OTFAMP 11-737

February 14, 2011

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215-6130

Re: Letter of Intent – Ohio Third Frontier Advanced Materials Program

This Letter of Intent is to submit a proposal under the current Advanced Materials solicitation which closes on March 18, 2011. Given below is the information requested in the RFP.

Applicant Name:	MetaMateria Technologies LLC
Address:	1275 Kinnear Rd. Columbus, OH 43215
Phone:	614-340-1690 (x2635)
Fax:	614-487-3704
Contact Name:	Dr. J. Richard Schorr, CEO/President
Email:	jrschorr@metamateria.com
Project Title:	Water Purification using Nano-Enabled Solutions
Estimated Grant Funds:	$950,000
Collaborators:	Wright State University, Industrial Partners TBD

If additional information is needed, please contact us.

Sincerely,

J. Richard Schorr
President/CEO

Water Purification Media

Harnessing the Power of Bio & Nano Technology

Water Purification using Nano-Enabled Solutions

MetaMateria Technologies has developed superior media that can be used to purify water and clean up waste gas. These products will be offered through a subsidiary company, MetaH_2O. Lab tests show exceptional performance and cost effective removal of contaminants when MetaH_2O media is used in water or gas purification systems. While some products are now sold on a limited basis, many opportunities exist to expand the products that use the base technologies. To do this requires new knowledge about product performance, testing to validate the performance under field conditions, and partners interested in helping commercialize the MetaH_2O media in markets they serve.

Needs for clean water represents both a national and global problem, which can be addressed with systems that incorporating MetaH_2O media. MetaMateria's mission is to see its technologies used in affordable systems to provide clean drinking water and to reduce pollutants that degrade water supplies.

MetaH_2O products are *game changers* that work faster and remove more contaminants than most commercial media. This cost-effective porous platform can be modified with nanomaterials and other compounds to address clean water issues, such as those associated with pathogens, fluoride, and harmful contaminants such as arsenic, selenium, perchlorate, and lead; thus making water safe for use. Testing has shown that MetaH_2O media removes three times more nitrate and phosphate from water, which is needed to reduce harmful algae problems in lakes and streams. High surface area media can remove many contaminants, including oils, perchlorates, PCBs and other harmful compounds from water.

The proposed program is focused on:

1. Methods to make high performance media for field tests conducted to clean water contaminated primarily with phosphate and nitrates compounds, but also to evaluate potential for other harmful compounds (oils, perchlorate, PCBs, and organic compounds.)
2. Filters for purification of drinking water to remove harmful ions (arsenic, fluoride, selenium), organic and chlorine/fluorine based compounds, and pathogens/viruses that are found in water. Focus will be on smaller systems used in rural environments.

For (1), lab testing has shown potential for contaminant removal and focus will be on developing manufacturing methods that can be used to make commercial quantities for use field testing. Obtaining performance in field tests is expensive but necessary to more rapidly move these products into the market. Sales are expected during the second year of the program. For (2), the initial emphasis will be in developing higher performance media and demonstrating that these can be used in filters to economically clean drinking water. The goal will be to do early field testing and obtain certification and initial sales.

MetaMateria plans to team with Wright State University to study the microstructure of high performance media to gain new understandings and to better correlate with media performance. We expect to work with several commercial environmental companies that are interested in exploring the use of MetaH_2O media for markets they serve.

MetaMateria Technologies • 1275 Kinnear Rd • Columbus, OH 43212
Phone (614) 340-1690 • Fax (614) 487-3704 • www.metamateria.com

OTFAMP 11-738

February 14, 2011

Surfaceigniter Corporation intends to submit a proposal in response to the Ohio Third Frontier 2011 Advanced Materials Program. The project name shall be "The Hot IQ System". George C. Hanna, President of Surfaceigniter, will be the point of contact. His telephone is 440-543-8221, his fax 440-543-5183, his email ghanna@graphitesales.com, his mailing address PO Box 23009, Chagrin Falls, OH 44023.

We anticipate a grant request of $500,000 with corresponding match of $500,000 to be provided. This funding is to enable development of an advanced materials manufacturing technology that is expected to result in the opportunity for significant employment in Ohio within 2 years of starting the project. The Third Frontier Grant will provide critical funding, in addition to that of Surfaceigniter Corporation and parent company Graphite Sales, Inc. to commercialize the advanced materials-related process. By so doing, we would enter the market with a product that is clearly superior to our already well-established product and will sell to our existing and new customers in existing and perhaps new-to-us markets. Our intended outcomes include the additional tax revenues that will accrue from additional sales of our improved gas-fired appliance igniter, but more importantly the manufacturing process and equipment understanding and optimization that will help enable bringing back jobs from Puerto Rico and China.

Graphite Sales was established by Mr. Hanna in 1971 to recycle broken graphite electric arc furnace electrodes. This capability, of particular use to the Ohio steel industry, made Graphite Sales one of the first "green" companies by reusing raw materials and thus avoiding the pollution inherent in their original production and the loss of the latent energy from that production. Graphite Sales is now a fully integrated graphite company, providing materials, machining and related services. Surfaceigniter was founded in 1969 as a division of Carborundum, and in 1997 became a division of Graphite Sales. Surfaceigniter was the pioneer in silicon carbide igniters for gas appliances.

The proposed project builds upon the well-established technologies and market presence of the two Ohio-based advanced materials companies. It addresses an identified market need and a technology development and commercialization opportunity to meet that need. Surfaceigniter and Graphite Sales have spent considerable funds over the last three years to refine the technologies to manufacture a Silicon Nitride igniter capable of replacing a higher cost and more fragile Silicon Carbide igniter currently used by the appliance, water heater and furnace industries. By reducing up-front and service costs of igniter-equipped gas appliances, energy savings will be realized, and Ohio's presence in advanced instrument, controls and electronics will be further enhanced.

The Hot IQ silicon nitride technology is being developed in a rented facility outside of Ohio. Prototype samples are being provided for evaluation by customers currently purchasing our Silicon Carbide product manufactured at our Puerto Rican facility. The

PLANT: 497 SOUTH POST STREET, P.O. BOX 1840, MAYAGUEZ, PR 00681 PHONE 787-834-0202 FAX 787-834-4285
ADMINISTRATION: P.O. BOX 23009, CHAGRIN FALLS, OH 44023 U.S.A. PHONE 800-321-4147 or 440-543-8221 FAX 440-543-5183

SiC

existing customer base and supply relationships will make transition to the new product seamless, once development of a robust and cost-effective manufacturing process enable commercialization of the resulting product.

To move from the present demonstration phase, to the market entry phase will require more rugged and higher capacity equipment, preferably in a larger Ohio based facility to replace testing which is now done in Puerto Rico. Transition to the new product and associated product will make an opportune time to close the Puerto Rico and China facilities and bring the approximately 140 manufacturing and assembly jobs at those facilities to Ohio.

Current manufacturing of the silicon carbide igniter uses electric resistance heated furnaces with temperatures of over 2600°C. The newly established silicon nitride technology eliminates the electrical energy requirement necessary to obtain such temperatures, by using a slip-cast process layering down alternative layers of non-conductive silicon nitride followed by conductive moly-disilicide followed by another layer of silicon nitride. The electrical leads are then connected to the conductive layer of the sandwich by vacuum brazing. This new technology totally eliminates the need for large banks of electrical power required to make the existing igniter technology, and by so doing reduces the motivation to locate in inexpensive-electricity locations.

The funding requested shall be used to refine the chemistry and dimensions of the slip-cast layers of both conductive and non-conductive materials and then to build equipment to support our current annual production levels of one to two million igniters.

We believe that the proposed project is a compelling opportunity for growth of manufacturing and professional employment in Ohio and therefore request an identification number for the anticipated Proposal.

Sincerely,

George C. Hanna
President

SiC

aeroclay
material advancement for industry®

OTFAMP 11-739

February 14, 2011

Ohio Third Frontier Commission
77 South High Street, 25th Floor
Columbus, OH 43215

Dear Ohio Third Frontier Commission:

Please accept this letter of intent from Aeroclay, Inc. for our Fiscal Year 2011 Ohio Third Frontier Advanced Materials ("OTFAMP") proposal.

Lead Applicant Name:	Aeroclay, Inc.
Address:	31200 Solon Road Solon, OH 44139
Telephone:	(216) 248-1039
Contact Person:	Ms. Lauren B. Wolf, CEO
Contact Email:	lwolf@aeroclayinc.com
Project Title:	AeroClay® Development & Commercialization
Estimated Grant Amount:	$1 million
Known Collaborators:	Case Western Reserve University

Summary of the Proposed Project:

Aeroclay, Inc. ("Aeroclay") is commercializing a new platform technology known as AeroClay® that combines clay, polymers and water to create a strong, lightweight, environmentally benign composite material. During the proposed OTFAMP project, Aeroclay will work with leaders in the advanced packaging industry along with academic and industrial partners that make up Ohio's advanced materials cluster to further develop and commercialize AeroClay® for specific advanced packaging applications.

Aeroclay is at the beginning of a new technology curve. As Aeroclay's manufacturing process and composites are improved and economies of scale are achieved, an opportunity to make a significant impact in the advanced packaging industry will emerge. With Ohio Third Frontier investment and match funding, Aeroclay and its collaborators propose to develop and commercialize an advanced packaging material to potentially replace current petroleum-based products.

Following the confirmation of product economics, expansion of customer testing, pilot production and scale-up, and the production of commercial quantities, Aeroclay expects to have a commercialized

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Solon, OH 44139
USA
P. 001.440.248.1039
F. 001.440.389.6230
E. info@aeroclayinc.com
www.aeroclayinc.com

advanced packaging material. Taken together, Third Frontier funding would enable Aeroclay to become a leading supplier of commercially validated and superior packaging materials which fulfill well defined end user needs. The proposed project will strengthen Ohio's position as a global advanced materials industry leader.

Thank you,

Ms. Lauren B. Wolf, CEO

WebCore Technologies, LLC
8821 Washington Church Road
Miamisburg, Ohio 45342
937.435.2200
www.webcoreonline.com

February 15, 2011

Ohio Third Frontier
Advanced Materials Program
Department of Development
OTFAMP2011@development.ohio.gov

Subject: **2011 OTFAMP LOI**

Dear Sir:

Please accept this Letter of Intent from WebCore Technologies for our Ohio Third Frontier Advanced Materials Program (OTFAMP) proposal. The relevant information about our proposal is as follows:

Lead Applicant: WebCore Technologies, LLC
Address: 8821 Washington Church Road, Miamisburg, OH 45342
Telephone: 937-435-2200 ext 224
Contact Person: Rob Banerjee, Ph.D.
Contact Email: rbanerjee@webcoreonline.com
Project Title: Structural Composite Panels for Trucks and Trailers
Estimated Grant Amount Requested: $1 million
Known Collaborators: Fiber-Tech Industries

Summary of the Proposed Project

Increasing fuel prices, government regulation, and consumer demand are motivating vehicle manufacturers of all types to improve fuel economy and freight efficiency. One method of achieving this objective is the use of lightweight materials.

WebCore Technologies and its team of collaborators have been developing new materials and panel technology for application in trucks and trailers. These panels, in the form of glass fiber reinforced sandwich panels incorporating proprietary TYCOR® core material, can be used for sidewalls, roof and floor in heavy duty trailers, trucks and delivery van bodies. WebCore will be building on technology previously developed for the wind energy

industry to develop a family of products for the transportation industry. Working with its collaborators, WebCore will develop engineered core materials to produce cost-competitive composite panel solutions for trucks and trailers. After appropriate design, engineering and laboratory testing, large panels up to 53' long for floor, roof and sidewalls will be fabricated and assembled into full scale vehicles. These vehicles will undergo testing and evaluation protocols that are standard for the truck and trailer industries.

The Third Frontier Advanced Materials grant and matching fund are sufficient to fund demonstration activities and to advance the technology to commercial market readiness. Once market entry is realized, it is anticipated the project will create significant new jobs and technology-based economic development for the State of Ohio.

