



Gas Turbine Laboratory

2300 West Case Rd
Columbus, OH 43235-2533

Phone 614 292-5015
FAX 614 292-5552

October 9, 2009

Letter of Intent to submit a proposal to Third Frontier Wright Projects Program

The Ohio State University Gas Turbine Laboratory in collaboration with General Electric Aviation intends to submit a proposal to the Third Frontier Wright Projects Program in the specific area of Advanced Propulsion and the topic area of the proposal will be novel design and development of internal gas path configurations for high-pressure turbine blades. As indicated, the specific opportunity area of this proposal would be Advanced Propulsion.

The Lead Applicant on this proposal will be The Ohio State University Gas Turbine Laboratory located at 2300 West Case Road, Columbus, Ohio 43235.

The contact person is Professor Michael G. Dunn and his phone number is (614) 292-5015 and his email address is dunn.129@osu.edu.

The proposed title of the proposal is "Development and Utilization of a Very Large Rotating Facility for Novel Internal Cooling Design for High-Pressure Turbine Blades"

The estimated grant funds to be requested is \$2,000,000 over the 3-year period.

The collaborator for this effort is General Electric Aviation.

A one-page summary of the planned work is given on the following page.

Sincerely,

A handwritten signature in cursive script that reads "Michael G. Dunn".

Michael G. Dunn
Director, OSU GTL



Gas Turbine Laboratory

2300 West Case Rd
Columbus, OH 43235-2533

Phone 614 292-5015
FAX 614 292-5552

Facility for Design of Novel Cooling Designs for High-Pressure Blades

There is a strong interest within the propulsion gas turbine industry to reduce specific fuel consumption (sfc), to increase overall efficiency, and to reduce engine emissions, especially in view of the rapidly increasing cost of fuel and the impact of emissions on global warming. These desired changes in the operational characteristics of the engine result in increased turbine inlet temperature and thus increases the demand for the airfoil cooling capability. Contemporary gas turbines rely on complex internal cooling passage designs to achieve minimum cooling gas requirements and maximum life. It is anticipated that the next few years will see improvement in material properties of these airfoils, but this anticipated improvement will not be sufficient to meet the required increased temperature capability in the absence of improved cooling technology. It is therefore important to develop bold new internal cooling configurations for the blades (rotating airfoils) of the high-pressure turbine stage. It is important to emphasize that whatever new internal cooling design is achieved, that design must be cost-friendly as well as commercialization-friendly to be of interest to the industry. The state-of-the-art has now advanced to the point where it is now possible to obtain the necessary detailed design information for screening of candidate internal cooling designs at conditions that duplicate the Coriolis and buoyancy forces present in the engine, but these measurements can now be obtained under controlled laboratory conditions.

The development work proposed in this proposal will be conducted by a team consisting of The Ohio State University (OSU) Gas Turbine Laboratory (GTL) and General Electric Aviation (GEA). The work will focus on development of bold new designs for internal cooling of propulsion gas turbine high-pressure turbine airfoils. The intent of this work is to significantly impact within the three year time period of this effort the internal cooling design methodology currently being used within GEA. By this is meant that the design approach developed as part of this effort will result in high-pressure turbine airfoils being constructed for evaluation in operational engines. This operational engine evaluation is the initial step in the commercialization process for this hardware.

The proposal will describe in detail completion of a facility already designed and under development that will allow one to explore novel internal blade cooling configurations at rotational and buoyancy conditions representative of high-pressure turbine operation. Advanced internal designs of blade cooling passages will result from this work and is expected to result in significant savings in gas turbine maintenance costs applicable not only to propulsion engines but also to stationary advanced power systems. There is significant potential payoff for the engine community when the technology developed through the efforts of this program are combined with continuing progress in other more mature allied technologies such as cooling air distribution and temperature profiling of the incoming gas stream.

OTFWPP 10-502**Dudley, Jon C.**

From: Tim Keener [Tim.Keener@uc.edu]
Sent: Thursday, October 15, 2009 10:05 AM
To: OTFWPP2010
Cc: dcoho@univenture.com; Chad Hummell; joo.lee@uc.edu; Sandra Degen; Tim Keener
Subject: 2010 OTFWPP LOI

RE: 2010 OTFWPP LOI

Lead Applicant's name: University of Cincinnati
College of Engineering and Applied Science

Address: Mail Location 77
University of Cincinnati
Cincinnati, Ohio 45221-0077
Telephone: 513-556-3576

Contact Person: Dr. Tim C. Keener
Tim.keener@uc.edu

Project Title: Commercialization of a CFL Safe Disposal Bag

**Estimated Grant Funds
to be Requested:** \$1,500,000

Known Collaborators: U.S. EPA: Argonne Laboratory: Univenture, Corp.: Tedia Corp.

Project Summary:

A method has been developed and laboratory tested for the safe disposal of mercury containing compact fluorescent light bulbs (CFLs). This Wright Project will result in the needed equipment to complete the "proof of concept" to commercialization of this safe disposal method.

CFL sales are rapidly displacing the use of traditional incandescence light bulbs for domestic use due to their significantly more efficient use of energy and longer life. CFLs contain mercury (typically ~5 milligrams per bulb) which is used as the ionizing gas for the fluorescence process. Starting in 2013, it will be illegal to manufacture incandescence bulbs for home use; CFLs are the expected heir apparent to this market. Our goal is to have a product on the market by 2012, by which time market studies have predicted that CFL sales will exceed 700 million units per year. The problem and opportunity to be addressed is that the potential exists for the release of massive amounts of mercury into the environment from broken and/or depleted CFLs, especially into landfills, if a safe disposal method is not available. The disposal method to be developed during this Wright Project is designed to minimize or eliminate this potential problem. The easy to use safe disposal bag method consists of a flexible disposal container which contains a small amount of an advanced

10/15/2009

patent pending nano-derived mercury sorbent material which has been developed at the University of Cincinnati (UC). UC is working with Univenture Corporation of Marysville, Ohio, which is an award winning inventor and manufacturer of a comprehensive and unique product line of eco-friendly packaging and printing solutions, document and CD/DVD media storage, presentation and mailing products. Univenture has a solid track record of inventing and manufacturing products for successful commercialization. Univenture is committed to developing and marketing these CFL safe disposal bags as part of their company's strategic mission. Also, UC is working with Tedia Corporation in Fairfield, Ohio, in order to produce the mercury sorbent. Tedia is an international high purity solvent manufacturer, and has the chemical processing knowledge required to manufacture the mercury sorbent. The company is committed to producing the mercury sorbent for CFL bulb disposal, The CFL disposal bags (to be manufactured by Univenture) will consist of a uniquely designed plastic bag in which the depleted and/or broken fluorescent light bulb is placed inside and sealed. The mercury sorbent (to be manufactured by Tedia) located inside the bag will adsorb and stabilize any mercury that leaks from the bulb either from breakage of the bulb or through leaks from the bulb seals. The sorbent is non toxic and will not leach mercury if brought into contact with water. This will allow for the proper disposal of CFLs in landfills or elsewhere. The Wright Project funds will be used to purchase needed analytical and pilot sorbent processing equipment, and pilot packaging equipment in order to develop the unique manufacturing capabilities to produce the user friendly safe disposal bags and mercury sorbent. The goal is to deliver a commercially viable product that addresses safe disposal of CFL bulbs, develops valuable IP and creates jobs through the commercialization of the safe disposal bag for CFLs.

Dr. Tim C. Keener, P.E., QEP
Associate Dean of Engineering for Graduate Studies and Research
College of Engineering and Applied Science
Mail Location 77
University of Cincinnati
Cincinnati, OH 45221-0077
Office Location: 701B ERC
Office: 513-556-3676
FAX: 513-556-2599
Tim.Keener@uc.edu
<http://ucfilespace.uc.edu/~keenertc>

"To have a good idea you must have a lot of ideas." Linus Pauling
"A man may die, nations may rise and fall, but an idea lives on." John F. Kennedy



CASE WESTERN RESERVE
UNIVERSITY
CASE SCHOOL OF ENGINEERING

Department of Biomedical Engineering
10900 Euclid Avenue
Cleveland, OH 4106

Ohio Department of Development
Research Commercialization Program
Third Frontier Project
State of Ohio

October 7, 2009

Subject: 2010 Wright Project LOI, OTFWPP2010@development.ohio.gov

Case Western Reserve University and collaborating institutions intend to submit a proposal in response to the 2010, Ohio Third Frontier Wright Projects Program.

Project Title: Biomedical Imaging

Estimated Grant Funds Requested: \$3,500,000

Lead Applicant Institution:
Case Western Reserve University
10900 Euclid Avenue
Cleveland, OH 44106

Contact person: David L. Wilson, PhD, Professor of Biomedical Engineering and Radiology

Collaborating Institutions: There are a very large number of potential academic, research, and commercial institutions.

Summary: We will invest in biomedical imaging equipment and development. This will aid Ohio companies creating imaging technologies and serve Ohio biotech companies developing therapeutics and imaging agents.

Regards,

A handwritten signature in cursive script that reads "David L. Wilson".

David L. Wilson, PhD
Robert Herbold Professor of Biomedical Engineering & Radiology

UDRI

UNIVERSITY
of DAYTON

RESEARCH
INSTITUTE

OTFWPP 10-504

16 October 2009

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

SUBJECT: Letter of Intent for 2010 Ohio Third Frontier Wright Projects
Advanced Materials Program

Dear Sir or Madam:

The University of Dayton is pleased to submit this Letter of Intent for the Fiscal Year 2010 Wright Projects Program in the area of advanced materials.

Lead Applicant: University of Dayton
300 College Park
Dayton, Ohio 45469-0104

Administrative Contact: Claudette M. Groeber
Director, Contracts and Grants/Auth. Rep.
(937) 229-2919
Claudette.Groeber@udri.udayton.edu

Technical Contact: Brian P. Rice, Division Head
Multi-Scale Composites & Polymers
(937) 229-2519
Brian.Rice@udri.udayton.edu

Project Title: Hybrid Fabrics for Multifunctional Composites

Estimated Grant Funds to be Requested: \$3,000,000

Collaborators: University of Dayton Research Institute, Goodrich,
Owens Corning

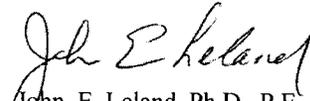
Project Summary: The proposal team intends to scale-up production of 60" wide, low-cost hybrid fabrics consisting of carbon nanotubes grown continuously on micron-sized carbon and glass fibers in fabric form. These hybrid fabrics allow for tailoring of electrical conductivity, thermal conductivity, and mechanical properties of composites. Application focus is on multifunctional aero-structures, armor, and smart materials. The entire supply chain from materials manufacture, material intermediates, and finished articles is represented by Ohio collaborators and partners.

The University of Dayton looks forward to participating in this program to promote technology-based economic development within Ohio.

UNIVERSITY
OF DAYTON
RESEARCH
INSTITUTE

Office of the Director
300 College Park
Dayton, OH 45469-0101
(937) 229-2113
FAX (937) 229-2888

Sincerely,



John E. Leland, Ph.D., P.E.
Director, Research Institute



College of Engineering and Applied Science
School of Electronics and Computing
University of Cincinnati
PO Box 210030
Cincinnati, OH 45221-0030

836A Rhodes Hall
Phone (513) 556-4763
Fax (513) 556-7326

Monday, October 19, 2009

Ohio Third Frontier Wright Projects Program

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

Sent to: OTFWPP2010@development.ohio.gov with subject line of "2010 OTFWPP LOI"

Subject: 2010 Wright Project Letter of Intent from the University of Cincinnati Microfluidics Faculty

To Whom It May Concern:

It is with great excitement that we submit this letter of intent for the 2010 competition for the Ohio Third Frontier Wright Projects Program. This letter contains two pages, the second of which provides a brief summary of our proposed project. On this page, required programmatic information is provided. We understand that this letter will be posted online.

