

2007 Innovations Awards Program APPLICATION

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ID # (assigned by CSG): 07-S-59OKOCASTNANOTECH

Please provide the following information, adding space as necessary:

State: Oklahoma

Assign Program Category (applicant): Economic Development (Use list at end of application)

1. Program Name
 - Oklahoma Nanotechnology Initiative/Oklahoma Nanotechnology Applications Program
2. Administering Agency
 - Oklahoma Center for the Advancement of Science and Technology (OCAST)
3. Contact Person (Name and Title)
 - Steve Paris, Manager, Technology Information Services & Rural Development
4. Address
 - 755 Research Parkway, Suite 110, Oklahoma City, OK 73104
5. Telephone Number
 - 405/524-1357
6. FAX Number
 - 405/319-8426
7. E-mail Address
 - sparis@ocast.state.ok.us
8. Web site Address
 - www.ocast.state.ok.us
9. Please provide a two-sentence description of the program.
 - The Oklahoma Nanotechnology Initiative (ONI) is a project coordinated by The State Chamber of Oklahoma and funded by the Oklahoma Center for the Advancement of Science and Technology (OCAST). 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.

10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on April 2, 2007, to be considered.

- The concept for what became the Oklahoma Nanotechnology Initiative was initiated as a result of Oklahoma Legislative Concurrent Resolution 23 which called for an advisory committee to provide recommendations on structure and operation of an initiative to promote nanotechnology in Oklahoma.
- A strategic plan for implementation and development of a nanotechnology infrastructure to support and drive Oklahoma's goal of establishing the State as a technical, industrial and economic leader in this emerging field was completed in Dec of 2003.
- The legislature received the report and appropriated \$125,000 to OCAST in July of 2004. OCAST called for proposals to implement the ONI in the fall.
- The proposal submitted by The State Chamber (which was involved from the beginning of the concept) was the highest ranked by proposal evaluators. The ONI officially began operations February 1 of 2005 with an OCAST contract for \$119,875 with matching funds from The State Chamber of \$36,625 for a total budget of \$156,500.

11. Why was the program created? What problem[s] or issue[s] was it designed to address?

- The few Oklahoma nanotechnology companies that were in their infancy were at a disadvantage with such companies from other states in competing for nanotechnology funding. The National Science and Technology Council has stated that "Nanotechnology will change everything human-made in this century" and Oklahoma wanted to make sure that Oklahoma companies were involved in this emerging technology. Having identified nanotechnology as a growing segment of America's technology future, OCAST worked with the Oklahoma Legislature to secure an initial \$125,000 per annum appropriation to create the Oklahoma Nanotechnology Initiative. A partnership and joint effort with the Oklahoma State Chamber focused initially to identify, showcase and assist Oklahoma firms that were looking at developing or using nanotechnology.

12. Describe the specific activities and operations of the program in chronological order.

- A 12 month Scope of Work and Milestone accomplishments was devised which included:
 - The creation of an advisory board consisting of public and private nanotechnology researchers, support agencies and businesses.
 - Conducting a research study which documented Oklahoma's Nanotechnology Assets, Resources, and Support Capabilities and potential impact on Oklahoma's economy.
 - The research study resulted in an updated strategic plan and report to the legislature.
 - Establishment of a nanotechnology information clearinghouse for the academic, business, financial and industrial communities via a dedicated website www.oknano.com.
 - Monthly press releases and a PowerPoint presentation used for presentations at meetings were developed.
 - A Nanotechnology Symposium featuring local and national speakers was successfully hosted.