Sincerely,

Rob

Rob Banerjee, Ph.D.
Vice President, Business Development
WebCore Technologies, LLC
8821 Washington Church Road
Miamisburg, Ohio 45342
Office: 937-435-2200 ext 224
Mobile: 937-321-5035
email: rbanerjee@webcoreonline.com
web: www.webcoreonline.com

OTFAMP 11-741

GOODRICH

Sensors and Integrated Systems
1555 Corporate Woods Parkway
Uniontown OH 44685-8799
Tel: 330 374 3040
Fax: 330 374 2290
www.goodrich.com

February 14, 2011

Subject: 2011 Ohio Third Frontier Advanced Materials Program (OTFAMP) – Letter of Intent

Project Title: Nanostructured Water Filter for Airborne Potable Water Systems

Estimated Grant Funds: $1,000,000

Lead Applicant: Goodrich Corporation, Sensors and Integrated Systems, 1555 Corporate Woods Parkway, Uniontown, OH 44685-8799
Program Lead: (Goodrich Corporation): Dr. Jin Hu, Tel.: 330-374-3040, Jin.Hu@goodrich.com

Collaborators:

- SNS Nano Technologies LLC, 5633 Hudson Industrial Parkway, Hudson, Ohio 44236
  POC: Dr. Laura M. Frazier Ph.D., Tel: 330-655-0030, lfrazier@snsnano.com
- University of Akron, College of Polymer Engineering, Address, Akron, OH 44325
  POC: Dr. Stephen Z.D. Cheng, Ph.D., NAE, Tel: 330-972-7500, scheng@uakron.edu

Goodrich Corporation, Uniontown, OH in collaboration with its Ohio industry partner, SNS Nano Technologies, LLC, and University partner, University of Akron, intends to submit a proposal to the 2011 OTFAMP to develop and commercialize a new filter incorporating engineered nanomaterials for use in airborne potable water systems to efficiently trap and kill pathogens. Goodrich Corporation intends to use these filters in their Potable Water Systems for installation on commercial and business aircraft that will meet industry standards such as NSF / ANSI 55-2000 Class A. To date such a filter does not exist for use on aircraft, and represents a significant advancement in the state-of-the-art. It is expected that other applications for the filter (beyond aircraft usage) will be forthcoming.

Sincerely,

Dave Sweet

Dave Sweet
Director of Research and Development
GOODRICH CORPORATION
Sensors and Integrated Systems
1555 Corporate Woods Parkway
Uniontown. Ohio 44685-8799
Telephone: 330-374-3707
Cell: 330-289-1103
FAX: 330-374-2290
e-mail: dave.sweet@goodrich.com

cc : Stephen Cheng, University of Akron
Chris Cojocar
Maureen Elkins
Laura Frazier, SNS Technologies LLC
Jin, Hu
Vijay Pujar
Tom Wiegele
Tom Wilson

OTFAMP 11-742

GOODRICH

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www.goodrich.com

February 14, 2011

Subject: 2011 Ohio Third Frontier Advanced Materials Program (OTFAMP) – Letter of Intent

Project Title: Ultraviolet Flashlamp for Purification

Estimated Grant Funds: $1,000,000

Lead Applicant: Goodrich Corporation, Sensors and Integrated Systems, 1555 Corporate Woods Parkway, Uniontown, OH 44685-8799
Program Lead: (Goodrich Corporation): Mr. Richard Hamm, Tel: 330-374-2833, richard.hamm@goodrich.com

Collaborators:

- Core Technology, Inc. 22750 Lear Industrial Parkway, Avon, Ohio 44011
  POC: Mr. Jack A. Redilla, President, Tel: 440-937-9934, jredilla@coretechnology.com
- National Machine Group®, 4880 Hudson Drive, Stow, Ohio 44224
  POC: Mr. Richard Yori, Corporate Director, Tel: 330-688-6952, ryori@nationalmacinecompany.com

Goodrich Corporation, Uniontown, OH in collaboration with its Ohio industry partners, intends to submit a proposal to the 2011 OTFAMP to develop and commercialize a new device (Ultraviolet Flashlamp) for purification of fluids and surfaces. Goodrich Corporation intends to use the device to kill pathogens in Airborne Potable Water Systems, Air Heater Systems and Hard Surfaces. Current devices are limited to use of mercury vapor lamps and require considerable time exposure to kill pathogens in Potable Water Systems.

Sincerely,

Dave Sweet

Dave Sweet
Director of Research and Development
GOODRICH CORPORATION
Sensors and Integrated Systems
1555 Corporate Woods Parkway
Uniontown, Ohio 44685-8799
Telephone: 330-374-3707
Cell: 330-289-1103
FAX: 330-374-2290
e-mail: dave.sweet@goodrich.com

cc : Chris Cojocar
Maureen Elkins

Rus Hamm
Vijay Pujar
Jack Redilla, Core Technology
Tom Wiegele
Tom Wilson
Richard Yori, National Machine Group®

OTFAMP 11-743

ABS Materials

770 Spruce St.

Wooster, OH 44691

Feb. 14th, 2011

Letter of Intent

Ohio Third Frontier Advanced Materials Proposal

Lead Applicant Contacting Details

Name: Dr. Paul Edmiston (Chief Science Officer)

Ms. Laura Underwood – Snr. Production Chemist / Program POC

Dr. Steve Jolly (VP Systems)

Address: 770 Spruce St. Wooster, OH 44691

Phone: 330-234-7999

Email: Lunderwood@absmaterials.com

Grant Funds Requested: $1,000,000.00

Collaborators: RJR Inc, Miljo AG, OARDC

Advanced Glass Separation for Selective Oil Recovery in Agricultural Value Added Systems

ABSMaterials founded in 2008 in Wooster, Ohio produces a novel organosilica Osorb®, and has pioneered novel systems to separate various hydrocarbons from water systems. The company is the winner of the 2009 MIT-DOE Energy Prize for Hydrocarbon Cleaning, the 2009 Innovation of the Year award in Advanced Materials from NorTech. The company has won 2009-2011 grants from DOE, NSF, EPA and DoD including two 2010 SBIRs phase 1 grants from DOE and NSF, and already won 2011 phase 2 funding from NSF, who featured ABSMaterials on the home page of the National Science Foundation as one of the nations outstanding innovation companies of 2010. The company has grown from two guys and a gal in January 2009 to 31 FTE today with clients in seven states and three nations.

For OTF, ABSMaterials proposes to develop new advanced glass materials and supporting systems to selectively capture harmful sub-groups of trace contaminants such as pesticides, herbicides and PCBs from agricultural oil products during the ag-processing.

ABSMaterials is already under under contract with agricultural product firms RJR and Milijo AG. These two firms are "astounded" by advanced materiasl systems to capture highly valued agricultural and nutritional oils without using heat. Our clients have all asked if we could do this while excluding the harmful byproducts which contaminate some of their products. ABS believes it is possible, with PCBs and other chlorinated pesticides to develop such an advanced material.

RJR has signed four contracts with ABS in the previous 12 months. Milijo AG, Europe's largest processor of fish-oils has signed one. Both have agreed to work with ABS on this challenge. Further ABSMaterials is a BiOhio Company and maintains one of our labs on the Ohio Agricultural Research and Development Center of OSU. Leadership at OARDC has expressed a strong interest in this effort.

Bioacculuation of toxins in agro and aqua products is growing issue worldwide. One of the leading problems is polychlorinated biphenols (PCBs) within the fatty tissues of various fish species. Among consumers there is a growing demand for better separation technology to remove the bioaccumulated contaminants such as PCBs from products including Omega 3 nutrient supplement oils, cooking oils and supplements. Contemporary systems for PCB extraction are extremely energy intensive fractional distillations systems or catalytic converters. ABS believes we can replace these process with a novel room-tempurature advanced material system. ABSMaterials has a proven track record in developing such advanced materials and has working systems doing this for Produced Water, TCE and PCE treatment and the detection of trace explosives.

Selective contaminant uptake would be applicable to hundreds of agricultural crops needing the removal of pesticides and herbicides or to reduce the bioaccumulation in various animals. Contaminants of issue are various pesticides and herbicides such as DDT, DDE, aldrin, endrin, and various others (Clarke-Brown, 2011).

Reference: Clarke-Brown, Carmen. What is postive soil pollution? http://www.thebigger.com/biology/pollution/what-is-positive-soil-pollution/ [Online] Accessed Feb. 14th 2011

"PCBs in Sport Fish: Anwsers to Questions About Health Effects." Office of Environmental Health Hazard Assessment (OEHHA). [Online]. Accessed: Feb. 14th 2011.

Respectfully submitted– Ms. Laura Underwood – Snr. Production Chemist - ABSMaterials Inc.

OTFAMP 11-744

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

15 February 2011

OTFAMP2011@development.ohio.gov

2011 OTFAMP LOI

Thank you for accepting our Letter of Intent to submit a proposal to the Ohio Third Frontier Advanced Materials Program as outlined in the 2011 Request for Proposals (RFP) released Jan 5th 2011.

Lead Applicant: Pilus Energy LLC, PO Box 30085, Cincinnati OH 45230

Phone: 513.314.5174

Contact: Daniel Hassett, PhD

Contact email: dhassett@pilusenergy.com

Project Title: A Biomimicry Approach for a High Surface Area Anode

Grant Funds Requested: $1,000,000

Collaborators: Nano-C Inc, Westwood MA.

MeasureNet Technologies, Cincinnati, OH

SUMMARY, 2011 OTFAMP LOI

A Biomimicry Approach for a High Surface Area Anode.

Pilus Energy is an Ohio-based Company that harnesses genetically enhanced bacteria in its Electrogenic Bioreactor (EBR). This scalable and modular platform harvests electricity and economically important biogases by metabolizing compounds stored in wastewater. As a result, the wastewater biochemical oxygen demand (BOD), chemical oxygen demand (COD), and volatile organic compounds (VOC) (collectively known as "pollutants") are reduced. The Pilus EBR has great commercial potential as it produces clean energy while reducing the burden of wastewater remediation.

The Pilus bacteria have hollow tube nanowire like appendages called pili. These bacterial extensions are ideal conductors of electrons released during phosphorylation. We have engineered the pili to adhere to an anode. When this occurs, the electrons are shuttled from the bacterium to the anode through the pili hollow nanowire. The more bacteria that adhere to the anode in an EBR, the greater its power density.

Pilus Energy in collaboration with Nano-C Inc. proposes to use carbon-nanotubes (CNT) in order to increase the anode surface area. As part of this proposal, the CNTs will be coated with the highly conductive pilin protein molecule. This advancement will 1) increase anode surface area, 2) increase electrical potential while reducing resistance, and 3) provide a surface for the bacteria to adhere to. In short, we are proposing a biomimicry approach to increase anode performance: the CNT serves as an endoskeleton that supports the pilin protein surface coating. Not only will this novel material increase the power output of the EBR platform, it should offer a revolutionary approach to nano-based electronics. Examples of potential applications include medical appliances to conduct electrical impulses, portable electronic devices, microprocessors, and integrated circuits.

Team:

Pilus Energy. Daniel Hassett, PhD is leading this product development endeavor. He is the Chief Science Officer for Pilus Energy, and a full-time professor of Molecular Genetics, Biochemistry, and Microbiology at the University of Cincinnati's College of Medicine.

Nano-C, Inc. will develop and provide the carbon nanotube (CNT) substrate. Founded in 2001, Nano-C is a leading developer of nanostructured carbon for use in energy and electronics applications. It manufactures CNTs along with CNT-based inks and coatings. Nano-C brings to bear considerable IP required for this work, including patent-pending surfactant free CNT inks and coatings.

MeasureNet Technologies, an Ohio-based firm, will provide the electrical engineering to integrate the carbon nano technologies into the EBR platform. MeasureNet worked on the first operational prototypes of the EBR.

The proposed research and development will take place in three phases spread out over 2 years:

Phase 1: Combine the CNT and pilin protein to create a high surface area **anode**.

Phase 2: Produce a high surface area **cathode** to attract a greater number of protons, using the same CNT without pilin protein coating to increase the flow of electrons from the anode to the circuit's load.

Phase 3: Pilot deployments of EBR platforms and expand the applications of the pilin-coated CNT beyond the EBR platform.

Pilus Energy expects that the proposed work will result in no less than ten positions in Ohio in the field of clean energy and small electrical appliances. It is also likely that biomolecule and CNT coating presence will be established in Ohio, making Ohio an early leader in this new material development.

Letter of Intent to Submit a Proposal for the Third Frontier Advanced Materials Program

Lead Applicant: American Trim, LLC
1005 W. Grand Ave.
Lima, OH 45801

Contact Person: Steve Hatkevich
Director, Research & Development
419-996-4740
shatkevich@amtrim.com

Project Title: Bulk Metallic Glass for Tool and Die Industry

Estimated Grant Funds: $1,000,000

Known Collaborators: The Ohio State University

Description of Project:
The tool and die industry is at the foundation of the US manufacturing economy. To keep manufacturing as a vital component to the US economy, the US needs to invest in innovative technologies. American Trim proposes here to develop and commercialize Bulk Metallic Glass (BMG) dies for high-volume low-cost manufacturing of metal components with complex surface features, using the revolutionary concept of BMG master/daughter dies and molds. BMG's are particularly attractive as die materials both for their forming characteristics and for their performance. However, more developments are needed to fully commercialize this technology.