Lead Applicant: Jason Heikenfeld, Ph.D.
Associate Professor
836A Rhodes Hall
University of Cincinnati
Cincinnati, OH 45221-0030
Telephone: (513) 556-4763

Contact Persons: Prof. Jason Heikenfeld - jason.c.heikenfeld@uc.edu

Project Title: The Ohio Center for Microfluidic Innovation (OCMI) – The Next Step In Creating an Internationally-Renowned Industrial Cluster for Microfluidics in Biomedical and Electronics Applications

Estimated Funds: Approximately \$3.0 M is requested for a project period of 3 years.

Known Collaborators: University of Cincinnati – Cincinnati, OH (project PI, use of funds, cost-share)
Siloam Biosciences – Cincinnati, OH (project co-PI, cost-share)
Gamma Dynamics - Cincinnati, OH (project co-PI, cost-share)
Sun Chemical – Cincinnati, OH (project partner)
Lion Apparel – Dayton, OH (project partner)
UES, Inc. – Dayton, OH (project partner)
EnMonT – Cincinnati, OH (project partner)
Polymer Vision Inc. – Eindhoven, Netherlands (project partner)

Sincerely,

A handwritten signature in black ink that reads "Jason Heikenfeld".

Jason Heikenfeld,
Director, Novel Devices Laboratory
Associate Professor of Electrical Engineering



Project Summary – The Ohio Center for Microfluidic Innovation (OCMI)

Microfluidics research at the University of Cincinnati has now reached the critical mass for creation of a new industrial cluster in southwest Ohio. The microfluidics faculty at Cincinnati have created several internationally respected research programs, with applications ranging from medical point-of-care devices to electronic displays. This new collective of Ohio scientific excellence is also highly entrepreneurial, as we have launched 3 startup companies and are sponsored by several mature Ohio businesses. However, the business community has requested that our rapid emergence in microfluidics be bolstered with new university infrastructure to support technology transfer. We now propose a Third Frontier Wright Project that will create the Ohio Center for Microfluidic Innovation at the University of Cincinnati, for translation of laboratory discoveries into a new world-class economic cluster. The timing for this proposal could not be better, as 5 of the proposal PI's for this proposal (Heikenfeld, Ahn, Son, Iyer, Steckl) have microfluidic devices that are targeted for market entry in the next 3-5 years (Gamma Dynamics, Siloam Biosciences, EnMonT, UES, Inc, Lion Apparel). Collectively, we envision several sustainable businesses leading to a total Ohio revenue stream that exceeds \$2 Billion/year.

The Ohio Center for Microfluidic Innovation (OCMI) will provide major capital acquisition into a new facility accessible to microfluidics faculty and business partners. As part of this Wright Project, this commercialization infrastructure will allow us to accomplish the following aims:

- ◆ **manufacturability** - bridge the gap between university R&D and industrial manufacturing by moving R&D programs onto industrially accepted rapid-prototyping equipment;
- ◆ **performance** – validate commercially-compelling performance metrics through advanced microfluidic measurement equipment;
- ◆ **reliability** - increase industry confidence and acceptance-rate of new microfluidic technologies by installing automated reliability and environmental testing equipment;
- ◆ **OCMI** - merge the above stated equipments and capabilities within a single, self-sustaining center, that for the 1st time will unify our numerous programs of excellence in microfluidics.

The new facility will also benefit workforce training and education, as we will be able to expand our National Science Foundation sponsored development of new microfluidics curriculum (co-PI Papautsky). The project outcomes also extend beyond microfluidics, because the microreplication techniques for creating microfluidic devices are similar to those used for advanced optical films (Ohio: Green Wave, 3M, Avery Dennison).

Although there are several commercialization outcomes for this project, we will focus the proposal narrative on two outcomes that span Third Frontier thrusts in Biomedicine, Advanced Materials, and Instruments-Controls-Electronics. The UC spin-off Siloam Biosciences, has developed a suite of innovative "smart" polymer lab-on-a-chips for health monitoring using microfluidics. The immunoassay-based diagnostic platform is ideally suited for emergency care applications. This technology is slated for commercialization in 2-3 years. In the long term, Siloam envisions a paradigm shift in patient management based on high accuracy, user-friendly testing for home use. Siloam's reliable and "smart" point-of-care platform can be used for a multitude of tests with minimal user intervention. The second technology that will be highlighted is electrofluidic displays. Electrofluidic displays are being commercialized by the UC spin-off Gamma Dynamics, and have captured global attention due to record performance. Electrofluidic displays are not an incremental improvement, but rather a potentially dominant technology in the emerging "electronic paper" industry. The performance roadmap for electrofluidic displays leads to a record-setting 70% full color brightness, comparable to magazine print. Beyond displays, a wide array of other electrofluidic products is possible, including electronic windows and adaptive camouflage.

In summary, there are no comparable microfluidics efforts in Ohio, nor world-wide, that could create the specific Ohio impact that is proposed here. Overall, the microfluidics work at the University of Cincinnati is now poised at the point of greatest risk and reward. The need for 3rd Frontier funding to bridge the gap to commercialization is therefore very timely and genuine.

OTFWPP 10-506

Lead Applicant Name: The University of Akron

Address: 302 Buchtel Mall, Akron OH 44325

Technical Contact/PI: Prof. Shivakumar Sastry, Associate Professor, Electrical and Computer Engineering, ssastry@uakron.edu, Tel: 330 972 7646

Authorizing Agent: Mrs. Kathryn A. Watkins, Director of Research Services & Sponsored Programs, kwatkin@uakron.edu, Tel: 330 972 6764

Project Title: **NEO Automation Systems Technologies Research Center**

Estimated Grant Funds: \$1.3 Million

Known Collaborators: Rockwell Automation (Dr. Fred Discenzo)

Case Western Reserve University (Prof. Kenneth Loparo)

Focus Area: Instruments, Controls, and Electronics (Engineering and Physical Sciences)

PROJECT SUMMARY

Working in close collaboration with Rockwell Automation, a major international automation system and equipment vendor, our colleagues at Case Western Reserve University, and a Northeast Ohio Supply Chain, we propose to establish a new center at The University of Akron to address critical needs in automation systems technologies and to develop innovative educational modules to improve workforce training and competency level. Our collaborative activities will focus on (1) networked platforms for control and data acquisition, (2) data aggregation and integration with commercial platforms for automation, (3) diagnostics and prognostics, and (4) advanced controls for complex processes. These technology areas represent core enabling functionality for next-generation complex, mechatronic, system that integrate wired and wireless networks for automation. Such systems represent a significant market opportunity of over \$20 Billion in the next five years. Students, staff, and investigators in this center will be supported by fellowships, research assistantships, internships, and tactical projects that address strategic business needs of Rockwell Automation, their customers, and end users. The unique testbed and analysis tools in the center will be available as a regional resource to local companies on a pay-for-service basis. Members of the center will submit coordinated proposals to federal agencies to advance research frontiers. IP developed in this center will be governed by the Laws of the State of Ohio and managed by The University of Akron with an established IP disposition strategy that protects university investments, grows the research base, and promotes technology commercialization.

The automation systems domain is broad and spans many application areas. Our efforts will focus on three themes – (a) Process, (b) Batch, and (c) Mixed Continuous and Discrete Systems. Our reference applications will highlight needs of emerging, real-world, systems and showcase compelling solutions that address these needs. *Our team will invent, develop, test, validate, and demonstrate emerging hardware and software technologies and mechatronic solutions to critical aspects of these reference applications.* These testbeds will be complemented with state-of-the-art simulation and analysis tools including hardware in the loop simulation capabilities. At least one testbed will be accessible over the Internet for training, research, regional workforce development, and educational outreach. Equipment and software acquired through this program will become a permanent part of the Complex Engineered Systems Lab (CESL) at The University of Akron. These testbeds are necessary for providing hands-on experience for education and research and for reproducing a variety of real-world system contexts and operational conditions of applications in automation, critical infrastructure monitoring, and homeland security systems.

CESL will provide resources to maintain the proposed testbeds. In addition to integrating this testbed for ongoing undergraduate and graduate courses, we will design and deliver short-courses that target the local workforce and address recognized knowledge and skill gaps. The University of Akron is located in close proximity to the largest installed-base of automation systems in North America. *The proposed center is a unique, world-class, facility that will sustain technology research in an area of critical national importance, strengthen the computer engineering program at The University of Akron, and rejuvenate education and workforce training in automation systems technologies.*



OTFWPP 10-507

October 18, 2009

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

SUB: 2010 OTFWPP letter of intent

Dear Sir,

The University of Akron, Department of Polymer Engineering is pleased to submit this letter of intent to the 2010 Ohio Third Frontier Wright Projects Program for the following proposed project:

Applicants Name:	The University of Akron.
Organizational Structure:	non-profit state supported university
Address:	205 South Forge St, Rm 221, Akron, OH 44325-0301
Phone Number:	(330) 972-2583
Contact Person:	Mark Soucek
Contact email:	msoucek@uakron.edu
Project title:	High power density Powder Coating System for Infrastructure and Industry
Estimated Project cost	\$2,150,000
Known Collaborators	Mesocoat Inc, EMTEC

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Soucek".

Mark Soucek
Associate Professor
University of Akron

Department of Polymer Engineering
Polymer Engineering Academic Center
Akron, OH 44325-0301, USA
330-972-5281 • 330-258-2339 Fax • <http://www.poly-eng.uakron.edu>

The University of Akron is an Equal Education and Employment Institution

Project Summary: According to the federal highway administration, Metal corrosion is estimated to cost the US economy over \$270B annually in repair and maintenance, downtime, and early replacement costs. In addition, a more than \$1T investment is required over the next 5 years in our aging infrastructure, just to maintain its capability. Currently, corrosion is combated with multi-layer coatings, many based on the use of toxic primers or highly energy intensive processes such as hot dip galvanizing. This Wright Project will construct a large area powder coating facility to produce laboratory, and full scale demonstration components for inorganic powder coatings, including metallic and ceramer (inorganic polymer) coatings that have shown potential for 30-100 year (or more) life in exposure environments, and which can be applied via a high rate powder coating process that eliminates the use of volatile organic solvents, toxic chemicals (such as chromate primers), and energy intensive processes. The purpose of this project and facility will be to support laboratory development of ceramer coatings, as well as demonstrate scalability and economics to enable commercial introduction of the resultant technology.

October 20, 2009

Third Frontier Wright Projects Program Fiscal Year 2010
The Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43125-6130

2009

OTFWPP 10-508

Dear Sir/Madam,

The University of Toledo, Toledo, Ohio, is pleased to submit this Letter of Intent in response to the Ohio Department of Development's Request for Proposals to the Third Frontier Project's Wright Projects Program (Fiscal Year 2010).