- An education program for economic developers in Oklahoma to assist them in working with nanotechnology companies that may be recruited to the state was designed and delivered to the Oklahoma Professional Economic Development Council.
- Coordination efforts were undertaken with the Texas Nanotechnology Initiative and the Colorado Nanotechnology Initiative.
- The ONI participated in Nanotech 2005 and two companies made presentations.
- A catalogue of promising nanotechnologies and tech transfer efforts from the comprehensive Universities was begun and is ongoing.
- Various federal funding opportunities were identified and directed to appropriate researchers and companies.
- A marketing piece to promote the advantages of locating in Oklahoma was jointly developed with the Oklahoma Department of Commerce and delivered via CD.
- Programs were presented to many different groups to create general awareness of the emerging field of nanotechnology and educating Oklahomans about the potential positive impact of nanotechnology on the Oklahoma economy.
- An inventory of Oklahoma nanotechnology companies initially identified six nanotech companies.
- Promoted Oklahoma as a valuable site for nanotechnology industry location and growth. Hosted site visits with three out-of-state nano companies, two of which established branches in Oklahoma.
- In January of 2006 an evaluation report was prepared showing that all of the objectives were accomplished on time and on schedule.
- In February OCAST and The State Chamber partnered in a continuation of the project for February- June. A \$52,000 budget was devised with \$21,000 in new OCAST funds, \$18,400 in carryover funds and \$12,600 in State Chamber funds. During this five month period the following Scope of Work was designed and completed.
 - A Nanotechnology Impact survey was designed and sent to 4,500 businesses in the state. The results were compiled into a report and distributed through email and the web.
 - A Nanotechnology Undergraduate Symposium for promising young nanotechnology scientists from Oklahoma, Texas, Kansas, and Arkansas was conducted in partnership with Oklahoma EPSCoR, the University of Tulsa and the ONI.
 - An ONI Booth was unveiled at Nanotech 2006 and the ONI was well represented at BIO 2006.
 - A Nano! T-shirt was designed to include the ONI website and has been distributed as prizes at various meetings and events.

- An updated report on the Oklahoma Nanotechnology Initiative was prepared and distributed to the legislature entitled “Nanotechnology Changing Everything!”
- OCAST and the ONI worked in concert with the Oklahoma legislature on perhaps the nation’s first incentive program for companies to commercialize products utilizing nanotechnology. The Oklahoma Nanotechnology Sharing Incentive Act was signed into law in April of 2006. This act created the Oklahoma Nanotechnology Applications Project (ONAP) which clearly focused on helping Oklahoma companies identify patented nanotechnology processes from anywhere in the United States and help them form partnerships or licensing agreements to incorporate those process into existing or emerging Oklahoma products. The concept is to take advantage of research done in Oklahoma and other states to help Oklahoma companies to become world leaders in developing commercial products enhanced by nanotechnology.
- In a special legislative session, \$2 million was added to the OCAST budget to provide incentive funding for these companies and to sustain the ONI.
- The number of Oklahoma companies involved in nano doubled from the original six to 12 during this period.
- A five month summary report was compiled and delivered to OCAST.
- In July of 2006, a new contract was developed between OCAST and The State Chamber with a budget of \$158,970 with \$125,000 from OCAST and \$33,970 from The State Chamber.
 - OCAST utilized the services of the Oklahoma Alliance for Manufacturing Excellence and i2E (Oklahoma’s Technology Commercialization Center) to assist with the implementation of the Oklahoma Nanotechnology Applications Program (ONAP).
 - A call for white papers resulted in 28 white papers from 26 different companies on how they would utilize nanotechnology to create a new or improved product in the near term 12-18 months).
 - A subsequent request for proposals from the best of the white papers resulted in 12 fully developed proposals.
 - An external peer review process ranked the 12 proposals and the top five were funded with a total of \$1.25 million in March of 2007.
 - A second round of funding for those projects needing more development time resulted in 12 proposals and \$500,000 will be awarded to the top ranked project in June of 2007.
 - The ONI compiled a database of public and private researchers involved in nanotechnology in the state with contact information etc. for 144 researchers.
 - The ONI also developed a database of Advanced Technology Companies in Oklahoma reaching a total of 1,653 companies.

- The ONI database of companies involved in nanotechnology has now tripled from the original six to nearly 40.
- The ONI just completed a statewide Nan Focus conference which included 40 presenters from local, regional and national levels. The five companies who received ONAP funding each made presentations on their projects.
- A highlight of the conference was a Nano Products Showcase which had exhibits that ranged from nano enhanced washers and dryers from Samsung, to Behr Paints, to a variety of clothing from stain resistant slacks, shirts and suits to women's running gear, to antimicrobial socks and hunting gear. The ONI also had cosmetics, sunscreen, toothpaste and a variety of sporting equipment on display.
- The ONI is currently doing an analysis of other states' nanotechnology initiatives.
- The legislature invested \$150 million dollars in a research endowment fund to support ongoing research.
- The ONI is also working with three community/technical colleges on developing nano technician training programs to provide a workforce to support these new endeavors.
- OSU-Tulsa (Oklahoma State University) is investing \$50 million in a new Advanced Materials Research Center which will have a strong nanotechnology focus, with 40 researchers and 100 graduate students.
- Oklahoma University, Oklahoma State University and Tulsa University, Oklahoma's three comprehensive research universities, recently completed their first joint web-based nanotechnology course with live Saturday labs with enrollments and instruction from all three universities in a collaborative effort.