The proposed project will address technical and commercial challenges by leveraging the collaboration between Ohio industry and Ohio academic resources. The outcome of the project will be a low-cost manufacturing technology, including new BMGs suitable for dies, new die making methods and new forming methods. The successful completion of the work proposed here will lead to new product lines for American Trim in near term (less than three years). Over the longer term, this project will be new a new tooling "model" that will enable US manufacturers to shift manufacturing processes dedicated to mass production to a mass customization model, ensuring American competitiveness.

Date: February 14, 2011

To: Ohio Department of Development Technology and Innovation Division
OTFAMP2011@development.ohio.gov

From: Xerion Materials
11001 W 120th Av, Suite 400
Broomfield, CO 80021

Subject: 2011 Ohio Third Frontier Advanced Materials Program Letter of Intent

Lead Applicant: Xerion Materials Corp

Contact Person: Robert Zavala
r.zavala@xerionmaterials.com

Project Title: High Tenacity Polymer Fiber Production

Grant Funds to be requested: $1,000,000

Primary Collaborator:
Lockheed Martin MS2 SAS Integrated Defense Technologies
1210 Massillon Road
Akron, OH 44315-0001
Contact Person: Dan Jones, daniel.h.jones@lmco.com

Project Summary: See next page

Respectfully Submitted,

Robert Zavala
Chairman and Chief Executive Officer

Project Summary:

Robert Zavala
Chairman and Chief Executive Officer, Xerion Materials Corp

High Tenacity Polymer Fiber Project Summary

Fiber reinforced polymers (FRPs) have proven themselves in a growing number of applications because of the wide variety of properties that can be obtained from these materials. Lighter and less expensive than most metals, FRPs have made automobiles safer and more fuel efficient, improved the performance of athletic equipment on the course or in the field and even had their impact in construction. FRPs marry the best properties of a fiber and a matrix to synergistically produce composite properties unexpected from the components. To provide the extreme properties required to maintain a lighter-than-air platform at stratospheric altitudes over extended periods of time, Lockheed Martin MS2 SAS Integrated Defense Technologies in Akron, OH, continues to develop new FRP composite hull materials.

Developed in Ohio over twenty years ago, PBO (poly-paraphenylene-2,6-benzobisoxazole) has never realized its potential as a reinforcement fiber because the PBO fiber lacks flexibility. PBO fiber breaks under bending stresses well below its high longitudinal tenacity. The poor flexibility results from the same molecular structure (rigid-rod polymer) that gives PBO its strength; until recently, attempts to increase flexibility have been unsuccessful because improved flexibility came at the price of decreased tenacity.

In response to demand to supply first responders (firemen, police) with fire-resistant, fire-retardant clothing, Xerion Materials is bringing the development of high-tenacity fiber back to Ohio. These new rigid-rod polymers (PBXN) are spun from a liquid-crystal dope to impose an intermolecular structure of ultra-high tenacity. The issue of flexibility is addressed by introducing a new chemical composition into the polymer backbone that allows flexibility without reducing strength, producing a macromolecule that bends, allowing spinning and weaving fibers into a cloth that is supple and protective.

Lockheed Martin MS2 SAS Integrated Defense Technologies has taken an interest in **PBXN** because it offers the possibility of a stable, high-tenacity fiber that gives a little when stretched and bends without breaking when folded during the construction and transportation of the hull. Together **PBXN** fiber, nano-reinforced matrix adhesives and films commercialized under the current (2010) OTF AMP allow the weight reductions and technological leap forward to launch a new generation of lighter-than-air flight.

The State of Ohio Third Frontier Grant will provide the seed money for a multi-million dollar investment to establish a pilot plant adequate for Lockheed Martin's fiber needs and trial productions runs to kick off industrial commercial production of **PBXN**. Xerion Materials already has investors with the means to finance such an operation; Lockheed Martin has access to one market and is requesting the materials now. Through the joint vision and efforts of Lockheed Martin, Xerion Materials, the State of Ohio and Ohio collaborators and materials suppliers we will set up a new development lab and new manufacturing facility here in the State of Ohio.

PBXN fiber promises to be the backbone for development of the next generation of flexible, laminate composites in Ohio and will bring the manufacturing of advanced fiber materials back home to Ohio.

OTFAMP 11-747

NanoSperse
Dispersion technology for a small world

2000 Composite Drive / Kettering, Ohio 45420 ph 937.296.5030 fax 937.296.5032

Via Email to: OTFAMP2011@development.ohio.gov

February 14, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

RE: FY2011 Ohio Third Frontier Advanced Materials Program (OTFAMP)

To Whom It May Concern:

We are pleased to present this Letter of Intent as notification of our upcoming proposal submission for the above referenced program.

Lead Applicant:	NanoSperse 2000 Composite Drive Kettering, OH 45420 Tel: (937) 296-5030
Contact Person:	Arthur W. Fritts President & Chief Executive Officer afritts@nanosperse.com
Proposed Project Title:	Nano-Enhanced Polymers for Direct Digital Manufacturing
Estimated Grant Funds to be requested:	$1 million
Known Collaborators:	Northrop Grumman Corporation Alliant Techsystems, Inc. (ATK) University of Dayton Research Institute (UDRI) Polymer Ohio

Summary:
This exciting project will scale up production of nano-enhanced polymeric resins designed for use in two specific Direct Digital Manufacturing (DDM) processes, which are targeted at applications in military and commercial aerospace parts production. It builds upon federal research and leverages funding intended to model commercial systems for immediate deployment. DDM

NanoSperse
Dispersion technology for a small world

2000 Composite Drive / Kettering, Ohio 45420 ph 937.296.5030 fax 937.296.5032

differs from traditional machining in that the form is established additively and, unlike molding, requires no tooling. Its advantages include energy efficiency, low material waste, speed, and multifaceted geometries. Parts can be produced in a finalized form with little to no additional machining required. Quickly evolving from its roots in rapid prototyping, this type of additive manufacturing is targeted for custom parts with complex shapes that are produced in a relatively low volume while remaining economically feasible. These "tool-less" manufacturing techniques, such as high temperature selective laser sintering (SLS) and fused deposition (sometimes called 3D printing), have traditionally been used for prototyping but are emerging in production applications. Previous materials used in these processes presented significant technical barriers as production-quality polymers lacked sufficient mechanical properties. Recent developments have shown that nano-enhanced materials can be utilized in DDM to create robust parts capable of use in fully functional components. Innovation in materials advancement and the capability to process them additively will undoubtedly create explosive growth and expansion opportunities. Supported by commercial aerospace demand and military data development, this project will commercialize nanomaterials for use in the emerging DDM market.

Sincerely,

Arthur Fritts
President/CEO

TechSolve
Process > Performance > Profit

February 15th, 2011

Ohio Third Frontier Advanced Materials Program
Fiscal Year 2011
The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: Letter of Intent (LOI) for the proposal, "Design and Development of Carbon Nano-Tube (CNT) Composite-Based Dampers for Next Generation Machine Tool Application"

Dear Sir/Madam,

Dr. Anil Srivastava will be submitting a proposal on behalf of TechSolve Inc, Cincinnati, OH, GBI Cincinnati, Inc. Cincinnati, OH and UIUC, Urbana, IL for consideration by The Ohio Third Frontier Advanced Materials Program, Fiscal Year 2011.

Prospective Lead Applicant's Information:

TechSolve, Inc.
Dr. Anil Srivastava
Manager, Manufacturing Technology
TechSolve, Inc.
6705 Steger Dr.
Cincinnati OH, 45237
Tel: (513) 948-2004
E-Mail: srivastava@techsolve.org

Proposed Project Title:

"Design and Development of Carbon Nano-Tube (CNT) Composite-Based Dampers for Next Generation Machine Tool Application"

Estimated Grant Funds to be Requested: (Two Years)

- $1 million in Third Frontier Research and Development (TFRD) funding for each year.
- $1 million in Wright Capital Funds (WCF) in the First Year (2011).

(Total for Two Years - $3 million that includes $1 million in WCF)

Known Collaborators:

1. Kevin Bevan
   GBI Cincinnati, Inc.
   6899 Steger Drive
   Cincinnati, Ohio 45237
   Phone: 513-841-8684
   Fax: 513-841-7326
   Email: kbevan@gbicincinnati.com

2. Professor Shiv G. Kapoor
   Mechanical Science and Engineering
   1206 W. Green Street
   Urbana, Illinois-61801
   Ph: 217-333-3432
   Fax: 217-244-9956

The proposal shall be submitted under **"Ohio Third Frontier Advanced Materials Program (OTFAMP), Fiscal Year 2011"**

Proposal will address the opportunity area of "**Advanced Materials**"

Point of Contact:

Dr. Anil Srivastava
Manager, Manufacturing Technology
TechSolve, Inc.
6705 Steger Drive
Cincinnati OH, 45237
(513) 948-2004
srivastava@techsolve.org

Thanks!

Anil Srivastava, PhD
Manager, Manufacturing Technology

Summary of the proposed project:

"Design and Development of Carbon Nano-Tube (CNT) Composite-Based Dampers for Next Generation Machine Tool Application"

Carbon Nano-Tube (CNT) composites have many innovative applications in manufacturing industry. Specially, development of CNT-based dampers will have many possible applications. In particular, directional CNT-based dampers are of interest for machine tool, motor vehicles and aerospace/aviation industries. Directional dampers allow for the flexibility in damping critical modes of vibration, which is especially important for damping chatter while machining, vehicle suspension where high damping of certain modes may make the system more sluggish. The objective of the proposed research program is to address the development and commercial manufacturing of carbon nanotube (CNT) composite-based directional dampers. The initial focus will be on the design and development of a next generation light weight, rigid machine tool.

Multi-walled carbon nanotubes have the ability to dissipate viscous energy when subjected to a shear load. This property can be used to dissipate viscous energy in CNT composites. For example, aligned CNTs in a PDMS matrix have been observed to have good damping characteristics. However the efforts to manufacture these composites have not been focused towards the *design, development and commercialization of directional dampers*.

The challenges faced in the realization of commercial CNT-based directional dampers are two-fold. First, a science-based understanding of the energy dissipation process in aligned CNT composites is needed to design and develop this new class of dampers. This will enable the design of woven/ply-based CNT networks within the PDMS matrix that can provide the desired damping. Second, the manufacturing technique used to deposit the CNT networks should be designed for "scale-up" towards commercialization.

As part of this research initiative, the proposers will first study the physics of the damping process in CNT-polymer composites. Simulations will be used to arrive at shapes of preferred CNT networks that provide the most effective damping characteristic to the composite. To address the commercialization aspect of these dampers, the proposers intend to deposit complex patterns of nano-scale reinforcements on polymer substrates by using a single-droplet generator in conjunction with a 5-axis micro-scale machine tool. With continuous development and understanding of the technology, a next generation, light weight, rigid machine tool will be designed and developed for real world application.

OTFAMP 11-749

MegaJoule Storage, Inc.

February 15, 2011

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Subject: 2011 OTFAMP Letter of Intent
VIA: E-mail to OTFAMP2011@development.ohio.gov

To Whom It May Concern:

Please let this letter serve as our notice of intent to apply for the fiscal year 2010 Ohio Third Frontier Advanced Materials Program (OTFAMP). Below is the information requested in Section 1.3.3 of the Request for Proposal for the OTFAMP. The attached project summary provides additional details about our project.

Lead applicant: MegaJoule Storage Inc.
Contact: Herb Crowther, President
Address: 1112 Kenilworth Avenue, Cleveland, OH 44113
Telephone: 216-496-8302
Fax: 216-751-9537
E-mail: hcrowther@megajouleinc.com
Proposed project title: Advanced Materials for Affordable Energy Storage
Estimated grant funds to be requested: $1 million
Target collaborators: JME, Inc.

Thank you for your assistance. Please feel free to contact me if you need additional information.

Sincerely,

Herb Crowther
President, MegaJoule Storage Inc.