Lead Applicant's Name: University of Toledo
Applicant's Legal Structure: 501(c)(3)
Organization's Address: 2081 West Bancroft Street, Toledo,
Ohio 43606

Contact Person: Richard Hanson, Interim Director
**Manufacturing & Technology Small
Business Development Center**
Phone Number: 419-530-3858
Email Address: Richard.Hanson@utoledo.edu
Expected Collaborators: SUREnergy, LLC
Teledyne Turbine Engines, Division of
Teledyne Technologies Incorporated
Next Generation Power Systems, Inc.,
Subsidiary of Juhl Wind, Inc.
NASA Glenn Research Center
Others to be determined
Proposal Type: Alternative Energy Program
Proposed Project Title: Renewable energy 33kW wind turbine
system
Estimate Dollars Requested: \$1,100,000 over 3 years

SUREnergy, LLC

Ohio Department of Development –
Technology and Innovation Division

10/20/2009



Letter of Intent to Submit a Proposal for the Third Frontier Wright Projects Program

SUMMARY OF PROPOSED PROJECT

The University of Toledo, Manufacturing & Technology Small Business Development Center, as lead applicant and in collaboration with SUREnergy, LLC, is an Ohio based business developing renewable energy systems for a broad base of governmental, educational, agricultural and commercial customers. The fear that O&M costs will skyrocket is often a stumbling block for schools and other potential small project developers who are evaluating a wind project. This proposal will advance unique technologies that will enable the development and commercialization of new manufacturing processes, technologies and products that can reduce the cost and improve the efficiency of small wind systems, creating a new market for advanced energy systems. This market will be a world-wide export opportunity and Ohio's pioneering leadership in wind turbine development will return significant economic impact in both technology licensing and manufacturing jobs. The proposed effort addresses the Ohio Department of Development's opportunity areas of Advanced and Alternative Energy, with a preference for wind technologies. An aggressive schedule, leading to market entry within one year, is possible by an experienced team of research engineers and proven manufacturers.

Wind energy is one of the most successful alternative energy sources in the world in terms of installed capacity. Very few large-scale wind projects are able to obtain financing under the current economic climate. But falling turbine, steel and labor prices have created a favorable environment for small wind energy projects to thrive. A demonstration of a commercial scale small wind 33kW turbine is needed to prove to potential customers that the first factory new 33kW wind turbine manufactured in the United States will reduce the cost and increase the return on investing in small wind renewable energy systems.

Innovative technologies developed by this Ohio team offer an opportunity to install wind turbines at much lower costs compared to current methods. The company plans to develop a next generation wind turbine system with no gear box, no windings, no brushes and slip rings on the rotor, resulting in much smaller size, lower costs, easier maintenance, and higher reliability. These lower installation costs combine with higher available energy to further improve the competitive advantage in this emerging market.

Funding will help support the development of the first factory new 33kW wind turbine in the United States. The Ohio Third Frontier Wright Projects Program is a key element in our business planning and formation by providing matching capital that will foster the investment necessary for sustained economic impact.

Please do not hesitate to contact me if you need additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Z. Zabel", is written over a horizontal line.



STARK STATE COLLEGE

Changing Lives ... Building Futures

OTFWPP 10-509

Date: October 19, 2009

To: Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFWPP2010@development.ohio.gov

From: Stark State College of Technology
6200 Frank Avenue NW
North Canton, OH 44720

Subject: 2010 Third Frontier Wright Project Letter of Intent

Lead Applicant: Stark State College of Technology

Contact Person: Dorey Diab Ph.D./Caroline Maloney
(330) 494-6170 ext 4266/(330) 494-6170 ext 4764
ddiab@starkstate.edu / cmaloney@starkstate.edu

Project Title: Corrugated Paper Center of Excellence

Grant Funds to be Requested: \$3,000,000 OTF

Collaborators:

Cargill Incorporated 15407 McGinty Road West Wayzata, MN 55391-2399 Contact: Larry Micek Larry_Micek@cargill.com	Kohler Coating 10995 Wright Road Uniontown, Ohio 44685 Contact: Herb Kohler herbkohler@kohlercoating.com
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Project Summary: See attachment

Respectfully Submitted,

Dorey Diab Ph.D.
Provost & Chief Academic Officer



STARK STATE COLLEGE

Changing Lives ... Building Futures

Corrugated Paper Center of Excellence Project Summary

Corrugated paperboard is a \$25 billion industry in the U.S. that processes approximately 31 million tons of paper, consumes 977 trillion BTU of fuel, and generates in excess of 91 million tons of CO₂. An average corrugated paperboard machine in the U.S. requires approximately 60,000 BTU per 1,000 sq. ft of production. Industry energy consumption patterns are largely due to the fact that the manufacture of corrugated paperboard requires substantial energy to heat the board to typical operating temperatures over 300° F and to dry the adhesive that bonds the board. As the global energy paradigm shifts towards increased use of energy from renewable sources – while promoting decreased greenhouse gas (GHG) emissions - there is a strong need and potential to reduce energy use and CO₂ emissions by corrugated paperboard manufacturers.

The objective of the Corrugating Center of Excellence is to set up a pilot facility to enable the integrated development, optimization, and demonstration of transformative fiber orientation technology and advanced adhesive applications to increase efficiency and modernize production practices in the corrugated board industry. To achieve these project goals, Stark State College will work with Cargill Inc., Kohler Coating, and the Stark Development Board (SDB) to develop and commercialize advanced fiber strengthening adhesive formulation and application methods as key enablers of this transformative technology. The Corrugated Paper Center of Excellence partnership will carry out final stage research, development, and commercialization of second-generation Reduced Energy Corrugated Packaging Technology (REPT) and adhesives to improve board strength by 30 percent, reduce energy consumption by 40 percent, reduce board weight, and promote increased energy efficiency in corrugated board manufacturing. Preliminary research shows that successful implementation of these technologies by the U.S. corrugated industry will result in an estimated energy savings of 551 trillion BTUs (75%) and reductions in GHG outputs by 45.6 million tons annually. The private sector project team members have dramatically advanced the state-of-the-art and independently demonstrated viable solutions in each of these areas.

The proposed Corrugated Paper Center of Excellence is relevant to several of the Program's scientific fields of interest, including: 1) Advanced/Alternative Energy - through reductions in energy and material uses, 2) Instruments, Controls, and Electronics - via new process and control strategy development, and 3) Advanced Materials – engineered corrugated paperboard product.

Once developed, the REPT process will be directly transferable and impact approximately 6,000 corrugated paperboard manufacturing plants worldwide and the thousands of manufacturing companies that ship goods in corrugated boxes. Through the development of academic fee-for-service, certificate, and degree programs developed by the partnership and taught by Stark State, the Corrugated Paper Center will make Ohio a training hub for all implementing U.S. and foreign corrugated manufacturers. The partnership takes advantage of an existing relationship between Stark State College, Kohler Coating, and SDB and would create a Cargill presence in the State of Ohio with a potential initial investment of \$4.5 million to get the Corrugating Center of Excellence project underway. Funding from the Wright Project will allow Stark State to establish the Center at a location in Canton, Ohio, where work with Kohler and Cargill can be undertaken. Upon completion of the program, the facility and equipment will be owned and employed by Stark State to continue training and support future research and development for the corrugated board industry.

SDB and Stark State College have collaborated in new business attraction efforts to grow industry clusters in our area and region (fuel cells). The proposed Corrugated Paper Center of Excellence will have a major impact on the corrugated paperboard industry and will also offer the opportunity for SDB to target manufacturing companies for expansion of operations in Stark County and the region. SDB will work closely with Stark State College, Kohler Coating, and other suppliers in marketing the benefits created by the Center of Excellence. This will be accomplished through direct marketing to consultants and manufacturers and through participation in corrugated paperboard trade shows. SDB will pledge \$10,000 dollars in matching funds and in-kind contributions to this effort over a three-year period.

The existence of the Center is expected to create 450 jobs with an average annual salary and benefits of \$45,000 in the community, generating \$2.9 million dollars in state income tax revenue. A total of 225 jobs will be created either directly at the facility, Kohler Coating or its local subcontractors, and the remaining created indirectly.

OTFWPP 10-510

Project Title: Center for Algal Engineering Research and Commercialization

Project Director	Name	David J. Bayless, Ph.D., P.E.		
	Title	Director, Ohio Coal Research Center		
	Organization	Ohio University		
	Address	248 Stocker Center		
	City, State, Zip	Athens, Ohio 45701		
	Telephone	(740) 331-4536	Fax	(740) 593-0476
	E-Mail	bayless@ohio.edu		

Estimated Grant Funds Requested: \$2.9 million

Known Collaborators

Biofuels Producers of America – Cleveland, Ohio
University of Toledo

One Page Summary of the Proposed Project

In 1996, when Ohio University started to develop the next generation of photobioreactors to enhance photosynthetic efficiency, there was only one focus – CO₂ remediation. Since then, the algal technology field has significantly grown, with entries focusing on production of biodiesel, bio-jet fuels, nutraceuticals, as well as CO₂ remediation. Ohio University's intellectual property in this field has generated several fee-paying licenses and numerous collaborations. Yet with all this activity, interest, and investment in algae-tech, there are numerous difficulties on the path to successful commercialization that Ohio University believes it can help address.

Commercialization of algal technology is of great importance, not only for economic growth, but also to address critical environmental and energy issues facing our nation. By growing algae photosynthetically as a feedstock for either fuel production from a non-food resource or as source of bioplastics or even animal feed, we create a renewable feedstock that reduces the amount of CO₂ in the atmosphere. As recognized by DARPA, DOE and numerous commercial entities that are developing these technologies, algal-based systems could be used anywhere in America - significantly improving our energy security by reducing our dependence on foreign sources of transportation fuel and reducing our reliance on central refining or processing facilities.

However, very few of the commercial companies working on algae technology have expertise in all the aspects of algal systems engineering to exploit these potential advantages, often relying on other competencies (such as manufacturing, integration or distribution) to move their concepts forward. Meanwhile, they face significant pressure to deliver because of the significant investment and interest in this area. The reality is that expectations are high, which could result in a market bust, crippling this potentially beneficial industry.

Concept

Ohio University proposes the first integrated academic research center focused on algal systems engineering and commercialization. This center would team the efforts of TechGrowth Ohio, the Voinovich School of Leadership and Public Affairs, and the Institute for Sustainable Energy and the Environment at Ohio University along with our commercial partners to move algal technologies from the concept phase to the demonstration phase. The key is that Ohio University would provide not only the algal technology and business expertise to aid in the commercialization effort, but would also provide a fully equipped laboratory and demonstration site that the commercial enterprise could employ to prove their technologies.

Numerous companies are attempting to commercialize algae systems for both reducing CO₂ (a greenhouse gas) emissions and creating biofuels. The majority of these companies are venturing into this

field, using their expertise in manufacturing or distribution as a starting point – not knowledge of algal systems and processing technology. They need expertise in growing, harvesting, and processing algae. And because these activities may vary greatly depending on what type of algae or cyanobacteria is being used, these companies need strategic expertise to develop scaled-up algal production and processing systems is critical to advance an industry that could potentially revolutionize our nation's energy and environmental future. Ohio University and its academic partners have that expertise and are willing to work with industry to help commercialize their systems.

Therefore, a multi-organization research team led by Ohio University proposes to develop an advanced multi-platform testing facility for real-world testing of algal production and processing systems with systems integration for upstream CO₂ sources and downstream algal applications. This will provide a platform for any company willing to participate to test their systems in near real-world conditions, develop technologies to overcome their shortcomings, and allow them to focus on their core competencies to commercialize their algal systems. The funding will provide for the hardware to establish the testing center and will culminate in creation of a self-sustaining development facility sufficiently large to evaluate the commercial potential of new technologies without commercial bias.



3640 Colonel Glenn Hwy.
Dayton, Ohio 45435
(937) 775-2425
Fax: (937) 775-3781
E-mail: rsp@wright.edu

LETTER OF INTENT

Subject: 2010 Ohio Third Project Wright Project Program LOI

Date: October 20, 2009

Lead Applicant: Wright State University

Contact Name: Yan Zhuang, Ph.D.
Phone: (937)7754556; Email: yan.zhuang@wright.edu
Department of Electrical Engineering
3640 Colonel Glenn Highway, Dayton, OH 45435

Title: Center for Nano Graphene Materials and Devices

Estimated grant funds requested: \$3,000,000

Known Collaborators: Angstrom Materials, LLC; WRIGHT-PATTERSON Air Force Research Laboratory

Summary:

This project seeks to acquire several major pieces of equipment to establish **Center for Nano Graphene Materials and Devices**. The goal of this Center is to assist and promote the emergence and growth of a vibrant **graphene** industry in Ohio. This project is focused on an emerging class of nano materials - atomic thick large-area graphene - for high energy/power density systems and ultra-fast chemical/biological sensing.

