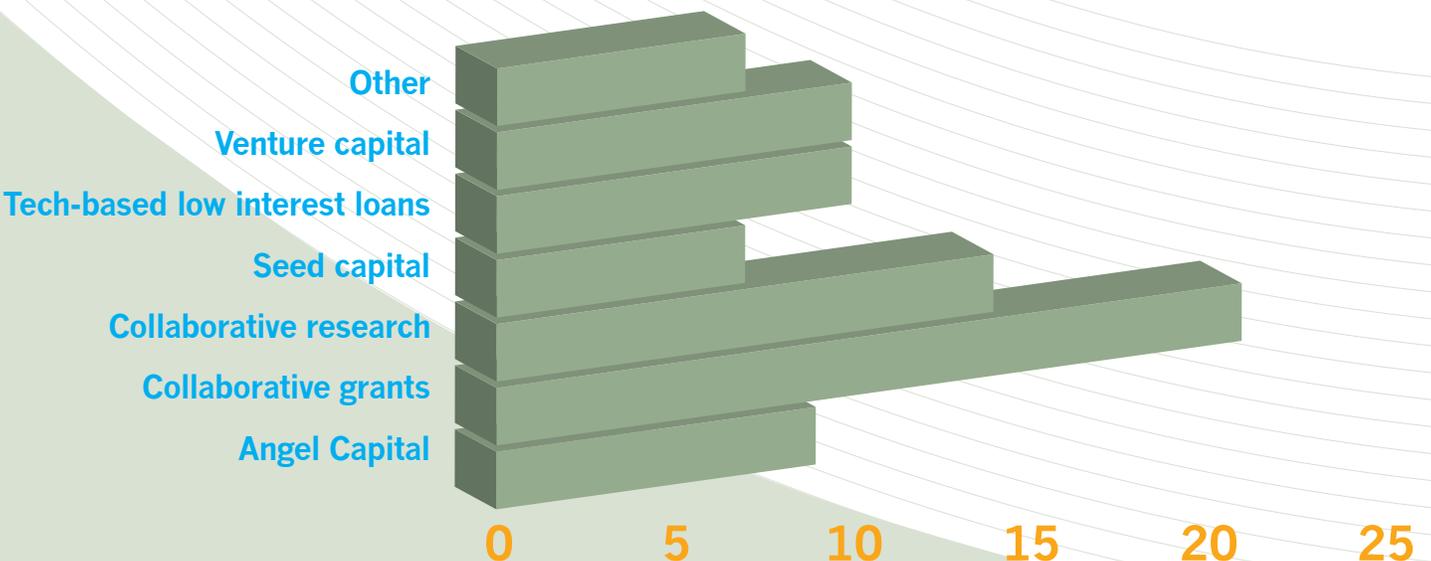
First Wave Aviation MRO, Inc.  
MotorGuide Marine  
Nano Advantage, LLC  
NDRS Technologies  
Topog-E Gasket Company

## Weatherford:

Imation Enterprises Corporation

## 2008 NANO Survey Says:

Survey responses show that collaboration grants are the greatest financial and investment needs impacting the growth and expansion of Oklahoma companies.



## Early Oklahoma Companies Using Nanotechnology

### NanoBioMagnetics (Edmond)

NanoBioMagnetics (NBMI) is a nanobiomaterials company pioneering an area of nanomedicine referred to as organ-assisting-device (OAD) technologies, which employ magnetically responsive nanoparticles to cause or drive a desired physiological event when activated by an external shaped magnetic field.

NBMI's developing OAD technologies will provide the physician and patient with new more effective therapeutic options for addressing the medical requirements of disease management.

### Imation Enterprises Corporation (Weatherford)

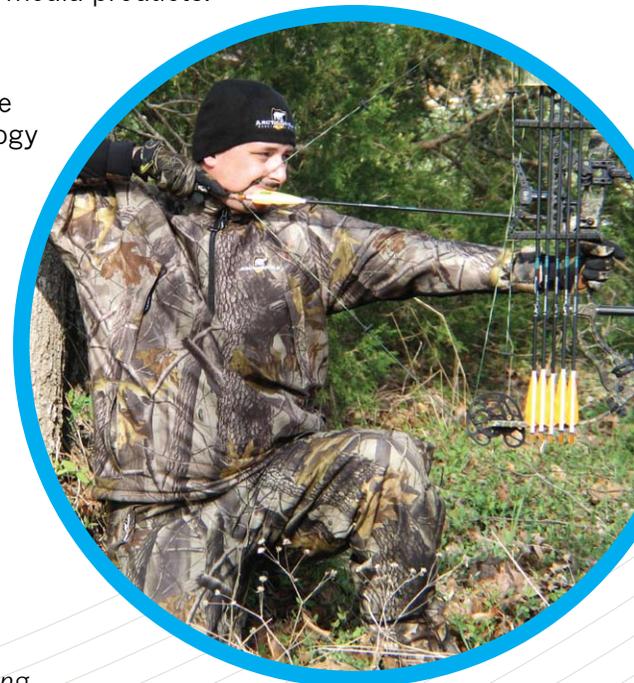
The Imation Corp., with a plant in Weatherford, was one of the first companies in Oklahoma to invest in nanotechnology to create a much better product. Using their new nano process they were able to produce a computer backup tape that went from 200 gigabytes of memory to 800 gigabytes in the same sized cartridge.