Attachment: Project Summary

Advanced Materials for Affordable Energy Storage
2010 Ohio Third Frontier Advanced Materials Program Project Summary

Business Overview: MegaJoule Storage Inc is developing electrical energy storage products for utility-scale stationary energy storage applications. This energy storage is based on proprietary electrochemical capacitor technology that offers lower cost, longer life and greater ease of use compared to other energy storage technologies. The project will develop advanced carbon materials that reduce the cost and improve the performance of energy storage systems for sale to electric utility, renewable energy, industrial and commercial companies. Commercialization of MegaJoule's energy storage products will expand Ohio's emerging advanced energy cluster and contribute to the state's advanced materials industry capabilities.

Project Description: This grant will assist MegaJoule and its collaborators in optimizing nanoscale activated carbon materials for use in advanced energy storage capacitors. A system demonstration in field conditions will demonstrate the functionality and performance of partial scale fully integrated energy storage systems in "peak shifting" day-night energy storage, and "firming" of renewable energy power generation. Improved performance of advanced carbon materials and successful field applications will lead to venture investment in MegaJoule to expand product development, manufacturing and distribution capacity.

MegaJoule's headquarters operations are based in Cuyahoga County. MegaJoule is collaborating with JME, Inc., Shaker Heights, Ohio. JME, Inc. will provide materials research, development, and performance testing.

MegaJoule has a first-to-market opportunity with a product line featuring transportable, turn-key, bulk energy storage systems ranging from 50 kilowatt hours (kWh) to megawatt hour (MWh) scale capacity.

OTFAMP funds will assist the growth of MegaJoule by providing capital that will allow it to accelerate reductions in product cost, enter the marketplace faster, and ultimately create jobs in Ohio. MegaJoule will invest heavily in the project and expects to exceed the targeted 1:1 cost share ratio. The success of the project will be measured by system sales revenue as well as job creation in Ohio and capital investment in MegaJoule. The success of the project, combined with other recent successes in advanced energy storage technology in Ohio, will help to develop the State of Ohio's leadership in the rapidly growing advanced energy industry.

zyvex™
performance materials

February 15, 2011

Ohio Department of Development
Technology and Innovation Division
Attention: OTFBP
77 South High Street
25th Floor
Columbus, OH 43215

Dear Sir/Madam,

This letter transmits Zyvex Performance Materials Letter of Intent to submit the subject proposal shown below.

Subject:
Lead Applicant: Zyvex Performance Materials
Address: 1255 Kinnear Road, Columbus, Ohio 43212 (Franklin County)
Phone number: 614-481-2222
Contact person: Lance Criscuolo
Email address for the contact: lcriscuolo@zyvexpro.com
Proposed Project Title: **Advanced Nanocomposites for Rebuilding Ohio's and America's Infrastructure**
Estimated Grant Funds to be requested: $1,000,000
Known Collaborators: Consolidated Electric Cooperative, Inc., Angstron Materials, Zyvex Performance Materials

One page summary of the proposed project: See Attached

Sincerely,

Lance Criscuolo
President
Zyvex Performance Materials

zyvex™
performance materials

Advanced Nanocomposites for Rebuilding Ohio's and America's Infrastructure

Carbon nanotubes and nanographene are known to be the strongest materials in the world. Recently these "world's strongest materials" have been successfully incorporated into composites for high-end applications in aerospace, defense, performance automotive, and even some sporting applications by companies like Zyvex Performance Materials. While these nanocomposite materials have improved strength, stiffness, and toughness while reducing the weight of the structures and components, they have not been adapted to infrastructure applications such as bridge repair, overpasses, utility structures, and new bridge construction.

For the most part, infrastructure technology has not progressed much beyond the ancient Romans who used concrete. One of the reasons these newer advanced materials have not been adopted for infrastructure repair or construction is the perceived costs associated with nanocomposites. However, with the proper investment in refining the technology, these newer, lighter, stronger, and longer lasting materials, can be successfully applied to infrastructure applications. Essentially, we propose to bring aerospace technology to infrastructure applications with cost effective implementation. These advanced nanocomposites offer the potential to cost effectively return our infrastructure to world-class standing. Looking further ahead, advanced nanocomposites may someday soon allow us to create bridges, overpasses, and utility structures that have the ability to tell us when they are in need of repair.

This proposed project is focused on leveraging the technology advances made thus far in nanocomposites and applying them to a commercialization strategy for new light weight, longer lasting, corrosion resistant nanocomposites that exhibit superior physical properties and deliver cost effective improved performance. If successful, our nanocomposites would provide an advanced technology platform for continued infrastructure development long into the future.

Techniloy, LLC
Headquarters Location- 319 Springfield Street – Dayton, OH 45403
Phone (937)-269-2386 & **Web** @ http://www.techniloy.com

Ohio Third Frontier Advanced Materials Program 2/15/2011
Ohio Department of Development OTFAMP2011@development.ohio.gov
(ODOD) Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215

LETTER OF INTENT

Techniloy is located in Dayton, Ohio and intends to submit a proposal entitled "Advanced Nano Material Alloy for Manufacturing Cost Reduction and Higher Purity Polysilicon Growth". This will create a supply chain need in Ohio for this product. This advanced material is designed to reduce production cost for mass polysilicon growth production around 10 to 20 % during certain processing steps of photovoltaic cell manufacturing. Techniloy, bringing in out of state funding of 3.5 million for R&D services and capital based on our current R&D lab efforts and validation results from large polysilicon equipment OEMs. Techniloy will spend another $1 million in 2011 if 1 million funding match is granted to further this development. This advanced material purpose is to help reduce bringing alternative energy to the market at a more affordable cost. This is in response to the Ohio Third Frontier Advanced Materials Program, fiscal year 2011 Request for Proposals (RFP).

Per the requirements of the OTFAMP 2011 Request for Proposal please note the following:

Applicant's Name:	Techniloy, LLC
Address:	319 Springfield Street Dayton, OH 45403
Project Name:	Advanced Nano Material Alloy for Manufacturing Cost Reduction and Higher Purity Polysilicon Growth"
Estimated Grant Funds:	$ 1,000,000
Contact Name:	Jason Sikora, R&D Manager, Senior Chemical Engineer
Telephone Number:	937-974-8472
Email:	Jason.p.sikora@gmail.com

The project and known collaborators:

- Process Equipment Company, PECO- Design, Fabricator, and Manufacture
- American Metalworks – Design and Fabricator
- The Edison Materials Technology Center (EMTEC) – experience in project management, product development, and commercialization.

The team is pleased to submit this letter indicating our intent to submit a full proposal for Third Frontier Advanced Materials Program.

Yours truly,
Techniloy, LLC

Jason Sikora
R&D Manager, Senior Chemical Engineer

Renivus
Your Renewable Energy Solution Provider.

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus OH 43215

Re: 2011 OTFAMP LOI

02/14/2011

To whom it may concern:

This letter is to inform you that Renivus, LLC, intends to submit a proposal for Ohio Third Frontier FY2011 Advanced Materials Program.

Lead Applicant
Renivus, LLC
1220 Huron Road East, 4th Floor
Cleveland, Ohio 44115
(216)416-0299

Contact person:
Kristopher McCrone
Renivus President/CEO
kristopher@renivus.com

Project Title:
Conductive NanoPaper for De-icing and Lightning Strike Protection of Wind Turbine Blades

Estimated Grant Funds to be Requested:
$1,000,000

Known Partners/Collaborators:
Nanomaterial Innovation, LLC
Center for Advanced Polymer and Composite Engineering, OSU
NanoInnovations, LLC

Project Summary:
Renivus proposes to integrate a carbon nanomaterial based thin film called NanoPaper developed by collaborators for use as an electrically conductive surface layer for wind turbine blades. The highly conductive surface layer will allow for de-icing and lightning strike protection of wind turbine blades. The scope of the proposed project is to develop a full scale NanoPaper fabrication line and test performance on full scale wind turbine blades in the field of operation. It is anticipated that the program will lead to manufacturing of several thousand square feet of the NanoPaper geared toward wind turbine blade OEM's and to aftermarket application.

Sincerely,

Kristopher McCrone
Renivus President/CEO

M-7 Technologies • 1019 Ohio Works Drive • Youngstown, OH 44510 • 330-779-0700 • Fax: 330-797-0471 • M7Tek.com

January 31, 2011
Mr. Mark D. Kvamme
Director
The Ohio Department of Development
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: 2011 OTFAMP LOI

Dear Mr. Kvamme:

On Behalf of M-7 Technologies (M-7), I am pleased to submit this Letter of Intent to the Ohio Department of Development in response to the Request for Proposal (RFP) under the Ohio Third Frontier Advanced Materials Program. Required information on our planned submission is provided below, and a one-page summary of the proposed project is attached.

Lead Applicant Name: Address & Phone Number:	M-7 Technologies 1019 Ohio Works Drive Youngstown, Ohio 44510 (330) 779-0700
Contact Person:	Mike Garvey (330) 509-9750 mgarvey@m7tek.com
Proposed Project Title:	Spring Tire® for All Terrain Vehicles
Estimated Grant Funds To Be Requested:	$2.0M, to include $1.0M in Wright Capital Funds
Known Collaborators:	The Goodyear Tire & Rubber Company Chris Varley Global PM, External Science & Technology Innovation Center PO Box 3531 Akron, Ohio 44309

Youngstown State University, STEM College
Brian Vuksanovich, Assistant Professor
2200 Moser Hall
One University Plaza
Youngstown, Ohio 44555

M-7 requests the issuance of an LOI Number for our proposed project. Please contact me at (330) 509-9750 if we can provide any additional information. M-7 looks forward to working with the Ohio Department of Development to leverage Ohio innovation into Ohio jobs.

Respectfully Submitted,

Michael S. Garvey
President, M-7 Technologies

Project Description: Spring Tire® for All-Terrain Vehicles

Our proposal will outline a two year, $4.0 million project with specific milestones and deliverables that are designed to culminate in a tested, commercially introduced, non-pneumatic all-terrain vehicle (ATV) tire, and a viable manufacturing line.

In 2007, Goodyear and NASA (through its Innovative Partnerships Program Seed Fund) jointly explored opportunities for "Generalizing Moon Tire Technology" with Mr. Vivake Asnani from NASA and Mr. Dave Glemming of Goodyear serving as co-Principal Investigators. Beginning in 2009, M-7 Technologies assembled and delivered metallic spring tires to Goodyear that were demonstrated and tested at NASA. A field test conducted on April 28, 2009 at NASA's Johnson Space Center validated that the spring-based concept has the potential to make significant contributions to NASA's mobility applications in harsh terrains, such as future planetary explorations. In the summer of 2010, members of Goodyear's Advanced Concepts team vulcanized a tread pattern around a structural spring assembly and created a non-pneumatic Spring Tire® suitable for terrestrial use. When Goodyear combined the low cost spring structure assembled at M-7 Technologies with their tire molding technologies, the prototype of a completely new tire product was created for terrestrial off road vehicles.

Field tests of the Spring Tire® also suggest that, with further development, this concept could be adapted for small terrestrial vehicles such as personal ATVs. The original scope of the NASA partnership project, however, did not allow for such development, which M-7 now proposes. Specifically, the proposed work would explore modifications of the spring-tire design to consider:

- Traction on surfaces common to ATV operation including on- and off-road surfaces,
- Speeds beyond the 15 mph lunar application and consistent with common ATV operation,
- Durability and robustness commensurate with ATV operation,
- Manufacturing process and scalability consistent with ATV tire volumes.

If M-7's OTFAMP proposal is successful, the resultant Ohio Third Frontier and Wright Capital Fund grants will be matched with investment from M-7 and Goodyear to create the first terrestrial ATV Spring Tire® commercial product.

Deliverables will include full-scale field testing of the selected design as well as a viable manufacturing scenario. The project is expected to last 2 years.

OTFAMP 11-754

Ohio Third Frontier Advanced Materials Program
Letter of Intent

Lead Applicant: University of Akron
302 Buchtel Common
Akron, OH 44325

Contact Person: Dr. Robert Weiss
Hezzleton E. Simmons Professor
Department of Polymer Engineering
250 S. Forge St.
Akron, OH 44325-0301

Email: rweiss@uakron.edu
Phone: (330) 972-2581

Project title: Functionalized Poly(lactic acid)

Anticipated grants funds to be requested: $1,000,000

Known collaborators: PolyOne Corporation
33587 Walker Road
Avon Lake, OH 44012

Proposal Summary

Nature of the Collaboration. This is a collaborative program between the University of Akron (UA) and PolyOne a global provider of specialized polymer materials, services and solutions. PolyOne has annual revenues of more than $2B and its Global Corporate Headquarters, Service Center, Plant, Warehouse and Regional Headquarters are located in Avon, OH.