Graphene-based materials and device technologies will find extensive applications in aerospace, automotive, energy, marine, electronics, construction, medical and telecommunications. Intensive R&D efforts are being conducted on alternative energy production/storage systems including batteries, fuel cells, electrochemical capacitors, and solar cells. Before these technologies can widely enter consumer markets serving as primary power supplies, cost-effective and high performance electrode/catalytic materials are essential. This center is emphasized on materials processing, characterization, and analysis for the development and commercialization of graphene-based energy systems.

The foundation of the center is to support Ohio industry competing for market shares on global materials production. The center will actively seek to develop high-value commercial applications across a range of carefully selected industrial and clean technology sectors. The commercialization strategy is to incorporate the developed nano graphene into the devices and systems. The center will aggressively pursue an integrated approach to systematically address the technical areas in their entirety. The center will facilitate curriculum development at Wright State University by providing hand-on experiences to train skilled workers in graphene-based industry and related energy sectors.

OTFWPP 10-512

Ohio Third Frontier Wright Projects Program

Fiscal 2010

Letter of Intent

Lead Applicant

The Ohio State University Research Foundation

1960 Kenny Road

Columbus, Ohio 43210-1063

MJ Benzakein

Benzakein.2@osu.edu

614-292-7699

Project Title

Turbine Innovation for Wide Wind Operation

Estimated Grant Funds Requested

2M

Collaborators

- Belcan Engineering Corporation, Cincinnati, OH
- Molded FiberGlass, Ashtabula, OH
- Northern Systems, Barre, Vermont
- GE Energy, Greenville, South Carolina

Project Summary

While current technology has enabled wind energy to become a viable resource in today's energy market, continued technological advancement will be required to achieve the DOE 20% by 2030 scenario. One major advancement to be sought is the performance improvements of wind turbines over a wide range of winds, especially at low wind conditions. It is proposed here to improve the effectiveness of the Northwind 100, a 100Kw turbine. It is produced by Northern Systems of Barre, Vermont and has a wide range of applications across the United States of America. This will be accomplished by the introduction of a new variable pitch mechanism as well as new innovative wind turbine blade design. The project will be to:

- Install a Northwind 100 Turbine on Sea Bass Island on Lake Erie at the OSU Stone Lab Campus.
- Baseline the Northwind 100 turbine performance and acoustics, through testing on the newly installed turbine.
- Belcan will design and procure a new variable pitch mechanism for the turbine.
- Ohio State will develop using CFD and wind tunnel tests a new airfoil for a wide range of operations.
- Belcan will design this new blade based on Ohio State airfoil analysis and test.
- Prototype blades will be manufactured by Molded FiberGlass located in Ashtabula, Ohio.
- The variable Pitch Mechanism and the new blades will be installed on the Northwind 100 Turbine on South Bass Island. They will be thoroughly tested for performance, acoustics, and aeromechanics.
- It is anticipated that the improved performance with the variable pitch mechanism and the newly designed turbine blades will result in a new improved Northwind 100 Turbine with a significantly larger manufacturing content in the State of Ohio.



Subject: Letter of Intent (LOI) – OTFWPP2010

October 26, 2009

Required Details

Lead Applicant: The Ohio State University
Address: 1960 Kenny Rd, Columbus, OH 43210
Contact Person: R. Scott Potter
Contact Email: potter.138@osu.edu
Telephone Number: 614.292.9446
Project Title: Cyber-controlled Microgrid for Intermittent Renewable Power and Storage
Grant Request: \$2,018,180
Collaborators: Edison Materials Technology Center (EMTEC)
Emerson Electric Company/ Liebert
GreenField Solar Corporation
Hull & Associates
The Dayton Power and Light Company

To: Ohio Department of Development:

This LOI is in response to the Ohio Department of Development's Request for Proposals for the 2010 Ohio Third Frontier Wright Projects Program. Professor Ali Keyhani, the Ohio State research group, and the project research collaborators intend to submit a proposal in response to the OTFWPP FY 2010 RFP. The title of the proposed project is *Cyber-controlled Microgrid for Intermittent Renewable Power and Storage*.

Ohio State and its collaborative partners propose to leverage the unique and isolated attributes of the Ohio State electric distribution system to enable the integration and reliable monitoring and control of intermittent, renewable, and green electric generation and storage systems. The project will provide energy system component manufacturers and energy service companies a real world application in which to optimize their products for commercial scale production and release. The developed system will also provide a test bed for the study of system and component control technologies and reliability testing, including the use of the interconnected renewable sources in control of load frequency, voltage, and active and reactive power in response to load demands. Once fully developed, this smart microgrid could also serve as a laboratory for utility scale distribution system emergency load response, islanding, and outage recovery strategies. The cyber-controlled microgrid monitoring and metering capabilities will provide a level of real-time and longitudinal data necessary for the successful broad deployment of intermittent renewable power in Ohio's energy distributions grids. This type of detailed data is not currently available.

For this project, The Ohio State University, EMTEC, Emerson Electric Company, GreenField Solar Corp, Hull & Assoc., and The Dayton Power & Light Co., will provide the cost-share.

Very Sincerely,

A handwritten signature in black ink, appearing to read "R. Scott Potter".

R. Scott Potter
Energy Research Specialist
College of Engineering

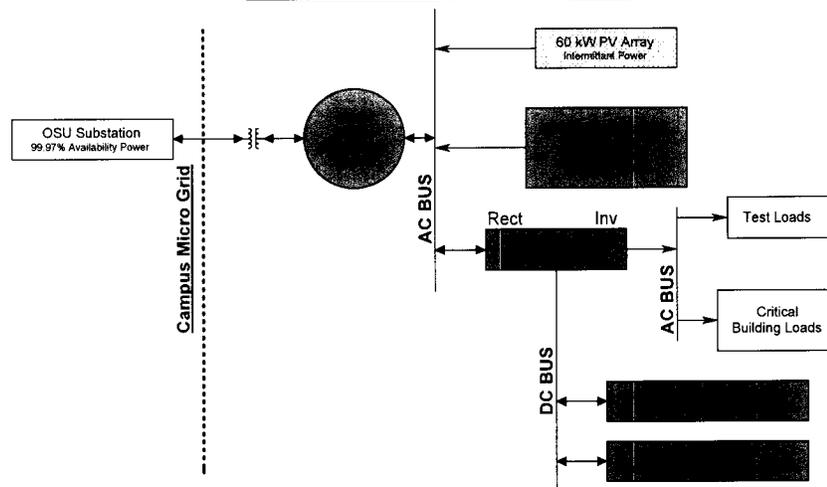
Attachment

Cyber-controlled Microgrid for Intermittent Renewable Power and Storage

The mission of this proposal is to develop a cyber controlled microgrid research laboratory for integration of renewable and green energy sources and energy storage into a microgrid and to use this laboratory to assist Ohio companies to develop new advanced energy products. To accomplish this task, we must develop a mathematical model for each element of the microgrid based on operating data. Then, we must construct a realistic simulation test bed of the microgrid to study control technology and what-if scenarios of system stability. The simulation test bed will facilitate the development of control technologies to make the renewable sources participate in load frequency control, voltage control and control of active and reactive power in response to load demands.

The microgrid research lab will be able to operate in two modes; 1) synchronized operation with the local utility system, and 2) island mode of operation, upon the loss of the utility system. In both modes of operations, the OSU microgrid system will be part of the OSU energy system operated by the OSU Facility Operations and Development offices. However, the microgrid lab will have additional instrumentation for collecting the essential operating data for model

Figure 1. OSU Cyber Microgrid Research Lab



identification and parameter estimation. The data collected from the operations will be used for modeling and the development of simulation test beds.

The knowledge learned from the simulation test beds can be integrated into stability studies of the U.S. smart grid. We will initiate a research program of U.S. electric grid stability problems through the use of the technology of phasor measurement by developing a self healing control technology. The OSU cyber microgrid laboratory will have several components as shown in Figure 1. These components include green and renewable energy sources with their associated power converters, efficient transformers, smart metering, and storage systems. The OSU cyber microgrid laboratory will provide a new paradigm for defining the operation of distributed generation systems. In these architectures, green energy sources, such as fuel cells, microturbines, or renewable sources, such as photovoltaic and wind generating stations can be connected to a microgrid without disrupting its operation.

In addition to providing the information that the industry collaborators need to aid in the commercialization of their products and services, the raw data collected from the OSU microgrid will also serve other faculty members and students for related research purposes, course material and curriculum development.

This is a unique laboratory that is the first of its kind in the US and possibly the world. The majority of the budget will be used for purchasing equipment that will remain at OSU, to be operated as part of the OSU power system and to provide green energy to the OSU campus.¹

¹ M. N. Marwali and A. Keyhani. "Control of Distributed Generation Systems Part I and II." *IEEE Tran. Power Electronics*, Vol.19 Nov.2004,pp.1541-1561.

A. Keyhani, S. Hao, R. P. Schulz."Maximum likelihood estimation of generator stability constants using SSFR test data," *IEEE Transactions on Energy Conversion* , Vol. 6, No. 1, pp. 140-154, March 1991.



Dr. Krzysztof Palczewski, Ph.D.
John H. Hord Professor and Chair

Department of Pharmacology

Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-4965

Visitors and Deliveries
School of Medicine W321A

Phone 216.368-4631
Fax 216-368-1300
E-mail kxp65@case.edu
<http://pharmacology.case.edu>

October 26, 2009

Lead Applicant: **Krzysztof Palczewski, Ph.D.**
Professor & Chair, Dept of Pharmacology
Case Western Reserve University
10900 Euclid Avenue, Wood 321
Cleveland, Oh 44106
216-368-4631 – Phone
216-368-1300 – Fax
kxp65@case.edu

Title: Membrane biology: Rational Design of New Pharmaceuticals

Requested Funds: \$3,000,000

Collaborators:

External:

Polgenix, Inc. (**Corporate Partner**)
11000 Cedar Avenue, STE 260
Cleveland, OH 44106
216-658-4528

University of Cincinnati
Genome Research Institute
2180 East Galbraith Rd.
Cincinnati, OH 45237

Internal:

Andreas Engel, Ph.D.
Director, CCMSB
Professor, Pharmacology
Case Western Reserve University
216-368-0411 – phone
Andreas.engel@case.edu

Arthur Heuer
Professor & Director
Material Sciences & Engineering
Case Western Reserve University
216-368-3868 - phone
Arthur.heuer@case.edu

Michael Maguire, Ph.D.
Vice Director, CCMSB
Professor, Pharmacology
216-368-6186 – phone
Michael.maguire@case.edu

Focco van den Akker
Professor, Biochemistry
Case Western Reserve University
216-368-5991 - phone
focco.vandenakker@case.edu

Mark Chance, Ph.D.
Director, Case Center for Proteomics
10900 Euclid Avenue
Cleveland, OH 44106
216-368-4406
Mark.chance@case.edu

Michael Weiss
Professor & Chair, Biochemistry
Case Western Reserve University
216-368-5991 - phone
michael.weiss@case.edu



CASE WESTERN RESERVE

Robert Miller, Ph.D.
Vice Dean for Research
Case Western Reserve University
216-368-6269 – phone
Robert.miller@case.edu

Matthias Buck, Ph.D.
Professor, Physiology & Biophysics
Case Western Reserve University
216-368-1490 - phone
Matthias.buck@case.edu

Vera Moiseenkova-Bell, Ph.D.
Assistant Professor, Pharmacology
Case Western Reserve University
216-368-2641 – phone
Vera.moiseenkova-bell@case.edu

Vivien C. Yee
Associate Professor, Biochemistry
Case Western Reserve University
216-368-1184 – phone
vcy2@case.edu

Derek Taylor, Ph.D.
Assistant Professor, Pharmacology
Case Western Reserve University
216-368-0684 – phone
Derek.taylor@case.edu



CASE WESTERN RESERVE

Dear Wright Project Reviewers:

Please accept this *Letter of Intent* for Case Western Reserve University's application to the 2010 Ohio Third Frontier Wright Projects Program. We request the opportunity to present an innovative program in membrane biology that will advance science, offer commercialization of novel drugs, benefit Ohio's biotechnology industry, and retain and develop scientific resources and talent here.