13. Why is the program a new and creative approach or method?

- The ONI was created to bring Oklahoma to the forefront of the emerging field of nanotechnology, establishing the state as a global leader in the technical, industrial and economic arenas. Planting the seeds of nanotechnology in Oklahoma is an important investment in our state's future. Most states are spending significant funds to stimulate nanotechnology research; the creative aspect of the ONI is its focus on "Applications of Nanotechnology."
- The ONI believes that helping Oklahoma companies be early adopters and among the first to actually develop commercial products places those companies in a competitive advantage in the world. Because nanotechnology is still a relatively new industry, there are no clear industrial leaders. Through The ONI, Oklahoma has a unique opportunity to position the state for a leading role in the emerging field of nanotechnology.
- Oklahoma through the Governor's office, Legislature, OCAST, The State Chamber and the ONI is taking aggressive action to play a leadership role in this promising new field. Oklahoma was one of the first five states to create a state nanotechnology initiative and one of the first to have a paid staff person dedicated to creating an environment for the growth of nanotechnology companies. The actions taken today are a significant investment in our state's future.

14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

- Starting in 2005, initial costs were \$156,500 with \$125,000 from the State Legislature and \$36,625 from The State Chamber to secure a contractor that will operate the ONI for the State of Oklahoma through OCAST. Subsequently OCAST and The State chamber funded an additional five months with a combined \$52,000 to get us to the government's fiscal year cycle. A second year of funding for 06-07 was \$156,970 with joint funding from OCAST and the State Chamber. That year Governor Brad Henry and Oklahoma lawmakers dedicated a total of \$2 million which included the \$125,000 from OCAST. The remaining \$1,875,000 was used to provide incentives for businesses to commercialize nanotechnology products under the Oklahoma Nanotechnology Applications Program. That program calls for a direct infusion of state funds into peer-reviewed small business opportunities created by those who will develop nanotechnology applications in their businesses.
- Staffing includes five OCAST employees who devote a portion of their time to ensure financial diligence and adherence to state law. The Oklahoma State Chamber provides one full-time employee devoted to the ONI and a part time assistant. The Oklahoma Manufacturing Alliance, a state manufacturing extension program, provides a staff of four at a part time level to recruit and qualify Oklahoma small businesses to apply to ONAP. Another OCAST affiliate, i2E, provides a staff of three to evaluate applicants.

15. What are the program's annual operational costs?

- \$2,036,970

16. How is the program funded?

- \$2,000,000 in state appropriations and \$36,970 in matching private funds.

17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number.

- The Oklahoma Nanotechnology Sharing Incentive Act was passed into law on April 21, 2006.

What equipment, technology and software are used to operate and administer this program?

- No special equipment, other than traditional office equipment, is used in this program.

18. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address.

- Charles Seeney, CEO of NanoBioMagnetics, 120 N. Bryant Ave. Ste C-3, Edmond Oklahoma 73034 seen111@nanobmi.com

19. Are you aware of similar programs in other states? If YES, which ones and how does this program differ?

- Other states have nanotechnology projects and initiatives primarily based on supporting nanotechnology research, however, development of the Oklahoma Nanotechnology Initiative came from in-state origins and to my knowledge, is unique in that it focuses on matching applications of nanotechnology research to established Oklahoma companies and assists emerging Oklahoma companies to commercialize the nanotechnology application via state incentives and support.

20. Has the program been fully implemented? If NO, what actions remain to be taken?

- Effective March 2007, the program is fully implemented, however, there is a consensus that nanotechnology and its use by Oklahoma firms, is a dynamic that will require attention from an economic development standpoint for years to come.

21. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.