Objective. This proposal focuses on the development and commercialization of improved compositions of poly(lactic acid), PLA with increased softening temperature, improved hydrolytic stability, faster crystallization and improved fracture toughness.

Justification of the Proposed Research. Poly(lactic acid), PLA, is a commercial thermoplastic with applications as packaging films, fibers and textiles, thermoformed containers, sutures and stents. PLA is a sustainable alternative to petrochemical-derived products. The lactide monomer is derived from fermentation of agricultural biomass, e.g., corn starch, and the polymer is biodegradable by industrial composting.

Four major problems currently limit the use of PLA: 1) a low glass transition temperature (60°C) compared with other commodity thermoplastics, 2) poor toughness, 3) poor hydrolytic stability and 4) slow crystallization kinetics. If these problems were solved, PLA could compete with general purpose polystyrene (GPPS) and polyethylene terephthalate (PET) in many other applications. An increase of the glass transition temperature by 10-15 °C would significantly reduce stability issues associated with storage and shipping PLA parts during the warm summer months, and it would also eliminate the softening point differentiation of PLA and PET. An increase of the Izod impact strength by 5-10 J/m would eliminate the differentiation of PLA and GPPS or PET and allow penetration into those markets generally associated with the latter two polymers. As with all polyesters, PLA is susceptible to hydrolysis and molecular weight degradation. The onset of hydrolysis is a function of the glass transition temperature, so increasing the latter will produce more stable materials for applications where temperatures may reach 60°C or higher. PLA with high L-lactide composition is semi-crystalline. The crystallinity improves the mechanical properties and shape stability above T_g, thus extending its use-temperature. However, crystallization of PLA is relatively slow and semi-crystalline PLA is not transparent, which is a detriment for applications such as packaging and coatings. If PLA crystallization were nucleated, the kinetics of crystallization would increase and clarity of the product could be achieved by the formation of very small, crystallites. Increasing the melt elasticity of PLA would also enable semi-crystalline PLA to be thermoformed on the "melt side", which is a thermoforming processing technique often practiced for polypropylene parts requiring clarity.

Third Frontier Project. This project concerns the development of a commercially viable process for functionalizing PLA with ionic groups (metal carboxylate, sulfonate or phosphonate). Such materials are termed *ionomers*, and each of the problems enumerated above can be addressed by the presence of these groups as part of the polymer. Intermolecular interactions that occur between ionic dipoles in an ionomer generally increase the glass transition temperature, nucleate crystallization of small crystallites that promote clarity, improve fracture toughness and improve melt strength. An example of an ionomer that has been a commercial success, largely due to the property improvements described in the previous sentence, is the metal salts of poly(ethylene-methacrylic acid), e.g., *Surlyn*™ from DuPont. In that case, the ionic species addressed problems with low-density polyethylene and large market niches were developed in packaging and sporting goods. The PI has previously demonstrated the synthesis of PLA ionomers and this collaboration will focus on adaptation of that chemistry to an commercially viable process.

Letter of Intent

Ohio Third Frontier Advanced Materials Program
Fiscal Year 2011

Prospective Lead Applicant:	Chemtex International, Inc. 6951 Ridge Road PO Box 590 Sharon Center, OH 44274
Contact Person:	Guliz Elliott, Ph.D. Site Manager – Technology Center
Phone Number:	(330) 239-7411 (office) (330) 242-2065 (cell)
E-mail Address:	guliz.elliott@chemtex.com
Project Title:	**Renewably Sourced Ethylene Glycol from Cellulosic Biomass**
Estimated Funds Requested:	$1,000,000.00
Known Collaborators:	The Ohio State University
Summary of Proposed Project:	*See next page for summary.*

Renewably Sourced Ethylene Glycol from Cellulosic Biomass

Ethylene glycol (EG) is a key component in the production of polyethylene terephthalate (PET) resins, polyester fibers, and anti-freeze. Because of the petrochemical nature of EG, there is a large domestic and international market suffering due to the instability of the countries in control of the world's oil supply. Thus, reliance on foreign oil extends well beyond energy concerns and there is a great need for alternative means of EG production. Chemtex International, Inc.'s sister company, M&G Polymers, is the second largest supplier of PET therefore a large consumer of EG. Chemtex has an ongoing research and development program to alleviate the demand for this advanced material.

Processes exist that have successfully converted biomass to EG. Problems that arise with these methods are high cost and low EG yield, due to use of food-competitive biomass and non-selective paths to EG production. These processes have not proven to be economically sufficient for the United States.

The first step in producing renewably sourced EG is conversion of biomass to cost-competitive sugar. Chemtex has proven their ability to do so and is working to optimize their process for converting cellulosic biomass to basic sugars. These efforts are in order to obtain an economically viable technology for implementation and licensing. In fact, the company is in the process of building a demonstration plant in Crescentino, Italy for this purpose. The demonstration scale plant will be ready for operation in the first half of 2012 and Chemtex' Sharon Center, Ohio facilities will have full access to these sugars. Nevertheless, Chemtex is evaluating all options to transfer and adapt their biomass treatment technology to the US based engineering and research centers. With a long history of research and development, the Chemtex Ohio Technology Center is at the top of the list.

The second step in this process involves converting sugars to EG. Chemtex International, Inc. has collaborated with The Ohio State University, through funding from The Ohio BioProducts Innovation Center (OBIC), to develop processes to cost-competitively convert basic sugars into EG. Available results indicate readiness for process optimization, catalyst lifetime improvement, and scale-up. Funding from the Ohio Third Frontier Advanced Materials Program will accelerate the R&D efforts and push this project significantly closer to commercialization. Renewably sourced EG could eliminate the dependence of the above industries on foreign oil, as well as stimulate the Ohio and US economies considerably.

Thank you,

Guliz Elliott, Ph.D.

CHEMTEX INTERNATIONAL, INC.
6951 Ridge Road, P O Box 590, Sharon Center, OH 44274
TEL: (330) 239-7400 • FAX: (330) 239-7403

WILMINGTON SHARON CENTER MUMBAI BEIJING SHANGHAI

OWENS CORNING SCIENCE AND TECHNOLOGY, LLC
275 SOUTHWEST AVENUE
TALLMADGE, OH 44278
(330)633-6735; FAX (330)633-4939

February 14, 2011

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215-6130

Re: 2011 OTFAMP LOI

Dear ODOD:

I am writing to inform ODOD of our intent to submit a proposal to Ohio Third Frontier FY2011 Advanced Materials Program in response to the recent announcement of RFP.

The Lead Applicant:

Company:	Owens Corning
Address:	Science & Technology Center 2790 Columbus Road, Route 16 Granville, OH 43023
Phone:	(740)321-6241
Contact Person:	Dr. Nikoi Annan
E-mail for the contact:	nikoi.annan@owenscorning.com

Project title:

Carbon Nanoparticles-Reinforced Polymer Foams for Insulation Markets

Estimate Grand Funds to be requested:

$1 million

Known collaborators:

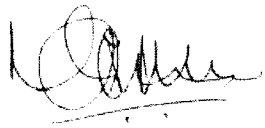
- The Ohio State University
- Nanomaterial Innovation Ltd (NIL)

PROJECT SUMMARY

This OTFAMP project is to develop and scale up a new group of light-weight, high-strength and fire-resistant polymeric foams by using innovative nanotechnology developed by Owens Corning together with The Ohio State University and Nanomaterial Innovation Ltd. The U.S. market for polymer foams was more than 7.4 billion pounds in 2001. However, their applications are limited by poor mechanical strength, surface quality, thermal stability and fire retardance. Furthermore, traditional halogenated (HFC) blowing agents cause global warming and phase-out of these, at least, in developed countries is imminent.

This proposal shall focus on the development and implementation of an environmentally benign and sustainable foam technology with zero ODP and zero GWP to defend and sustain the three-hundred-million-dollar ($300 Million) Owens Corning XPS Foam business, which employs more than 600 people in the U.S. and close to 300 people in Ohio alone. This objective shall be achieved by the synthesis of nanocomposites using both plate-like and fiber-like carbon nanoparticles to enhance insulation capability to achieve R-5 and higher per inch. The nanoparticles shall be surface-chemically-modified for better dispersion and for stronger affinity to carbon dioxide (CO_2) to ensure high absorption and retention of CO_2 as an environmentally benign blowing agent. Polymer blends including a minor phase with high CO_2 solubility are used as the matrix material. The presence of nanoparticles in the polymer matrix allows better control of cell morphology and foam density in the manufacturing processes. Ultra-low-density foams with thermal insulation properties better than the existing insulation materials have been achieved. The success of this project is critical not only to defending our business in Ohio, but also critical to achieving our objective and responsibility to develop and deploy technologies that protect the environment and safeguard societal health. A successful implementation of this novel technology shall also lead to significant impact on energy- and material-savings that are critical to Ohio's economy. The primary focus will be the thermal insulation in building construction and industrial applications.

Sincerely yours,



Dr. Nikoi Annan
Owens Corning
Leader, Foam Science & Technology

OTFAMP 11-757

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
(330) 972-7666 Office
(330) 972-6281 Fax

February 14, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFWPP2011@develoment.ohio.gov

Subject: 2011 OTFAMP LOI

Dear Sir or Madam:

Please accept this Letter of Intent from The University of Akron for our Ohio Third Frontier Advanced Materials Program (OTFAMP) proposal. The relevant information about our proposal is as follows:

Lead Applicant Name:	Department of Polymer Science College of Polymer Science and Polymer Engineering The University of Akron Akron, OH 44325-3909
Contact Person:	Matthew L. Becker, Ph.D. Associate Professor (330) 972-2834 becker@uakron.edu
Proposed Project Title:	Advanced Orthopaedic Biomaterials for Accelerated Bone Ingrowth
Estimated Funds Requested:	$1,000,000
Known Collaborators:	OrthoHelix Akron Polymer Systems Austen BioInnovation Institute

A summary of the proposed project appears on the following page.

Sincerely,

Kathryn Watkins-Wendell
Director, Research Services and Sponsored Programs

Office of Research Services and Sponsored Programs

Akron, OH 44325-2102

(330) 972-7666 Office
(330) 972-6281 Fax

Advanced Orthopaedic Biomaterials for Accelerated Bone Ingrowth

Musculoskeletal disease is a leading cause of disability in Ohio and across United States. It accounts for over 50% of all chronic conditions for people over 50 years of age. The economic impact is staggering, with an estimated cost of $849 billion in the U.S. (7.7% of gross domestic product) for treatment and lost wages. The human toll in terms of diminished quality of life is immeasurable. Still, the investment in musculoskeletal innovation lags behind other chronic conditions.

It is well established that bone morphogenic proteins (BMPs) induce cell differentiation and bone defect healing. There are at least 14 known BMPs, and several already have FDA approval for orthopaedic applications. Despite the promise of improved clinical outcomes and FDA approval, use of BMPs are now widespread due to astronomical cost. Local delivery of attenuated BMP peptides would provide the desired effect while drastically reducing the cost. We have developed a novel advanced biomaterial construct capable of confining and locally delivering BMPs. The synthetic constructs are scalable and cost effective, and applicable to a wide variety of surgical interventions.

RIVERS ADVISORS

February 15, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFAMP2011@development.ohio.gov

SUBJECT: Letter of Intent for 2011 Ohio Third Frontier Advanced Materials Program

Dear Sir or Madam:

5 Rivers Advisors is pleased to submit this Letter of Intent for the Fiscal Year 2011 Advanced Materials Program Request for Proposal. Information for this project is as follows:

Prospective Lead Applicant: 5 Rivers Advisors

Address and Contact Person:
Craig Sosebee
Managing Partner
323 Salem Avenue, Suite 3-D
Dayton, OH 454061

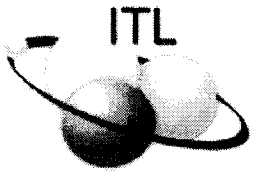
Phone: (937) 604-7436
Email: csosebee@5riversadvisors.com

Project Title: High-capacity Production System for Eco-Chemical Heat-Transferable Inks

Estimated grant funds: $600,000

Known collaborators:

- IYA Technology Labs (Miamisburg, OH)
- Americans Networking Innovation Alliance (ANIA)



Summary of the Proposed Project:

5 Rivers Advisors, an Ohio Minority-Owned Business, has entered into an agreement with IYA Technology Labs to create market-aligned sustainable high-growth/high-value pipelines for their emerging products. IYA of Miamisburg, Ohio was founded in 2004 with the vision to be a global leader in innovative eco-chemical solutions. IYA's demonstrated strength is in research, product development, market validation and product commercialization. Their solution-driven strategy is to create unique, proprietary eco-chemical technologies that can be used in the *Ohio-based manufacturing* of high quality products for use in various market segments.