Purification and structural determination of membrane proteins are critical for rational design of new drugs. The cell membrane contains only ~2% of cell protein, but ~30% of the proteins encoded by the human genome are membrane proteins. These membrane proteins are required for structure, energy production, uptake of nutrients, removal of toxic substances, and participation in critical and complex signaling pathways, all essential for human health. Thus, membrane proteins, far more than soluble proteins, are key targets for drugs. *Currently, there is no comprehensive facility in the USA dedicated solely and specifically to both the production and structural characterization of membrane proteins.*

CWRU established the Cleveland Center for Membrane and Structural Biology (CCMSB), a dedicated building with 7000 sq. ft. of space. It provides state of the art facilities for study of membrane proteins by using a *complete* spectrum of approaches involving x-ray and neutron crystallography, electron cryomicroscopy and tomography, atomic force microscopy and nuclear magnetic resonance. Ohio has no single central operation capable of providing *all* relevant structural methodologies. Most structural studies and collaborations currently involve companies and facilities located on the east and west coasts, taking business and jobs away from Ohio. The CCMSB can not only create new jobs, it would also enhance the high-end skills and scientific expertise in Northeast Ohio, providing the spark to attract additional funding. Such external funding already exists as exemplified by existing contracts with Amgen Pharmaceuticals and Eli Lilly *via* our business collaborative partner, Polgenix, Inc., headquartered in Cleveland. CWRU has already invested significant effort and funding in CCMSB including >\$1.5M for x-ray crystallography and robotic crystallization facilities, \$1M for renovation of 5 unit electron microscopic suite at CCMSB, installation of a 200 keV electron microscope for single particle/protein analysis, and most importantly the resources to hire several world class research faculty in structural biology.

This application seeks \$3,000,000 to help fund purchase the *final major instrument* needed for a comprehensive facility dedicated to membrane protein structure: a 300 keV cryoelectron microscope for electron crystallography that will complement the other state of the art instrumentation *already present within the CCMSB* and provide the final instrument to ensure that the CCMSB is world class leader in structural biology.

We cannot emphasize strongly enough the importance of establishing the CCMSB in Ohio. This unique facility, yet to be duplicated anywhere in the world, will be a comprehensive facility that will produce large quantities of therapeutically relevant *membrane proteins* and provide high resolution structural data for drug design by investigators and pharmaceutical companies nationwide. The products of the CCMSB will be the proteins, their structures, and, in many cases, initial drug designs. Rather than sending such research out of state, the CCMSB will retain that research in Ohio, thereby keeping money and creating jobs in the state.

Sincerely,

K. Palczewski

Title: Building Infrastructure for Producing High-Value Products from Bio-based Polymers

Submitted to the Wright Projects Program (Advanced Materials)

Lead Applicant: Sarit B. Bhaduri, University of Toledo
MS 312, MIME, 2801 W. Bancroft Street
Toledo, OH 43606. Phone: 419 530 8223 Fax: 419 530 8206
Email: sarit.bhaduri@utoledo.edu

Estimated Requested mount: \$2M

Other known collaborators: Plastic Technologies Inc, MVG, OBIC, Polymer Ohio

SUMMARY OF THE PROPOSED PROJECT

The aim of the Wright Projects proposal is to build infrastructure for producing high value-added products from bio-based polymers. Bio-based polymers such as polylactic acid (PLA) will be the focus here. By virtue of their origin, these materials are sustainable and biodegradable. The topic is of great commercial interest as polymer industries and brand owners are trying to make a switch to sustainable polymers derived from natural sources and exploring new ideas for products made from them.

The proposal will link two most important industries (e.g., polymer and ag-bioindustries), which are critical for sustaining and growth of the economy of Ohio. According to the Battelle study conducted on behalf of the ODOD, both polymer and ag-bioindustries are among the largest industries in Ohio.

The effort will be spearheaded by the University of Toledo. Potential partners will be Plastic Technologies Inc., Maumee Valley Growers (MVG), Polymer Ohio, Ohio BioProducts Innovation Center (OBIC) etc. The idea is to conduct small scale trials of new materials and processes with a goal towards using them in packaging (both rigid and non-rigid) and agricultural uses. These bio-based polymers are available in commercial quantities but they still need improvement in their properties. Depending on their applications, different routes of processing will be pursued.

With the above theme in mind, it is anticipated that a number of *state-of-the-art* equipment for running small-scale experiments will be procured and placed in a renovated laboratory space. The equipment will include a torque rheometer fitted with twin screws for compounding small batches, bench top injection molding machine for trials, film making and thermoforming equipment etc. for bio-based polymer processing. Other items will include mechanical characterization equipment and software. These facilities will help supplying the industries with well-trained local manpower, while simultaneously helping the industrial partners to develop commercial products using bio-based polymers, This is expected to benefit the economy and commerce in the state of Ohio in the long run.

OTFWPP 10-516



Department of Electrical and Computer Engineering

205 Drees Laboratory
2015 Neil Avenue
Columbus, OH 43210-1272

Phone (614) 292-6119
FAX (614) 292-7596
Email: xu.12@sou.edu

Oct. 27, 2009

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

RE: Ohio Third Frontier Wright Projects Program FY 2010 Solicitation

Dear Sir:

The Ohio State University is pleased to submit this Letter of Intent to submit a proposal in response to the subject Request for Proposals.

Lead Applicant: The Ohio State University
2015 Neil Avenue
Columbus, Ohio 43210

Administrative Contact: Jo Ellen Scherrer
Engineering Research Services
The Ohio State University
224 Bolz Hall, 2036 Neil Avenue
Columbus, OH 43210
Phone: 614-292-5277
Email: Scherrer.4@osu.edu

Technical Contact: Dr. Longya Xu
Professor
Phone: (614) 2926119
Mobile Phone: (614) 638-0975
Email: xu.12@osu.edu

Project Title: Center for High Performance Power Electronics (CHPPE)
Estimated Grant Funds to Request: \$3,000,000
Collaborators: GE Aviation Systems LLC, Electrical Power Business
U. S. Air Force Research Laboratory, Propulsion Directorate

Description: Over the past 15 years, the Air Force Research Laboratory (AFRL) and other Government Agencies have invested over \$75M in the development of a new class of semiconductor power switches fabricated with Silicon Carbide (SiC). These devices have significant benefits compared to the silicon-based diodes and switches that are ubiquitous in industry today. When applied in electronic conversion circuits in high performance applications, this new class of devices will offer up to 80°C higher temperature operation, substantially lower switching and conduction losses, and as much as a 50% envelope/size reduction in inverters/converters when compared to inverters/converters designed with the best Silicon technology. This Wright Project will establish a Center for High Performance Power Electronics at The Ohio State University to capitalize on the advantages of SiC semiconductor power switches when used in advanced electrical power technology for advanced aircraft applications.

GE Aviation Systems in Vandalia is extremely excited to partner with OSU. GE views the CHPPE project as a way to transition this new class of devices into GE electrical power products including distribution equipment, converters and engine starters that are mainly designed and manufactured in Ohio. A Center for High Performance Power Electronics at OSU is strategically important to GE's global plans.

AFRL is an enthusiastic collaborator with OSU. AFRL sees the OSU facility and work as a transition tool to rapidly move this exciting technology from "proof of principle" to aircraft products developed by Ohio companies. Success in this OSU/GE/AFRL collaboration and commercialization of SiC-based products will make Ohio the worldwide leader in high performance electrical system components for aerospace applications, both civil and military.

The Ohio State University and its collaborators look forward to participating in this Wright Projects Program; clearly, this will be a huge stimulus for Ohio's aircraft electrical power business and economy in general.

Sincerely Yours,

A handwritten signature in black ink, appearing to read 'Longya Xu', written in a cursive style.

Longya Xu, Professor



OHIO NORTHERN UNIVERSITY

THE T.J. SMULL COLLEGE OF ENGINEERING

October 26, 2009

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

RE: Third Frontier Wright Projects Letter of Intent

To Whom It May Concern:

This document is submitted as a Letter of Intent to apply to the Third Frontier Wright Projects program for Fiscal Year 2010. The preliminary proposal submission details are as follows:

Lead Applicant Organization: Ohio Northern University
Lead Applicant Address: 525 S. Main Street,
Ada, OH 45810
Contact Person: Dr. Eric T. Baumgartner, Dean
College of Engineering
Phone Number: (419) 772-2372
E-mail Address: e-baumgartner@onu.edu

Project Title: Enabling Flexible Fabrication and Robotic Assembly
through Agile Manufacturing

Estimated Grant Funds: \$3,000,000

Known Collaborators: American Trim, Rhodes State College, Ohio Energy &
Advanced Manufacturing Center, American Electric
Power, Motoman

The proposed project will focus on the development of facilities and equipment associated with the rapid fabrication and assembly of structures and enclosures for the alternative energy market. Specifically, the proposed project titled "Enabling Flexible Fabrication and Robotic Assembly through Agile Manufacturing" will look to push the limits of state-of-the art manufacturing processes that seek to drive down the turn-around time required to develop complex structures and enclosures. In addition the proposed project will develop capabilities associated with the autonomous robotic assembly of these structures using sensor feedback including vision sensors. These autonomous

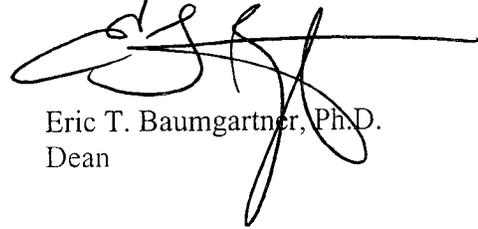
Arts & Sciences • Business Administration • Engineering • Pharmacy • Law

525 SOUTH MAIN STREET • ADA, OH 45810 • (419) 772-2371 • FAX: (419) 772-2404 • www.onu.edu

vision-based manipulation and assembly techniques will be developed using technology that has been utilized by NASA's Jet Propulsion Laboratory for the scientific investigation of Mars through the Mars Exploration Rover mission.

If you have any questions regarding this LOI submission, please do not hesitate to contact me at your earliest convenience.

Sincerely,

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

Eric T. Baumgartner, Ph.D.
Dean



CASE WESTERN RESERVE

GREAT LAKES ENERGY INSTITUTE

October 27, 2009

To: Ohio Department of Development email: OTFWPP2010@development.ohio.gov

Subject: 2010 OTFWPP LOI

This letter states our intent to submit a full proposal under the Third Frontier Wright Projects Program

LEAD APPLICANT NAME: Case Western Reserve University
Great Lakes Energy Institute

LEAD APPLICANT ADDRESS: Olin 305
10900 Euclid Avenue
Cleveland, OH 44106-7074

LEAD APPLICANT CONTACT: Larry A. Viterna, Ph.D., P.E.