- Due in large part to the innovative approach by contractor Jim Mason and the Oklahoma State Chamber, coupled with due diligence provided by OCAST, the state's technology-based economic development agency, the program has exceeded expectations. Oklahoma has grown from six nanotechnology companies to nearly 40 in a very short time due to this project. An outstanding website that serves as a clearinghouse of information for the academic, business, industrial and financial communities has been developed. This program is aggressively creating public awareness through program presentation throughout the state.
- Several databases have been created including: Oklahoma Nanotech researchers, Oklahoma Nanotech companies, Oklahoma Advanced Technology companies and Oklahoma Tech Transfer Opportunities.
- A Regional Nanotechnology Roundtable Alliance is being developed with collaboration and involvement from Oklahoma, Texas, Colorado, New Mexico, Kansas and Arkansas.
- Two statewide nanotechnology conferences have been conducted and the following businesses have successfully competed for nanotechnology applications funding:
 - **SouthWest NanoTechnology (SWeNT)**, of Norman, manufactures high quality carbon nanotubes. With new OCAST funding and new manufacturing techniques developed at OU, SWeNT plans to diversify its manufacturing processes and mass produce a "commercial grade" of carbon nanotubes at a substantially lower price than is currently possible. Production volumes will increase more than 30 fold while costs are expected to fall by 90 percent. (\$430,000)
 - **XetaComp Nanotechnologies**, of Edmond, in conjunction with an equipment manufacturer has developed a proprietary manufacturing process to produce titanium dioxide nanoparticles (n-TiO₂). XetaComp is developing the technology with the goal of lowering costs. XetaComp plans to manufacture the n-TiO₂ in their Lawton facility and use it in sunscreens, both in a direct branded lotion and as a wholesale product to national sunscreen brands. (\$250,000)
 - **Rupture Pin Technology** is an Oklahoma City based manufacturer with \$5 million in current sales and growth reaching 60 percent per year. Pressure relief valves they make are limited to lower pressure applications because O-ring seal tends to fail at high pressures. The company will research adding carbon nanotubes to the elastomers used to manufacture the O-ring for improved strength. If successful, the valves could be marketed to higher pressure applications dramatically increasing the product's market size. (\$150,000)
 - **Access Optics**, in Broken Arrow, manufacturers and assembles components and complete sub-assemblies for medical related endoscopic equipment. This is done using small particles of ceramic or metal to form a seal between the lens and metal encasement. During normal use, the product is subjected to extensive autoclave

cleanings and therefore significant “wear” occurs on the seals. The company will use nanoparticles to improve the glass to metal seal for the lens. \$(165,000)

- **Martin Bionics**, of Oklahoma City a relatively new company, focuses on “state of the art” research in the field of prosthetics and the commercialization of new prosthetics innovations. Their research is focused on a nanoparticle platform technology capable of producing multiple products for amputees. Such applications include development of a superhydrophobic nanoparticle powder the amputee can spray onto existing liners to repel perspiration and incorporating the nanopowder into the actual liner in order to permanently provide a liquids repelling barrier. (\$250,000)

22. How has the program grown and/or changed since its inception?

- Due to the program’s short life to date, only minor adjustments have been required. The most major change was recognition that Oklahoma small businesses have few resources available to them to incorporate nanotechnology in their processes. That realization was the genesis of the ONAP program which will fund at least five new firms each year.

23. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?

- Lawmakers must be informed of the benefits of such a program. In effect, funding for nanotechnology applications must compete for funding much in the same manner as any other state agency or program. When shown the economic development benefits, most lawmakers will understand the value of an ONI or ONAP program.

2007 Innovations Awards Program Program Categories and Subcategories

Use these as guidelines to determine the appropriate Program Category for your state's submission and list that program category on page one of this application. Choose only one.

Infrastructure and Economic Development

- Business/Commerce
- Economic Development
- Transportation

Government Operations

- Administration
- Elections
- Public Information
- Revenue

Health & Human Services

- Aging
- Children & Families
- Health Services
- Housing
- Human Services

Human Resources/Education

- Education
- Labor
- Management
- Personnel
- Training and Development
- Workforce Development

Natural Resources

- Agriculture
- Energy
- Environment
- Environmental Protection
- Natural Resources
- Parks & Recreation
- Water Resources

Public Safety/Corrections

- Corrections
- Courts
- Criminal Justice
- Drugs
- Emergency Management
- Public Safety

Save in .doc or rtf. Return completed application electronically to innovations@csg.org or mail to:

CSG Innovations Awards 2007
The Council of State Governments
2760 Research Park Drive, P.O. Box 11910
Lexington, KY 40578-1910

Contact:

Nancy J. Vickers, National Program Associate
Phone: 859.244.8105
Fax: 859.244.8001 – Attn: Innovations Awards Program
The Council of State Governments
E-mail: nvickers@csg.org

This application is also available at www.csg.org, in the Programs section.

Deadline: April 2, 2007