5 Rivers is forming a portfolio company, Bellwether SG, to insert into IYA's multi-product pipelines. In this position Bellwether SG can actively and dynamically align and optimize IYA's various products into multi-market and market segment order fulfillment kits. Capitalizing Bellwether as a 5 Rivers Opportunity Fund portfolio company makes it attractive as a tangible investable entity that creates and grows revenue by accelerating new marketing and delivery capacity. We do this while optimizing existing individual channels into common multiple market segments for existing and new IYA products. For IYA pipelines, distribution will still look like one channel with multiple segments. This approach optimizes market development and channel distribution costs while maintaining IYA quality and brand purity *with no Intellectual Property transfer*. This will subsequently allow us to focus on market-qualified technology applications and new product development, retain the organizational and manufacturing efficiency of dedicated product pipelines, reduce marketing and distribution cost duplication, maximize market leverage through a common lens, and maintain brand clarity.

Opportunities are growing faster than our present capacity to deliver for market-defined new products that leverage existing core IP and technology.

In particular, 5 Rivers Advisors has identified substantial opportunities to partner with well-established national and international textile manufacturing and apparel companies.

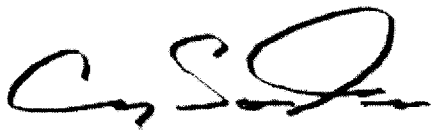
In response, 5 Rivers Advisors is working with the Dayton-based Americans Networking Innovation Alliance (ANIA) to specify, design, and demonstrate high capacity systems for heat-transferable ink production, and continuous transfer manufacturing processes. ANIA has been recently formed by a cadre of engineers and scientists from the Air Force Research Laboratories (AFRL) at Wright Patterson AFB (WPAFB).

OTFAMP participation will accelerate and reduce the risk of demonstrating the Ohio-based capacity and capability for delivery on a mass-production basis. Proof of our ability to deliver at this scale will overcome a substantial barrier to market entry and rapid growth. This will in turn accelerate the formation of Ohio-based production, distribution and sales, material engineering, and design jobs.

5 Rivers Advisors is at your disposal. With best regards;

Craig Sosebee

Managing Partner



OTFAMP 11-759

February 15, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

SUBJECT: 2011 OTF AMP LOI

Dear Sir or Madam:

Please accept this letter of Intent from the University of Akron for the OTF AMP.

Lead Applicant: The University of Akron
302 Buchtel Common
Akron, Ohio 44325

Contact Person: Dr. Mukerrem Cakmak
Distinguished Professor, Polymer Engineering
Email: cakmak@uakron.edu
Phone: 330-972-6928

Project title: Roll to Roll Manufacturing of Flexible, Transparent, Conductive Films

Anticipated grants funds to be requested: $1,000,000

Known collaborators: Akron Polymer Systems
2990 Gilchrist Rd.
Akron, OH 44305

Spectra Group Ltd.
27800 Lemoyne Rd # J
Millbury, OH 44347

Kent Displays Inc.
343 Portage Blvd
Kent, OH 44240

The proposed project summary appears on the following page.

Sincerely,

Kathryn Watkins-Wendell, Director
Research Services and Sponsored Programs

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
330-972-7666 • 330-972-6281 Fax

Roll to Roll Manufacturing of Flexible, Transparent, Conductive Films

Project Summary

Many next generation electronic devices will require multifunctional films with the capability to act as electrodes. Applications such as displays, sensors, photovoltaics, RFID devices, circuit boards, and others will require characteristics that include flexibility, elasticity, electrical conductivity, transparency, and low manufacturing costs.

The University of Akron has demonstrated the capability to produce such advanced multifunctional films using patented roll-to-roll processes at its National Polymer Processing Center. Leveraging this capability with a unique Ohio commercial supply chain of Spectra Group, Akron Polymer Systems, and Kent Displays offers an excellent opportunity to develop, demonstrate, and bring to market several application specific multifunctional films for a variety of next generation electronic devices within 2 to 3 years.

ANGSTRON MATERIALS

02/15/2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Re: 2011 AMP LOI

This letter is to inform you that Angstron Materials intends to submit a proposal for the Ohio Third Frontier FY 2011 Advanced Materials Program.

Lead Applicant:
Angstron Materials
1240 McCook Avenue
Dayton, OH 45404
937-331-9884

Contact Person:
Aruna Zhamu
aruna.zhamu@angstronmaterials.com

Project Title
Manufacturing of Economical and High Performing EMI Shielding Solutions for the Cabling and Aerospace Industry

Estimated Grant Funds Requested:
$1,000,000

Known Partners/Collaborators:
Buckeye Composites
Additional OEM partners will be identified in the proposal

Project Summary

The electronics and communications industry is constantly driven by customer demands for increases in cable speed and capacity while maintain size and weight limitations. This combination often results in EMI shielding constraints. Our customer defined solutions will result in a combination of lighter weight, smaller diameter and more flexible shielding materials than conventional copper and aluminum braids, meshes and foils.

Through existing collaborations with aerospace and commercial cabling manufacturers we have identified market entry requirements and are completing prototype testing for specific applications.

Sincerely,

02/15/2011

Aruna Zhamu
Angstron Materials

OTFAMP 11-761

February 15, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFAMP2011@development.ohio.gov

Subject: 2011 OTFAMP LOI

Dear Sir or Madam:

Please accept this Letter of Intent from The University of Akron for our Ohio Third Frontier Advanced Materials Program (OTFAMP) proposal. The relevant information about our proposal is as follows:

Lead Applicant Name:	Department of Biomedical Engineering College of Engineering The University of Akron Akron, OH 44325
Contact Person:	Juay Seng Tan, Ph.D. Assistant Professor (330) 972-6678 jstan@uakron.edu
Proposed Project Title:	Advanced Biopolymer Glue for Herniated Disc and Wound Closure
Estimated Funds Requested:	$1,000,000
Known Collaborators:	Akron General Medical Center Austen BioInnovation Institute AxioMed Spine Corporation Cleveland Clinic Integra Spine NEOUCOMP OrthoHelix Summa Health System

A summary of the proposed project is attached.

Sincerely,

Kathryn Watkins-Wendell
Director, Research Services and Sponsored Programs

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
330-972-7666 • 330-972-6281 Fax

Advanced Biopolymer Glue for Herniated Disc and Wound Closure

Lumbar disc herniation, common in healthy male adults aged 45-54, causes excruciating pain, immobility and results in loss of productivity. A high incidence of 18% in disc herniation recurrence is known following surgery, resulting in need for a second surgery. The unmet clinical need of repair of torn annulus following an episode of lumbar disc herniation remains a problem today. No proven technique is available to the surgeons to effectively prevent both incidence of the index herniation and recurrence of subsequent herniation.

Current surgical fibrin glues approved for internal applications do not have sufficient strength to repair the musculoskeletal structure. The available stronger glues are not suitable for internal applications due to toxicity. We have developed a novel advanced biopolymer glue that could be delivered via a syringe and is capable of withstanding substantial load for application in the spine. This novel biopolymer glue would be used for closure of internal and external surgical wounds.

OTFAMP 11-762

THE UNIVERSITY OF TOLEDO

February 14, 2011

Ohio Department of Development
Technology of Innovation Division
Attention: Ohio Third Frontier Program
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: Letter of Intent for Application for the Ohio Third Frontier Advanced Materials Program - FY 2011 Program

Dear Sir/Madam,

The University of Toledo is planning to submit a proposal to the Ohio Third Frontier Advanced Materials Program FY 2011 Program. Details of the intended proposal are given below:

1. **Lead Applicant:**
   The University of Toledo, 2801 W. Bancroft Street, Toledo, OH 43606

2. **Contact Person:**
   Dr. A. H. Jayatissa, Associate Professor; Department of Mechanical, Industrial and Manufacturing Engineering; Mail Stop 312; The University of Toledo,
   2801 W. Bancroft Street, Toledo, OH 43606
   Phone: (419) 530-8245; Fax: (419) 530-8206; E-mail: ajayati@utnet.utoledo.edu

3. **Project Title:**
   Commercialization of Nanostructure Carbon Materials

4. **Estimated Grant Funds to Request:** $1,000,000

5. **Collaborators:**
   Did not identify yet

6. **Project Summary:** Please see attached.

Should you have any question regarding this letter of intent, please do not hesitate to contact me at your earliest convenience.

Sincerely,

A H Jayatissa

Ahalapitiya H. Jayatissa

College of Engineering
Mechanical, Industrial and Manufacturing Engineering • Mail Stop 312 • 2801 W. Bancroft St. • Toledo, Ohio 43606-3390
419.530.8210 Phone • 419.530.8206 Fax • www.mime.eng.utoledo.edu

THE UNIVERSITY OF TOLEDO

Project Summary:

The proposed project will focus on the research and development activities that enable rapid development and fabrication of nanostructure carbon for applications in electronic devices, nanocomposites and structure materials. Specifically, the proposed project is to develop carbon nanotubes, graphene and carbon fibers by chemical vapor deposition methods. Nanostructure carbon has worldwide applications in many fields, including sensors, medicine, biology, and harvesting and storage of energy. The University of Toledo's team members have gained lots of experience on synthesis of nanostructure carbon in the recent past. The team is working towards the development of scalable process to commercialize their nanostructure carbon materials.

As the part of this project, fabrication processes will be developed for developing mass scale production of nanostructure carbon including carbon nanotubes, carbon fibers, and graphene with high quality. The processes developed will have unique features such as process scalability, high purity and multi functionality. These materials can be used for many applications such as biocomposites, coating materials, electronic device structures, solar cell absorbers, and energy storage devices. However, production of these nanomaterials is a challenging task all over the world. Therefore, the team is expecting to develop raw material production for these applications. This project will involve a wide range of engineering and scientific research and development (R&D) activities associated with the commercialization of advanced carbon nanomaterials.

The proposed project builds on the expertise of the team members in the field of chemical vapor deposited materials, carbon materials, graphene and nanocomposites. The team members have lots of experience in product optimization, design of experiments as well as quality control. Proposers anticipate that this project will allow technology transfer to industries in very effective manner. Team members will actively work with appropriate industrial partner to design, synthesis, demonstration of prototype material delivery methods, process optimization, process scaling, and product commercialization. It is expected that this project will generate new employment opportunities in advanced technologies, training of the next generation of scientists and engineers in advanced materials, and high-tech manufacturing capabilities in Ohio.

College of Engineering
Mechanical, Industrial and Manufacturing Engineering • Mail Stop 312 • 2801 W. Bancroft St. • Toledo, Ohio 43606-3390
419.530.8210 Phone • 419.530.8206 Fax • www.mime.eng.utoledo.edu

OTFAMP 11-763

IAP Research, Inc.

2763 Culver Avenue
Dayton OH 45429-3723

February 15, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Re: 2011 OTFAMP LOI

To Whom It May Concern:

This letter is to inform you that IAP Research, Inc. intends to submit a proposal for Ohio Third Frontier Advanced Materials Program 2011.

Lead Applicant:
IAP Research Inc
2763 Culver Ave
Dayton, OH 45429

Contact Person:
Robert Rothfuss
Director, Marketing and Commercialization
rrothfuss@impaxtg.com
Phone:513-482-0371

Project Title:
Manufacturing of Carbon Based Nano Composites for Biomedical and Energy Saving Applications

Estimated Grant Funds to be requested:
$1,000,000

Known Partners \Collaborators:
Will be announced at the time of full proposal submission

Project Summary:
IAP proposes to commercialize carbon based nano composite powders produced via unique blending technology using micron sized powders. Such powders will enable high life orthopedic implants and high wear resistant components. The program aims to introduce these powders into manufacturing of orthopedic implants and wear resistant components such as bearings or break pads.

OTFAMP 11-764

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

February 14, 2011

Re: 2011 OTFAMP LOI

Dear Sirs:

This letter is to inform you, that NanoSynthesis, Ltd. intends to submit a proposal for the Ohio Third Frontier FY 2011 Advanced Material Program.

Lead applicant: NanoSynthesis, Ltd.

3161 Bowdoin Circle
Columbus, OH 43204

Contact person: Dr. Oleg A. Kuznetsov, CEO

kuznetsov_oa@yahoo.com
614-634-8953

Project title: Novel carbon nanostructured materials for advanced electrodes for clean energy applications.