CONTACT PHONE NUMBER: 216.368.0374

CONTACT EMAIL ADDRESS: Larry.Viterna@case.edu

PROPOSED PROJECT TITLE: Development and Commercialization of an
Offshore Wind Turbine Foundation and Tower

ESTIMATED GRANT FUNDS TO BE REQUESTED: \$3M

KNOWN COLLABORATORS: The Great Lakes Construction Company
Great Lakes Energy Development Task Force

A handwritten signature in cursive script that reads "Larry A. Viterna".

Larry A. Viterna

This project will design, install, and test a commercial prototype of an offshore wind turbine foundation and tower that will be the first in the Great Lakes. The proof of survivability of wind turbines in the water and ice conditions of fresh water remains the largest hurdle for the emerging offshore wind industry in the Great Lakes. If this project is awarded it could position our Ohio industry partners to capture a significant market share by being the first successful product demonstrated and also establish a unique experience base for our team.

Case Western Reserve University and its partners will build on their expertise in civil, mechanical, and materials engineering to analyze, design and install one or two foundations and towers for utility scale wind turbines. Additionally, the team's existing wind turbine test facilities and instrumentation provides a significant basis for this project. Most likely, the prototype(s) will be tested in a location near one of the sites offshore of Cleveland that have been identified by Cuyahoga County and the Great Lakes Energy Development Task Force and thus leverage the great effort of that team.

A close working relationship with the State of Ohio and particularly the Department of Natural Resources will be developed to insure proper permitting in Lake Erie and move this project safely and in a timely fashion to be competitive in this potentially rapidly emerging market. It is expected that the permitting requirements will be reduced because there will not be a rotating wind turbine on the tower(s).

The commercialization model is through the use of existing Ohio-based companies that will be able to provide wind turbine foundations and towers to offshore wind projects throughout the Great Lakes. The Great Lakes Construction Company will be a key for-profit collaborator on the project however several other companies will be involved. Employment impact is expected to be significant because the raw materials, manufacturing, assembly, shipping, installation and maintenance services can be provided by Ohio to markets throughout the Great Lakes.

Wright Projects Program Letter of Intent

Lead Applicant's Name: Cleveland Clinic

Contact Person: Brian L. Davis, Ph.D.

Address: 9500 Euclid Ave, Mail Code ND20, Cleveland Clinic, OH 44195

Office Phone: (216) 444-1055

Fax: (216) 444-9198

Email: davisb3@ccf.org

Proposed Project Title: Clinically Applied Rehabilitation Engineering (CARE) Project

Estimated Grant Funds to be requested: \$3,000,000

Known Collaborators

Parker Hannifin Corporation

Veterans Administration Medical Center

Case Western Reserve University

Bertec Corporation

Summary of the Proposed Project

The ability to perform core activities of life, or activities of daily living, is central to independent living. These activities include self-care (showering, and dressing), mobility (transferring from beds, bath tubs or chairs) and communication. People with neurological and/or musculoskeletal conditions generally have difficulty with many of these tasks. Moreover, the capacity to perform these basic activities decreases with age. Depending upon the amount of pain and upper or lower body limitation, people experience a range of activity limitations. The inability to maintain a person's home, shop for groceries, prepare meals, or manage medication has a profound impact on a person's quality of life.

The underlying tenet of this CARE project is that by increasing patients' abilities to cope with tasks that require moderate energy expenditure (e.g., walking, transfer activities) they will be better equipped to age with a disability. CARE will focus on (i) the design of more efficient rehabilitation devices, (ii) evaluating them in a new state-of-the art rehabilitation facility, and (iii) continuous ideation sessions involving industry leaders in Ohio working in tandem with world-class clinical experts.



Office of the Vice President for Research and Dean of the Graduate School

Akron, OH 44325-4717
(330) 972-6458 Office
(330) 972-2413 Fax

October 26, 2009

Ohio Third Frontier Wright Projects Program 2010 (OTFWPP)
The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215-6130

RE: Letter of Intent to Submit an OTFWPP Proposal to ODOD

Dear Sir or Madam:

The University of Akron and Avtron Industrial Automation, Inc. hereby submit a Letter of Intent in response to the Ohio Department of Development Third Frontier Wright Projects Program 2010 Request for Proposals.

Prospective Lead Applicant's Name: The University of Akron

Prospective Lead Applicant's Address: Department of Electrical and Computer Engineering,
College of Engineering
The University of Akron
Akron, OH 44325-3904

Contact Name: J. Alexis De Abreu-García

Contact Phone Number: (330) 972-6709

Contact E Mail: alexis4@uakron.edu

Project Title: Industrial Switched Reluctance Motor Drives and
Energy Storage Research and High Power Motor Drive
Testing and Training Facility

Estimated Funds Requested: \$3,000,000

October 26, 2009

Ohio Third Frontier Wright Projects Program 2010 (OTFWPP)

RE: Letter of Intent to Submit an OTFWPP Proposal to ODOD

Project Title: Industrial Switched Reluctance Motor Drives and Energy Storage Research and High Power Motor Drive Testing and Training Facility

Collaborators:

Collaborator's Name: Avtron Industrial Automation, Inc.

Collaborator's Address: 7900 East Pleasant Valley Road
Independence, Ohio 44131

Contact Name: Donald J. Kosnik

Contact Phone Number: (216) 642-1230 X 1286

Contact E Mail: dkosnik@avtron.com

With best regards, I remain

Sincerely,



George R. Newkome, Ph.D.
Vice President for Research and Dean, Graduate School
Oelschlager Professor of Science and Technology
Professor of Polymer Science and Chemistry

xc: Luis Proenza, President, The University of Akron
Katie Watkins-Wendell, Director, Research Services & Sponsored Programs

OTFWPP 2010: Industrial Switched Reluctance Motor Drives and Energy Storage Research and High Power Motor Drive Testing and Training Facility

The key research and development area for the project is high-power, low speed switched reluctance motor (SRM) drives for industrial applications. The typical power rating of these machines is 2MW and beyond. Example applications of these drives are in extreme weather conditions or under the sea where they have to operate without interruption day after day. Their reliability depends heavily on the motor control algorithms and feedback signals provided by the sensors to the controller. Some sensor signals are also to be transmitted wirelessly to distant locations for monitoring and potential fault management.

The University of Akron is working with Avtron Inc. on the control of large SRM drives for slurry pumps. Avtron has teamed up with Continental Electric of Canada to supply SRM drives to pump manufacturer Georgia Iron Works of Augusta, Georgia. The University of Akron will provide the SRM controller advanced technical and research support. Avtron will supply the motor drive based on the control algorithms developed at the University of Akron.

Research on increasing the efficiency, fault tolerance and reliability of high performance industrial motor drives is not possible without a top class test bed. A world class 2MW electric motor drive testing and evaluation dynamometer test set-up will be built at the University of Akron with the Wright Project funds. The dynamometer set-up along with power analyzer, network analyzer, power supplies, and other measurement and data acquisition devices are essential to test power electronics, novel sensors, energy systems, and controllers for a high performance electric motor drive for the high power motor drive industry in general. The facility will be used for testing their advanced drives, and the revenue from such testing will provide for the operating costs of the facility.

Research Tasks: The research tasks to be undertaken for the Wright project are:

- *SRM controls* – SRM controllers with four-quadrant capability both with discrete mechanical sensors and with indirect position sensors will be developed. Four-quadrant SRM drives are extremely attractive for traction applications in the mining industry. Suitability of SRM drives for wind power generators will also be investigated.
- *Energy storage system* – Several heavy machinery industry require an energy storage system for peak power shaving and load leveling to minimize the power drawn from the supply. Research will be conducted on sizing and charge equalization for the energy storage systems.
- *Bidirectional inverter and controls* – The energy storage system will be interfaced with the SRM motor drive with a bidirectional inverter. Research will be carried out to develop the power electronics circuitry and controls for the inverter.

Testing Facility: A dynamometer set-up capable of testing up to 2MW power electronics, electric machines and drives will be developed. Wright Projects funds will be used to purchase a 2MW regenerative dynamometer with active front end. Sensor networks will be built around the dynamometer set-up. Additional controls, data acquisition and power systems will be developed for the testing facility. The power system will recalculate the energy within the dynamometer such that only the losses of the dynamometer set-up are required from the utility minimizing operating cost. The facility will be used to test advanced storage and power conversion systems for the alternative energy sector as well. Energy-efficient, high power machines and drives used in both conventional energy and alternative energy sectors will be tested in this facility.

The unique features of the test set-up are the high power testing capability at both low and high speeds up to the 2MW level, and data acquisition capability. Industries will be able to use the facility for evaluating motor drive efficiency, performance, vibration issues and thermal capability. The fee for service model will ensure the sustainability of the test center.



Ohio Manufacturing Institute
1248 Arthur E. Adams Drive
Columbus, OH 43221

Prof. Glenn S. Daehn
phone: 614-292-6779
daehn.1@osu.edu

27 October 2009

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

Re: Letter of Intent for the Ohio Third Frontier Wright Projects Program

Dear 2010 OTFWPP Staff,

The Ohio Manufacturing Institute (OMI) at The Ohio State University (Columbus, Ohio), together with collaborators Cutting Dynamics (Avon, Ohio), American Trim (Lima, Ohio), Edison Welding Institute (Columbus, Ohio), and the Center for Automotive Research (OSU, Columbus, Ohio), propose to commercialize a technology developed by OSU and Cutting Dynamics that allows the precise direct net-shape shaping of full-hard aerospace components. This method and allied techniques will be commercialized for a range of lightweight structure applications including agile manufacture of aerospace, automotive and heavy vehicles. This technology will significantly cut manufacturing costs, lead times, and will reduce the environmental impact in addition to allowing consumer fuel savings due to lighter weight vehicles. It will also enhance American Trim's position in providing electromagnetic forming components and systems to this industry and others. Lastly, it will accelerate the development of a pipeline of new products envisioned for several vehicle companies, ranging from small to large lightweight structures. Other entities, including vehicle producers, are expected to be part of the final submission.

Funding will be used to establish the "Laboratory for Light Structures Design and Manufacture". The lab will focus on the commercialization of manufacturing technologies for of full-size light weight high-strength vehicle frames and components and their testing; including new technologies for dissimilar material joining such as magnetic pulse welding, laser impact welding and conformal interference joining. New equipment and facilities will be complementary to those in existing institutions (such as EWI) and sharing arrangements will avoid duplication. Thus, the lab and the resulting partnerships will have a lasting impact on the automotive, aerospace, heavy vehicle and advanced materials industries by enabling them to accelerate the transition to light weight high strength vehicle structures. This in turn will help Ohio become a global Center of Excellence, and thereby attract, enhance, and grow a cluster of companies in Ohio to serve this new direction for the automotive and related industries.

It is anticipated that the request will be for an amount of \$2.5M in capital equipment and \$500k in operating expenses and will be matched 1:1.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Glenn Daehn", written in a cursive style.

Glenn S. Daehn
Director, Ohio Manufacturing Institute and
Mars G. Fontana Professor of Metallurgical Engineering
Department of Materials Science and Engineering, The Ohio State University



Subject: Letter of Intent (LOI) – OTFWPP2010

Required Details

Lead Applicant: The University of Toledo
Address: 2801 Bancroft St.
Toledo, OH 43606-3390

Contact Person: Chuck Lehnert
Contact Email: charles.lehnert@utoledo.edu
Telephone Number: (419) 530-1447
Project Title: Great Lakes Smart Grid Test Bed
Grant Request: \$2,500,000.00
Collaborators: Edison Materials Technology Center (EMTEC)
Emerson Electric Company/ Liebert
GreenField Solar Corp.