Imation is recognized as a global leader in removable data storage media, and its data storage offerings are a key ingredient in much of the world's technology infrastructure. Their product line spans both consumer and business users with merchandise including magnetic, flash and optical media products.

### ARC Outdoors (Broken Arrow)

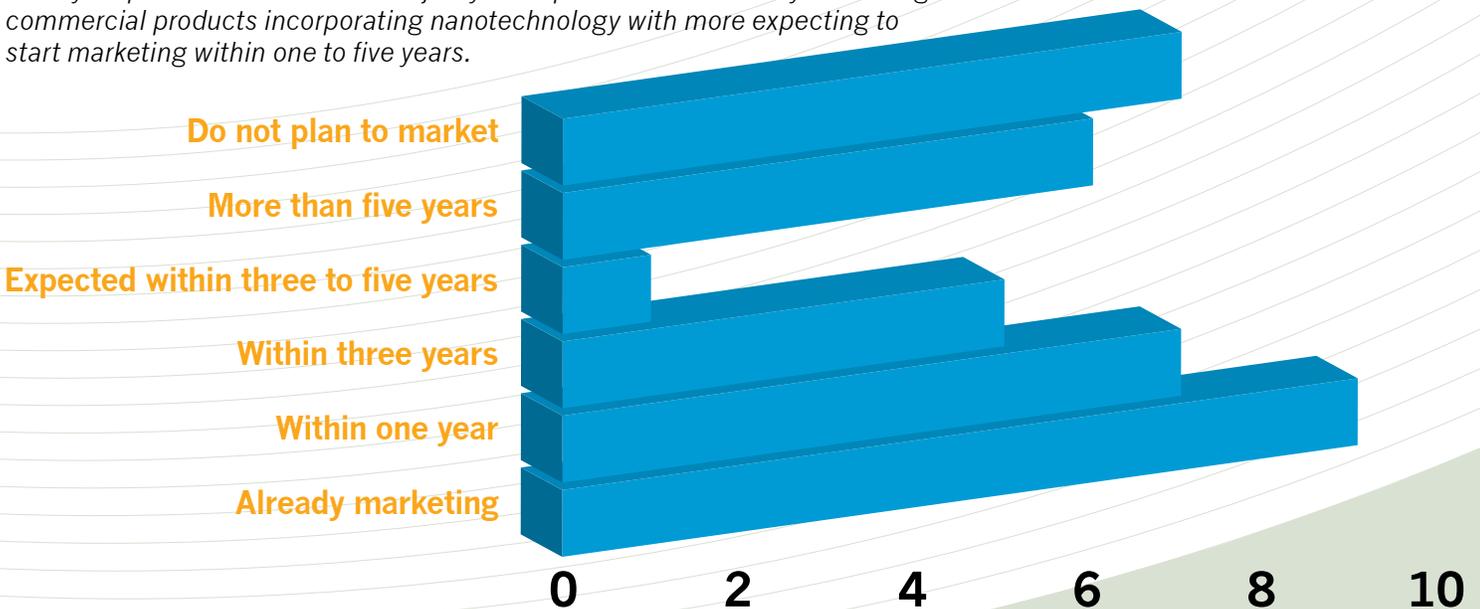
ARC Outdoors of Broken Arrow specializes in advanced solutions for the outdoor industry that combines cutting-edge scent eliminating technology with everyday comfort and functionality. Their X-System smart apparel utilizes nano-silver technology to eliminate the source of body odor, making hunters nearly invisible to animals' keen sense of smell.

X-System's™ permanently integrated silver nanoparticles have microbe managing properties and are highly effective in controlling odor. Silver has proven effective in many fabrics worn by men and women in the armed forces and law enforcement and is used as an effective treatment in a variety of medical applications.



## 2008 NANO Survey Says:

Survey responses show that the majority of respondents are already marketing commercial products incorporating nanotechnology with more expecting to start marketing within one to five years.



## ONI Mission Statement

The Oklahoma NanoTechnology Initiative (ONI) serves as a mechanism for creating statewide awareness of the emerging nanotechnology industry and its potential impact on the state of Oklahoma. The ONI works to promote Oklahoma and its resources as a valuable site for nanotechnology industry location and serves as a clearinghouse of information to the academic, financial, industrial, and business communities.

## WWW. OKNANO.com

Check out our website [www.oknano.com](http://www.oknano.com). We have a special section for

students, beginning with our own video **“Nanotechnology for Students”**. We also have activities for students and teachers with links to great places on the web to learn about nanotechnology.



## About ONI

An affiliate of The State Chamber and funded by the Oklahoma Center for the Advancement of Science and Technology, the Oklahoma NanoTechnology Initiative (ONI) encourages businesses to adopt nanotechnology applications. For more information about nanotechnology in Oklahoma, go to the ONI website, [www.oknano.com](http://www.oknano.com).