Estimated Grant Funds to be requested: up to $1 M

Known Collaborators: Honda Research Institute USA, Inc.

1381 Kinnear Rd., Ste. 116,
Columbus, OH 43212

Summary of the proposed project:

NanoSynthesis, Ltd. and Honda Research Institute USA, Inc. are starting collaboration to develop scaled-up production of long carbon nanotubes with enhanced conductivity. These special carbon nanotubes will be manufactured using proprietary technology, and are intended to be used as additives in electrodes of a new generation of Li-ion batteries, as well as for other applications. Addition of the nanotubes was proven to enhance vital characteristics of batteries such as conductivity, durability and charge/discharge rate. This program combines expertise in materials science at NanoSynthesis with expertise, capabilities of HRI USA in research, product development and commercialization to develop low cost carbon nanostructured materials with unique properties.

Third Frontier Grant funds are expected to create high-tech jobs in Ohio and significantly speed up further development and commercialization of the technology. The anticipated longer term result will be creation of Ohio-based production facilities for manufacturing advanced carbon nanostructured materials for clean energy applications for sale in Ohio, USA and worldwide.

PolyOne

February 15, 2011

Ohio Department of Development
Technology and Innovation Division
Attention: OTFBP
77 South High Street
25th Floor
Columbus, OH 43215

Dear Sir/Madam,

This letter transmits PolyOne Corporation's Letter of Intent to submit the subject proposal shown below.

Lead Applicant: PolyOne Corporation
Address: 33587 Walker Road, Avon Lake, Ohio 44012 (Lorrain County)
Phone number: 630-746-1544
Contact person: Thomas W. Hughes
Email address for the contact: Thomas.Hughes@polyone.com
Proposed Project Title: Nano-filled Biopolymers for Moldable Durable Goods Development
Estimated Grant Funds to be requested: $1,000,000
Known Collaborators: The Ohio State University/Center for Multifunctional Polymer Nanomaterials and Devices (CMPND), Becton Dickinson and others
One page summary of the proposed project: See Attached

Sincerely,

Dr. Cecil C. Chappelow
Vice President, Chief Innovation Officer
PolyOne Corporation

PolyOne

Summary of Project
Nano-filled Biopolymers for Moldable Durable Goods Development

While there have been some exciting advances in the recent development and commercialization of bioderived/biodegradable polymers, they still suffer some significant property "gaps" that limit their wide adoption by the plastics industry. Of particular relevance to this team is the availability of clear, bioderived, biodegradable materials that can be injection molded into durable goods. End markets are very large for such materials and include packaging for food and cosmetics, interior automotive components and medical devices.

The commercial development of PLA by Natureworks has opened the door to cost competitive, bioderived/biodegradable materials for large volume film and packaging applications. Further development is necessary to capture the sustainable benefits of these materials in molded applications. This team will develop higher temperature materials based on bioderived polymers for durable goods that can withstand the typical temperatures seen in transportation and storage. Current materials are not able to be transported or stored under uncontrolled temperature conditions experienced during transit or in warehouses.

Fillers are a common way to improve the property profile of a polymer. In order to preserve the transparency of the polymer, the filler must be very finely divided. A very promising candidate is the incorporation of nanocellulose in the polymer. Past work suggests that success is not simply a matter of compounding but also cost-effective treatment of the filler. This work proposes to develop fillers such as nanocellulose for compounding into bioderived polymers in order to improve the formulation for durable goods use.

The proposed materials improvements will significantly expand the potential applications for bioderived polymers, opening up significant markets for sustainable and moldable polymers. The result will be an economic driver for the state of Ohio, creating jobs and benefiting existing Ohio supply chain resources to further Ohio's dominance in the area of polymer development. The proposed project is requesting $1M in funding from the Ohio Third Frontier Advanced Materials Program, met with $1M in cost share for a total project budget of $2M.

PolyOne Corporation • 33587 Walker Rd. • Avon Lake, OH 44012 • • Phone 440.930.1000 • Fax 440.930.1011 • www.polyone.com

OTFAMP 11-766

Applied Sciences, Inc.
PO Box 579 • 141 W. Xenia Ave. • Cedarville, OH 45314-0579
Phone: 937-766-2020 • Fax: 937-766-5886

February 15, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street 25th Floor
Columbus, OH 43215

Subject: 2011 OTFAMP LOI

Attention: OTFAMP2011@development.ohio.gov

This Letter of Intent serves to communicate Applied Sciences, Inc.'s intention to submit a proposal in response to the FY 2011 Ohio Third Frontier Advanced Materials Program for the following project:

Lead Applicant:	Applied Sciences, Inc. (Ohio for-profit company)
Address:	141 W. Xenia Ave., Cedarville, OH 45314
Phone:	937-766-2020 x100
Contact person:	Max L. Lake, President / CEO
Email:	mllake@apsci.com
Proposed Project Title:	Nanomaterial Sheetgoods for Advanced Composites
Estimated Request	$1,000,000
Known Collaborators	Technical Fiber Products Yardney Technical Products General Motors Pyrograf Products, Inc. (Ohio for-profit company)

Sincerely,

Max L. Lake
President

Applied Sciences, Inc.
PO Box 579 • 141 W. Xenia Ave. • Cedarville, OH 45314-0579
Phone: 937-766-2020 • Fax: 937-766-5886

Applied Sciences, Inc.'s proposed project for the FY 2011 Ohio Third Frontier Advanced Materials Program

Project Title: Nanomaterial Sheetgoods for Advanced Composites

Project Description:

Graphitic, fibrous nanomaterials have shown great promise for improving the mechanical and electrical properties of advanced composites. However, their widespread use has been limited by the absence of product forms which are wholly compatible with conventional pre-preg and composite manufacturing processes. Applied Sciences has demonstrated a laboratory scale process for dispersion and subsequent re-formation into a continuous sheet form that can be processed using existing pre-pregging equipment without modification. In the proposed effort, ASI and its collaborators will scale the manufacturing capability of the nanomaterial sheetgood to enable the production of large format pre-preg materials for composite applications ranging from EMI shielding and thermal management for consumer electronics to lightning strike protection and structural composites for aircraft and spacecraft.

Letter of Intent for Ohio Third Frontier Advanced Materials Program

Feb 15, 2011

Project Title: Advanced Thermal Acoustic Composite

Lead Applicant: Thermacoust Composites, LLC (TCL), 4410 Sussex Dr., Columbus, OH 43220; Phone number: (614)537-8888, yong686@126.com

Contact Person: Joe Liu – President of Thermacoust Composites, LLC

Project Director: Joe Liu --Thermaousta Composites, LLC

Project Co-Director: Randy Wolf and Dr. Garyyong G. Min on new product development

Collaborators: The Ohio State University/Gallant-NA/Acoust-A-Fiber Midwest

Grant Funds Requested: $1.00 million

Summary: With the fastest growing on encore-friendly automobile industry such as battery car and fuel cell car, the development of advanced light weight thermal and acoustic insulating materials is becoming very important and critical. In addition, the advanced thermal and acoustic insulating material can be also used at construction, electronics, and biomedical industries. The total market potential is well over $3 billion based on current market reports.

Thermacoust Composites, LLC (TCL) is an Ohio based company working on developing advanced thermal acoustic composite for automobile, biomedical, and construction industrials. TCL is working with the Ohio State University, Gallant-NA, and Acoust-A-Fiber Midwest and formed an innovation alliance on developing a family thermal and acoustic insulating material for automobile applications such as, Exhaust Shields, Catalytic Converters, Engine Manifolds, Sound Shields, Under Body, etc. The material performance and products design are coming from the automobile OEMs such as, Ford, GM. and Handa. This innovation alliance will address the market needs for improved performance materials, and enhanced quality manufacturing processes for improved durability automobile parts for existing products as well as the next generation products.

During Phase-I of this project the innovation team will focus on developing an improved underbody heat and acoustic insulating shield that has a 20-30 percent manufacturing cost and a 10-20 percent improvement in performance advantage relative to industry benchmarks. For the Phase-II milestone targets of this project the innovation team will develop a next generation improved thermal and acoustic insulating material that can be used at the encore-friendly vehicles.

The success of this project will not only promote the existing automobile supply chain at Ohio towards the upcoming encore-friendly automobile industry, but also enhance the technology development at Ohio to create more job opportunities.

TECHMETALS, INC.
Headquarters Location- 345 Springfield Street – Dayton, OH 45403 & P.O. Box 1266 – Dayton, OH 45401-1266
Phone (937)-253-5311 Fax (937)-253-5096 & Web @ http://www.techmetals.com

Ohio Third Frontier Advanced Materials Program 2/15/2011
Ohio Department of Development OTFAMP2011@development.ohio.gov
(ODOD) Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215

LETTER OF INTENT

Techmetals is located in Dayton, Ohio and intends to submit a proposal entitled "Advanced Nano Material Alloys for reduced friction and enhanced part identification". This will increase the current supply chain of medical device manufacturing in Ohio by increasing local capabilities and unique technologies in the area. This advanced material is designed to reduce production cost, improve performance, and improve in field use. Techmetals, will work with in state Medical Device OEM that will support these efforts by in kind type testing, prototype part fabrication, and validation testing. Techmetals and collaborators through R&D cost, commercialization cost, and capital based on our current R&D lab efforts and validation results, Techmetals will spend another $1 million in 2011 if 1 million funding match is granted to further this development. This advanced material purpose is to provide a better product and to help maintain Ohio's Medical OEM's strategic advantages in their markets. This is in response to the Ohio Third Frontier Advanced Materials Program, fiscal year 2011 Request for Proposals (RFP).

Per the requirements of the OTFAMP 2011 Request for Proposal please note the following:

Applicant's Name:	Techmetals, Inc.
Address:	345 Springfield Street Dayton, OH 45403
Project Name:	"Advanced Nano Material Alloys for reduced friction and enhanced part identification".
Estimated Grant Funds:	$ 1,000,000
Contact Name:	Phillip Brockman, Engineer
Telephone Number:	937-253-5311
Email:	pbrockman@techmetals.com

The project and known collaborators:

- The Edison Materials Technology Center (EMTEC) – experience in project management, product development, and commercialization.
- American Metalworks – Design and Fabricator

The team is pleased to submit this letter indicating our intent to submit a full proposal for Third Frontier Advanced Materials Program.

Yours truly,
Techmetals, Inc.

Phillip Brockman
Director of Business Development, Eng

OTFAMP 11-769

Sunny Sethi
Chief Technology Officer
ADAP Nanotech, LLC
411 Wolf Ledges Parkway
Suite 105
Akron, OH 44311

Ohio Department of Development
Technology and Innovation Division
77 S. High Street, 25th Floor
Columbus, OH 43215

15-February-2011

Subject: Letter of Intent for 2011 Ohio Third Frontier Advanced Materials Program

To whom it may concern:

ADAP Nanotech, LLC (ADAP) in collaboration with The University of Akron would like to submit this letter of intent for Ohio Third Frontier, *Advanced Materials Program 2011*. Programmatic information is provided in the following table. Project summary is provided on page 2 of the letter.

Lead Applicant **Contact Person**	ADAP Nanotech, LLC Sunny Sethi, PhD 411 Wolf Ledges Parkway Suite 105 Akron, OH 44311 sethisunny@gmail.com 330-701-5983
Project Title	Manufacturing system for *"Aligned-Metallic-Carbon-Nanotube"* for Thermal Interface Materials
Estimated grant funds requested	$1.0 M
Known Collaborators	The University of Akron.

Sincerely,

Sunny Sethi, PhD
411 Wolf Ledges Parkway,
Suite 105
Akron, OH 44311
sethisunny@gmail.com
P: 330-701-5983
F: 330-972-5290

www.adapnanotech.com

Summary of the proposed project

ADAP Nanotech is Akron based company specializing in manufacture of carbon nanotube (CNT) based adhesives and coatings. CNT have unique electrical and mechanical properties which have made them indispensable for numerous applications. Most of the commercially available products based on CNT involve use of CNT powders dispersed in various polymeric systems. ADAP Nanotech specializes in synthesis of metallic CNT grown vertically from various surfaces in form of brushes (aligned CNT). Such geometry allows us to utilize electrical and mechanical properties of CNT for many unique products. Our main product is CNT based thermal interface materials (NanoTIM). Thermal Interface materials are used for heat management in electronic devices. Currently, most TIM materials are thermal greases or thermal pads based on phase change materials. At ADAP Nanotech, we have developed a material which can transfer heat between two metal blocks using gecko inspired adhesives made of vertically aligned multi-walled CNT systems (NanoTIM). The design of NanoTIM is based on quantitative studies of mechanical, electrical and thermal properties of carbon nanotubes.