Chuck Lehnert
Vice President
Facilities and Construction
Mail Stop #216
2801 W Bancroft
Toledo, Ohio 43606-3390
419-530-1448 Phone
419-530-1401 Fax

www.utoledo.edu

To: Ohio Department of Development:

The University of Toledo (UT) is currently working on an ambitious, multiphase, multiyear project that will demonstrate UT's commitment to clean & alternative energy, conserve energy, institute renewables generation, reduce UT's carbon footprint, and educate and train future advanced energy professionals. UT will maintain and enhance its position as a leader in advanced energy research and education through developing energy efficiency and renewables demonstration at the Scott Park Campus of Energy and Innovation.

The Scott Park Campus of Energy and Innovation will serve as a hands-on alternative energy laboratory used for teaching, research and demonstration, as well as the base location from which to generate energy and reduce the UT's carbon footprint. UT, a national leader in solar energy research, is the only university in the country to commit an entire 600,000 sq ft. campus with existing classroom and laboratory space and active energy researcher expertise to advancing solar renewable, alternative and sustainable energies. Over time, UT intends to relocate the entire School of Solar and Advanced Renewable Energy to the Scott Park campus, and add an accelerator for company graduates of UT's incubator programs.

The critical goals of the project are to accelerate job creation for Northwest Ohio and to foster regional economic development through commercialization and business incubation efforts. Through all of this work the ultimate goal of the project is to provide for a unique and relevant educational experience, not only for the students of UT, but for the greater Toledo community and the larger Ohio business community. Furthermore, additional job creation is a foundation of the project and will lead to additional projects of similar scale and recognition. This initiative will not only allow UT to take one step closer to their energy goals, but act as a spring board for additional research in advance energy and encourage both national and regional companies to locate their research in advanced energy at UT.

Very Sincerely,


Chuck Lehnert
Vice President
Facilities and Construction
The University of Toledo

Great Lakes Smart Grid Test Bed

The objective of this project focuses on the deployment of a smart grid infrastructure that will provide a "risk mitigation" test bed that establishes a living smart grid platform, taking advantage of the unique realities of the University of Toledo (UT) campus. This will provide the unique benefit of developing an environment where current and future smart grid technologies can be architected, deployed, and fully understood prior to the deployment in a real world environment. This will accelerate the development, deployment, and customer (both utility and consumer) acceptance of smart grid technologies, work hand in hand with the UT Incubator, and bring to the fore-front their economic and societal benefits.

The goals are to commercialize GreenField Solar Corp.'s StarGen™ concentrated solar photovoltaic (PV) system and to use it in conjunction with a Liebert NX™ uninterruptable power supply (UPS). The unique characteristics of the Great Lakes Smart Grid Test Bed will allow GreenField Solar Corp. to test and demonstrate their new product in a safe, secure environment with real world attributes. One goal of this proposal is to achieve the lowest delivered cost per kilowatt-hour PV system that is suitable for commercial production. By connecting the energy output of the solar concentrators to the load using DC (Direct Current) instead of AC (Alternating Current) one level of energy conversion can be skipped along with its attendant cost and energy losses. A second goal is to refine the existing StarGen design to reduce the production costs and to use known optical and thermal management techniques to increase the peak output performance.

Emerson Liebert provides UPS systems to the data center industry which uses 7% of the national electric energy production. Data center customers have begun to ask for renewable energy sources to meet government regulations, reduce their energy costs, increase reliability and reduce their carbon footprint. Liebert has the world's most modern UPS test facilities in Delaware Ohio but does not have access to PV and other renewable energy sources at their test lab. By installing a test UPS on the Smart Grid Test Bed, they can accomplish their mission of meeting their customer's needs and increase the market share of their product line.

OTFWPP 10-523

Prospective Lead Applicant: Ohio University
120 RTEC
Athens, OH 45701
(740) 593-0370
Rathindra N. Bose
Professor of Biomedical Sciences & Chemistry and
Biochemistry
bose@ohio.edu

Proposed Project Title: Acquisition of Biotech Equipment for Successful Drug
Development

Estimated Grant Funds to be requested: \$2,000,000

Known Collaborators: Interthyr Corporation
Metallopharm

Key primary scientific/technical field(s): Biomedical – drug development, therapeutics.

Ohio University is requesting funds to support major capital acquisitions to be housed at the university's business incubator—the Innovation Center—to support the drug development activities for two in-house, Ohio for profit companies—Interthyr Corp. and Metallopharma—and one university faculty member. The Innovation Center, Ohio University's business incubator, specializes in supporting bioscience and technology start-ups. Three start-up firms in the small business incubator contributed 378 jobs, \$16.9 million in labor income and an estimated \$1.5 million in local tax revenues in 2008.

The first compound, C10, is a tautomeric cyclic thione (TCT) that inhibits key steps in the Toll-like receptor (TLR) signaling cascade. Interthyr, in collaboration with Ohio University, recently received \$2.2M in Phase II STTR funding to pursue the development of C10 for use in autoimmune-inflammatory disease and cancer. The goals of the project are to (i) conduct standard preclinical studies that will enable the best dosing regimen; (ii) determine the mechanism of action of C10; (iii) demonstrate that C10 inhibits TLR signaling in cancer and (iv) identify other members of the TCT family that inhibit the TLR pathway. Interthyr already has a track record in diagnostics, significantly contributing to the product line of Diagnostic Hybrids, Inc., which recently graduated from the Innovation Center to its own facility. Funded with a Technology Action Fund (TAF) Senior Scientist Grant to the president of Interthyr and Ohio University, Interthyr's collaboration DHI has been associated with an increase in over 200 jobs and establishment of DHI as a major Biotech Co. in Southeast Ohio. The TAF award to Interthyr was considered one of the most successful TAF projects by outside reviewers.

MetalloPharm has created a novel technology (metallopharm) that has the potential to irreversibly inactivate Hepatitis C virus (HCV) protease. Interferon alpha and ribavirin are the only drugs licensed for the treatment of persons with chronic hepatitis C. Neither was developed specifically for the treatment of the virus. HCV has been reported to show a high mutation rate and can produce a resistant clone immediately following treatment. MetalloPharm has developed catalytic metallopharms that function through a novel mode of action that also addresses the problem of drug resistance. MetalloPharma has received a Phase I STTR to focus on characterizing lead metallopharms of potential therapeutic value against HCV protease, as well as demonstrating efficacy in an animal model.

Rathindra Bose, Professor of Biomedical Sciences & Chemistry and Biochemistry, has discovered a new class of cancer chemotherapeutics, phosphaplatins that have been shown to effectively kill ovarian, testicular, head and neck cancers both *in vitro* and *in vivo*. These compounds are also effective towards resistant cancers where other available drugs have failed. Furthermore, these compounds exhibit minimal toxicity compared to other drugs available in the market. This class of compounds activates a set of genes that are primarily engaged in programmed cell death for cancer cells. He is currently developing a partnership with Battelle to design and implement toxicology studies in animal models in support for an IND application.

All three products under development have customized regulatory plans, which detail the regulatory strategy, requirements, and scheduling for animal pharmacology and toxicology studies, chemistry, manufacturing and control, and clinical testing, that will allow for Investigational New Drug (IND) Application filing by the end of the three-year project period. During the three-year project period, the project will create employment opportunities within the companies and at contract research organizations conducting the necessary testing for IND application submission. Long-term, the equity created in these Ohio-based companies will support additional employment opportunities during the clinical testing and scale-up manufacturing phases. The proposed acquisition of equipment will not only successfully lead to IND applications of three potential drugs described in this proposal but also attract other biotech spin-off companies to the innovation center.

Wright Projects Program

Letter of Intent The Ohio State University

Lead Applicant: The Ohio State University, Office of Sponsored Programs
1960 Kenny Rd.
Columbus, OH 43210

Proposal Title: **The Center for Biomedical Safety Assessment of
Biologics and Devices**

Budget Request (Estimated):

Capital:	\$2,500,000
<u>Operating:</u>	<u>\$ 500,000</u>
TOTAL:	\$3,000,000

Collaborators: Battelle Health & Life Sciences (Herb Bresler)

Contact: Aimee Nielsen-Link
The Ohio State University
Office of Sponsored Programs
1960 Kenny Road
Columbus, OH 43210

Phone: 614-292-3143

Fax: 614-292-9779

Email: Nielsen-link.1@osu.edu

This proposed center is a collaboration between The Ohio State University and Battelle Health and Life Sciences with further partners to be named.

The concept of the center is to build a platform technology environment that synergizes with other Third Frontier investments as well as strategic efforts of several Ohio partners. The safety assessment of biologics such as toxicology and implantable devices such as compatibility with radiofrequency fields, magnetic fields, ionizing radiation are essential for the successful product development and time to market as well as sustainable market potential. Strategic opportunities have been identified that will facilitate significant acceleration of commercial development and market opportunity of biologics and devices if a center exists as a resource to guide, design and objectively assess safety and compatibility. Creating such a unique environment will create a competitive advantage by itself and, in addition to other opportunities, help accelerate the commercialization of biologics and devices. The center is proposed to be housed at Ohio State in a joint operation with Battelle Health and Life Sciences. The anticipated request is \$3 million including \$500,000 operating expenditures.

OTFWPP 10-525

Date:

October 28, 2009

Subject:

FY 2010 Wright Project Letter of Intent

Lead Applicant:

Case Western Reserve University

Contact Person:

João Manuel Luis Lopes Maia, Ph.D.
Associate Professor, Department of Macromolecular Science and Engineering
Kent Hale Smith Building, room #540
2100 Adelbert Road
Case Western Reserve University (CWRU)
Cleveland, OH 44106
phone: (216) 368-6372
e-mail: joao.maia@case.edu

Proposed Project Title:

Ohio Center for Advanced Polymeric Materials and Products (Ohio-CAMPP)

Estimated Grant Funds to be Requested:

\$2,500,000

Known Collaborators:

Ohio Supercomputer Center
PolymerOhio
Goodyear Tire & Rubber Company
Applied Sciences, Inc.
Zyvex Performance Materials, Inc.
Granville Plastics Associates, Inc.

Summary of the Proposed Project:

Within the State of Ohio, the polymer industry generates \$49 billion in annual sales revenue and employs over 140,000 workers¹. As a foundational industry for Ohio, it is necessary to continue to innovate and grow to remain relevant in the global marketplace. Fortunately, the industry has arrived at another potential peak for growth that promises to not only retain the polymer industry's prominence in Ohio, but grow it exponentially. Currently confronting the polymer industry are two primary issues: cost and function. It is critical that the industry look closely at the design of better and more efficient processes as well as the design and manipulation of molecular structures that can be tailored to specific applications. If solutions can be identified, the overall efficiency (in time, direct costs and product performance) of new product, materials and processes designed by Ohio companies will rise significantly, resulting in increased sales and significant job growth through the ability to capture more of the market share.

The proposed Ohio Center for Advanced Polymeric Materials and Products will work directly with existing and start-up polymer-based companies to achieve these increased efficiencies by developing an industry-aligned center that brings together advanced computational tools with lab scale processing (e.g.,

¹ Ohiomeansbusiness.com/key/polymers.php

Letter of Intent to Propose to the Ohio Third Frontier Wright Projects Program

extruders, compounders/mixers) and characterization (e.g., thermal, rheological, physical, and chemical), able to deliver the following:

- An **integrated methodology** to reliably design and optimize polymer-based materials, processes and products, covering the whole chain of value in polymer processing, from thermo-rheological modeling, to equipment and processing conditions design and optimization, to final products with the desired shape and performance. An example of this new methodology would be to replace the costly and time-intensive trial and error procedures associated with plasticating extrusion with experimentally-validated on-line monitoring techniques and advanced viscoelastic models for polymer blends of composites. The capabilities provided will have a fully modular and interchangeable nature in order to allow each company to tailor the process to its needs.
- The use of **design principles** focusing on aesthetics including coloration, gloss, and texture that heretofore have not been emphasized as part of an integrated appreciation of design considerations and which can help to add significant differentiation to what might otherwise be a cheap commodity plastic. By integrating interdisciplinary linkages such as cognitive science and design thinking into the process, companies will tap into new approaches and marketing concepts for their polymer products.