The biggest roadblock in commercialization of NanoTIM is that there are no existing systems that can create aligned CNT arrays on large scale in a cost effective manner. The manufacturing systems used currently are batch processes, based on tube furnace (low yield and low efficiency). Commercially available aligned CNT pads cost few hundred dollars per square cm (commercially unviable) and supply is limited. In the current effort we propose to design and manufacture a semi-continuous process for growing aligned CNT. The system would be designed to yield high quality aligned CNT at production rates conducive for commercialization of NanoTIM. The chemistry of the process would be optimized to maximize the rate of production while minimizing by-products. Such system is essential to reduce the cost and environmental impact. The proposed CNT growth system would not only be important for commercialization of NanoTIM, but the efforts will enable commercialization of other products based on aligned CNT.

Commercial potential and Broader impacts: The total market for thermal interface materials (TIM) is approximately $0.4 billion. Currently, most TIM materials are polymer based materials. The major challenges being faced by polymer based TIM include but are not limited to low heat transfer efficiency, contamination, loss of properties over time and low thermal stability. NanoTIM offers solution to these challenges by combining high thermal conductivity and stability of CNT with fibrillar morphology (allows them to form intimate contact with various surfaces) In addition to its applicability as a thermal pad, NanoTIM finds use in other application like dry adhesives for high temperature and vacuum applications (Our technology was awarded as one of the six *"Technologies that could change the way you manufacture"* by *Society of Manufacturing Engineering* in 2009).

The manufacturing system developed would be first of its kind for synthesis of aligned CNT. The infrastructure and expertise developed in the current project will allow other CNT based companies in the region to commercialize their products and compete globally. The project will increase growth of high-tech jobs and attract private funding. In the next three years, ADAP looks towards expanding its team to 15 full time employees. The workforce would largely be hired from local universities. The new technology will greatly affect Ohio's current industrial base of equipment manufacturers.

DELPHI

OTFAMP 11-770

February 15, 2011

Ohio Department of Development
77 South High Street
Columbus, Ohio 43215

Dear Sir or Madam:

I am writing to inform you of our intent to submit a full proposal for the Ohio Third Frontier Advanced Material Program. Below, you will find the requested information to be included in our Letter of Intent:

Lead Applicant: Delphi Automotive

Lead Applicant Address: 4551 Research Parkway NW; Warren, Ohio 44483-1973

Lead Applicant Contact: Alex Delavan

Contact Telephone Number: 248-813-8012

Contact Email Address: alex.b.delavan@delphi.com

Proposed Project Title: Advanced Material Development for Cycle Time Reduction of Injection Moldable Thermoplastics

Estimated Funding Request: $1,000,000

Known Collaborators: TBD

Sincerely,

Alex Delavan
Manager, Government/Technical Affairs

Summary of Project Proposed:

Delphi is a leading global supplier of electronics and technologies for automotive, commercial vehicle and other market segments. Operating major technical centers, manufacturing sites and customer support facilities in 30 countries, Delphi delivers real-world innovations that make products smarter and safer, as well as more powerful and efficient. With our global engineering headquarters and manufacturing facility in Warren and divisional headquarters in Streetsboro, the Packard Electrical/Electronic Architecture division maintains a strong presence in northeast Ohio

Injection molded plastic connectors remain a core business line for Delphi's Ohio manufacturing operations. One of Delphi's challenges involves finding ways to gain greater production throughput within our existing Ohio facilities. Reduction in cycle time of the injection molding process through advanced material development is a main focus in overcoming this challenge to keep many operations within Ohio due to expanding production demands.

Traditional injection moldable thermoplastics have significant constraints associated with cooling time. Development of advanced engineered thermoplastics that set more quickly in the mold, with faster crystallization, will allow faster cooling and an overall reduction in production cycle times. As a result, reduction in cycle times will assist Delphi in meeting cost and performance standards demanded by our customer base.

Our project proposes to develop and evaluate the advanced material, process aids/additives, and product process designs necessary to allow shorter production cycle times for thermoplastic connectors. Developing this new material will also allow Delphi to gain a significant competitive advantage in the overall automotive manufacturing process while giving future products the opportunity to be manufactured within Ohio utilizing this shorter cycle time.

The Ohio Third Frontier program and this investment will further highlight and reinforce Ohio's position as a leader in manufacturing. An investment today by Delphi, our collaborators, and the Ohio Third Frontier is not just supporting the implementation of the new advanced material technologies in the next three to five years, but is also bringing long term promise to Ohio's future advanced material manufacturing.

Letter of Intent
Request for Proposals
Ohio Third Frontier Advanced Materials Program Fiscal 2011

Prospective lead Applicant:

SuGanit Systems Inc.,
Suite # 210
Research and Technology Complex 1,
2600 Dorr Street,
Toledo, OH 43606

Collaborators:

The University of Toledo,
Toledo, OH 43606
Department of Chemical & Environmental Engineering

Contact persons:

(Technical contact) Srikanth Pilla
spilla@suganit.com
phone: 419-320-1861

Praveen Paripati (Business and Commercialization issues)
President,
SuGanit Systems Inc.
Phone: 703-371-6718
praveen@suganit.com

Proposed Project Title: **Design & Development of Sustainable Materials from Bio-Refinery By Products.**

Estimated Grant Funds to be requested: $450,000 from TFRD and $350,000 from WCF with another $800,000 in cost share from the lead applicant and the collaborators.

A brief summary of the proposed project is provided on the next page;

Design & Development of Sustainable Materials from Bio-Refinery By Products

Human society has benefited tremendously from the use of petroleum-based plastics. However, there are growing concerns with their adverse environmental impacts and volatile costs attributed to the variable oil prices. Thus, during the last couple of decades, scientists all over the world have been focusing on developing new biobased polymeric materials. The objective of this project is to develop biobased foams from biorefinery byproducts using a unique environmentally benign foam-processing technology (see figure below).

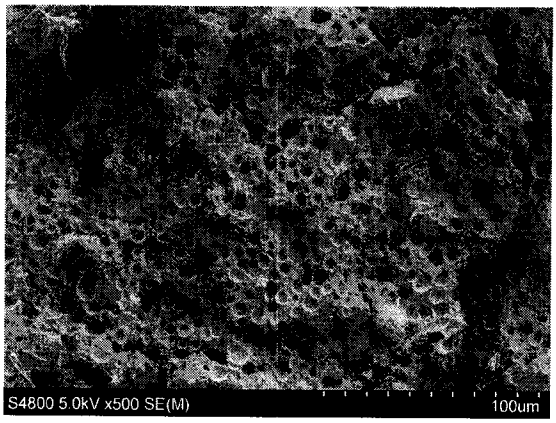


Figure: A representative SEM image of proposed biofoam

The biofoams will have reduce the carbon footprint by more than 75%, compared to existing thermoplastic conventional foams, with superior specific mechanical properties such as toughness and tensile strength.

OTFAMP 11-772

Letter of Intent (LOI) for Submission of a Full Proposal to the Ohio Third Frontier Advanced Materials Program

Lead Applicant	Name:	**The University of Toledo**
	Address:	**2801 West Bancroft Street, Toledo OH 43606**
	Contact:	**Michael J. Heben, Ph.D.**
	Phone / E-mail:	**(419) 530-3870 / michael.heben@utoledo.edu**

Known collaborators at time of this Letter of Intent, February 15, 2011.

The University of Toledo, Toledo OH

Proposed Project Title:

Carbon Nanomaterials for Renewable Energy Technologies

Estimated dollars requested from OTF:

$1 million from Third Frontier Research and Development (TFRD) funding
$1 million in Wright Capital Funds (WCF)

Description of the Proposed Effort:

Development of carbon nanomaterial-based electrodes, interfaces, and materials for commercialization by partners in battery, capacitor, display, and photovoltaic applications. This advanced materials technologies proposal will provide value to two key Ohio industries; Advanced Energy and Environmental Technologies; Motor Vehicle and Parts

It is our intent to submit a proposal for the current FY 2011 Ohio Third Frontier Advanced Materials Program.

Lead Applicant:

Third Millennium Metals, LLC
110 E. Emmitt Avenue
Waverly, Ohio 45690

Lead Contact:

Louis A. Luedtke, CEO
937-367-7229
lluedtke@tmmetals.com

Proposed Project Title:

"Parallel Commercialization of Copper Based NanoComposites; Copper Covetics"

Estimated funds to be requested:
$1,000,000 funding from TFRD funding.

Collaborators:

Ajax Tocco Magnethermic
Youngstown State University

Summary:

Third Millennium Metals, LLC has a proprietary process with a patent application, to add carbon to metals to produce nano carbon metals. The material produced with copper is called Cu Covetic. This project will advance the commercialization of Cu Covetic by evaluating the design and scale-up of the furnace modifications needed to produce covetics, by studying and applying Cu Covetics in induction furnace applications and by studying and applying Cu Covetics in specialty wire applications. Two parallel commercialization pathways will be followed with this grant request.

Please respond with an LOI for this effort so we may submit on March 18, 2011.

THIRD MILLENNIUM
METALS, LLC

Louis A. Luedtke
110 East Emmitt Avenue
Waverly, OH 45690
937-367-7229
Fax 740.947.1815
lluedtke@tmmetals.com

OTFAMP 11-774

TIMKEN
Where You Turn

Date:	February 15, 2011
To:	Ohio Department of Development Technology and Innovation Division 77 South High Street, 25th Floor Columbus, OH 43215 OTFAMP2011@development.ohio.gov
From:	The Timken Company 1835 Dueber Avenue S.W., P.O. Box 6930, Mail Code TEC-05 Canton, OH 44706
Subject:	2011 Third Frontier Advanced Materials Program – Letter of Intent
Lead Applicant:	The Timken Company (Timken)
Contact Person:	Robert Kolarik, Ph.D. (330) 471-2378 bob.kolarik@timken.com
Project Title:	Improving Wind Turbine Performance with Advanced Polymer Components
Grant Funds to be Requested:	$1,000,000 R&D / $1,000,000 WCF
Collaborators:	Stark State College (SSC) 6200 Frank Avenue NW North Canton, OH 44720 Contact: Dr. Dorey Diab / Ms. Caroline Maloney ddiab@starkstate.edu / cmaloney@starkstate.edu University of Akron Research Foundation (UARF) The University of Akron (UA) Auburn Science & Engineering Center 201 Akron, OH 44325-3901 Contact: Dr. Ajay Mahajan majay@uakron.edu
Project Summary:	See attachment

Respectfully Submitted,

Robert V. Kolarik II

Robert V. Kolarik II
Technology Program Manager
The Timken Company

Project Summary

This proposal is aimed at building the polymer capabilities of Ohio manufacturers in the polymer industry such that they can become suppliers to Timken in its efforts to be a world leader in the bearing industry, especially for the wind turbine markets. This will be accomplished by creating a research and development test capability at the new Wind Energy R&D Center located at SSC which is being partially funded by the State of Ohio (TECH 11-058). The embellished Center would be capable of performing research on advanced materials such as polymers that will be used in bearings in Wind Energy applications. This effort builds upon a current contract between Timken and the UA to develop a new generation of polymers for use in bearings as well as significant funding for the Wind Center.

The $1M R&D funds will be used to conduct research on products made from new formulations of polymer materials created in conjunction with local Ohio polymer manufacturers. Researchers at the UA will take the lead in the research and characterization efforts, while Center associates will take the lead in testing to evaluate the polymer products relative to wind industry requirements.

The aim is to work with Ohio manufacturers and build their capabilities so that they can become suppliers for Timken and the wind industry. Current likely suppliers are located outside Ohio. As the need for polymers increases, it is to the State's advantage to have an Ohio supplier for these needs. The $1M Wright Capital funds will be used to outfit the Center with ability to test the polymers and their derived components as well as to examine them after application testing.

Northeast Ohio and western Pennsylvania are already recognized by the U.S. Department of Commerce as a Regional Innovation Cluster in the area of Clean Energy Technologies, and this proposal fits exactly within that focus area. Timken and SSC are developing the Wind Center to be a unique test facility for the world wind energy markets. This funding will enable the Center to become a research facility also capable of building local strengths in advanced materials with the ultimate aim of selecting an Ohio manufacturer for their polymer needs. Such manufacturers have already been identified and the proposal will include these partners in the detailed plan of action. There will likely be some job creation within the Wind Energy R&D Center and at the UA on this funding, but the most significant job creation will be at the local polymer companies.