Over the short-term, the expectation is for the partnering companies to use the Center which will house capital equipment such as twin-screw extruders, different single-screw extrusion lines, static mixers and compounders, shear and extensional rheometers, tensile and impact testing machines and various softwares to allow for the integrated methodology that will increase the efficiency (and cost) of processes that incorporates the use of new materials. Examples of specific industrial areas that have the potential for significant impact include Biomedicine and Health, Aerospace, Automotive, Electronics and Microelectronics, Energy and Design with Plastics. To help push the products to market, as the new processes yield new products, companies will also have access to prototyping equipment within the Center to decrease time to market.

Over the long-term, Case Western Reserve University will work with area educational institutions to develop the appropriate workforce that can support the new processes and products developed by our partner companies. This includes using the Center infrastructure to offer continuing education and workforce training for industry technical staff, graduates from 2-year community colleges through PhD education, and individuals seeking career changes. Educational opportunities will cover the whole range of activities involved in materials selection, processing and final product design.



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

October 18, 2009

Dear Sir,

With this Letter of Intent we are pleased to inform you that we plan to submit an application for the Wright Project in response to the Ohio Third Frontier Advanced Energy Program Fiscal Year 2010 Request for Proposals.

Lead Applicant: Case Western Reserve University, 10900 Euclid Ave, Cleveland, OH 44106

Contact Person: Yanming Wang, PhD: yxw91@case.edu 216 844 3288
Jeffery Duerk, PhD: duerk@case.edu 216 368 6047

Project Title: Case Radiopharmaceutical Center

Estimated Grant Funds to be requested: \$3,000,000

Known Potential Collaborators:

Case Western Reserve University and University Hospital Health System
Cleveland Clinic
University of Akron, University of Toledo
General Electric Healthcare, Siemens Medical Systems, Philips Medical Systems
Biomedical, Structural, Functional & Molecular Imaging Enterprise
MIMVista, Clear Image Technologies
Fused Multimodality Imaging, Interventional Imaging, Inc., QED, PETNET,
Neomed, CardioInsight

Description: Over the past decade, Ohio has entered a new round of vigorous technology-based economic development. Substantial investments have been made to further strengthen biomedical research and commercialization in Ohio. The result is the transition of the Ohio economy to include a strong biotech presence, in many ways now second only to that in Minnesota (Minneapolis) and Massachusetts (Boston). As result of Ohio investment and subsequent follow on funding, many new drugs have been developed, new technologies created and new start-up companies have been established. In particular, Ohio's leadership in biomedical imaging plays a key role in efficacy evaluation and validation of new drugs and therapeutic interventions.

Case Western Reserve University has proven itself a national leader in biomedical imaging through its start-of-the-art imaging facilities, world-renowned faculty, and the newly established Case Center for Imaging Research (CCIR). CCIR is designed to support biomedical research in northeastern Ohio through access to a variety of imaging modalities such as magnetic resonance imaging (MRI) and nuclear imaging such as positron emission tomography (PET). MRI and PET are two key imaging modalities, which are capable of translational studies and allow NE Ohio researchers to work over the domains from molecular discovery to animal trials to patient studies. The various imaging modalities complement each other in terms of resolution and sensitivity. While MRI provides primarily anatomic information with high resolution, PET provides primarily functional information at molecular level with high sensitivity. So far, we have established a strong MRI facility in Ohio through collaboration with academic institutions and commercial companies. In this application, we propose to establish a new radiopharmaceutical facility as part of CCIR, which will become the core facility for drug discovery and technologic development in related biomedical imaging technologies.

The new facility is expected to serve as "green house" of biomedical research and commercialization in Ohio over the next few years. It will assist in drug discovery and development within existing Ohio companies. It will also become a driving force in creation of 50-100 new jobs for Ohioans through establishment of several new start-up companies. The mission of the new radiopharmaceutical facility is to support pharmaceutical development in Ohio as well as those companies which operate at the cutting edge of biomedical imaging technology development. It will have the following functions: 1) conduct drug screening and evaluation based on the existing PET imaging technologies; 2) identify new PET imaging technologies for commercialization; 3) develop new PET imaging agents for diagnosis and efficacy evaluation of emerging therapeutic interventions; 4) serve as a resource in state-of-the-art nuclear imaging research to provide a sustainable competitive advantage to partner companies via access to the latest data and methods.

The new radiopharmaceutical facility will be managed by investigators at Case Western Reserve University with a strong history of industrial collaboration and business formation and staffed by professional and technical personnel ranging from faculty, physicians, licensed nuclear pharmacists, engineers, radiochemists, and technicians. The facility will be built on Case Western Reserve University/University Hospitals of Cleveland campus. This project includes a wide range of known and potential collaborative partners including Case Western Reserve University/University Hospital System, University Hospital System, the University of Toledo, the University of Akron, and General Electric Healthcare, Siemens, Philips Medical Systems, Biomedical, Structural, Functional & Molecular Imaging Enterprise, MIMVista, Clear Image Technologies, Fused Multimodality Imaging, Interventional Imaging, QED, PETNET, Neomed, and CardioInsight.

Ohio Third Frontier Wright Projects Program Letter of Intent for Proposal 2010 WPP

Lead Applicant: The Ohio State University Office of Sponsored Programs, 1960 Kenny Road, Columbus, OH 43210

Proposal Title: Center of Excellence for Energy Storage Technology

Budget Request (Estimated): \$3,000,000

Industry Partners: EWI, AEP, others

Contact: Giorgio Rizzoni, Center for Automotive Research and Department of Mechanical Engineering -
930 Kinnear Road, Columbus, OH 43212, e-mail: Rizzoni.1@osu.edu tel. (614) 688-3856, fax. (614) 688-4111

Fundamental advances in energy storage systems will have an immediate and lasting impact on the transition from a carbon based energy economy to a wide range of alternative, renewable energy sources that depend on energy storage to guarantee continuity of power supply (e.g.: solar, wind). One of the most immediate consequences will be **greater penetration of electric power in transportation systems through plug-in hybrid electric and electric vehicles**. Further, the **electric power grid can significantly benefit from distributed energy storage**, either by inexpensive, small-scale batteries distributed throughout the power grid or by using vehicle batteries to assume this role, and it is quite likely that the market for stationary energy storage will increase dramatically in the future and will be based on the same technology as that of plug-in hybrid electric vehicles.

Energy storage continues to be the most significant limitation to the transition to electricity as a transportation fuel and in the implementation of distributed energy storage on the smart grid. Further, the **U.S. is lagging in the development of energy storage devices and systems**, with most of the commercial development in advanced batteries taking place in Japan, China and Korea. Today, virtually 100% of the production of commercial Lithium-ion cells (used in virtually all hybrid electric vehicles and all portable electronic devices) takes place outside the U.S.A.

The goal of this program is to establish a national *Center of Excellence in Energy Storage Technology* and development with focus on both mobile and stationary applications. The center of excellence is intended to be a partnership between the OSU Center for Automotive Research (CAR) and the Edison Welding Institute (EWI), with the involvement of other partners, such as American Electric Power, and the domestic automotive and battery industries. The establishment of such a center through an initial grant will clearly establish the State of Ohio as a leader in this important field, with the potential for significant commercialization and job creation opportunities in Ohio. The focus on damage and aging characterization and on manufacturing and assembly sets this activity apart from other national initiatives, and will create a strong Ohio presence in advanced battery technology development.

The proposed center will leverage the strong relationships OSU, EWI and their partners have with the automotive, electric power and energy storage industries to establish a unique capability to develop and transfer energy storage system technology through a fundamental understanding of damage and aging mechanisms and through the development of new materials, manufacturing and system concepts.

Funding will be used to expand existing battery characterization facilities at OSU CAR and to develop a pilot facility for battery manufacturing and assembly processes.

OTFWPP 10-528

Ohio Department of Development
Ohio Third Frontier Wright Projects
77 South High Street, 25th Floor
Columbus, OH 43215

Dear Members of the Ohio Department of Development:

Case Western Reserve University is pleased to submit this Letter of Intent in response to the Ohio Third Frontier Wright Project FY 2010.

Lead Applicant: Case Western Reserve University,
10900 Euclid Avenue
Cleveland, OH 44106

Administrative contact: Cena Hilliard, Department of Radiology
(216) 844-8076, cdm20@case.edu

Project Directors: Ronald Novak, Asst. Vice-Chair for Research
(216) 844-7519, ronald.novak@case.edu
Robert Gilkeson, Vice-Chair for Research
(216) 844-7437, Robert.Gilkeson@UHhospitals.org

Project title: **CAD and Post-Processing Radiology Software Development**

Estimated funds to be requested: \$3 million

Known Collaborators: University Hospitals Case Medical Center, Riverain Medical, Miamisburg, OH, Philips Medical Solutions (In Negotiation).

Description: The Department of Radiology at Case Western Reserve University/UH-Case Medical Center (CWRU/UH-CMC) has a long history of innovative clinical and basic radiology research. A part of this research has been the two year collaboration with Riverain Medical in Miamisburg, Ohio through the Third Frontier Early Lung Disease Detection Alliance (ELDDA) project via a subcontract with the Cleveland Clinic Foundation. As a part of this project, Radiology faculty Robert Gilkeson, MD and Ronald Novak, Ph.D. along with residents and medical students, continue to work with Riverain Medical in the continuous improvement of their "OnGuard®" lung computer assisted diagnosis (CAD) system. This collaboration has resulted in several presentations at national and international scientific meetings as well as publications now in press. The Department of Radiology at CWRU/UH-CMC improved the diagnostic capability of the OnGuard® system through integration and testing of the OnGuard® software system with Dual-Energy Subtraction Radiography, a product of General Electric Health Systems. This collaboration resulted in improved efficacy and diagnostic capability for the OnGuard® software system. Riverain Medical is developing other post-processing radiology software systems and continues development of the OnGuard® system prior to FDA approval. Collaboration with an academic medical center and engineering departments can be crucial for the timely development, testing, FDA approval and marketing of diagnostic software systems for clinical use. CWRU/UH-CMC, through medical, engineering and patient based clinical facilities is in a unique position to assist Ohio based radiology software companies in this regard. Highly trained faculty, graduate students and medical support personnel such as the Department of Radiology at University Hospitals Case Medical Center, the Department of Biomedical Engineering at CWRU, The Case Center for Imaging Research, the Small Animal Imaging Center and Biomedical Image Processing Laboratory at Case will work in a synergetic manner to assist Ohio medical software companies in product development and testing. Collaboration between CWRU/UH-CMC and

these companies can provide a unique opportunity for increased innovation and growth of Ohio based medical diagnostic software businesses.



Ohio BioProducts Innovation Center

1680 Madison Avenue
Wooster, OH 44691-4096
Phone (330) 263-3701
Fax (330) 263-3688

152 Howlett Hall
2001 Fyffe Court
Columbus, OH 43210-1066
Phone (614) 292-2922
Fax (614) 292-4739

October 28, 2009

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

E-mail bioproducts@osu.edu
<http://bioproducts.osu.edu/>

Subject: 2010 Wright Project LOI

The Ohio BioProducts Innovation Center (OBIC) intends to submit a Third Frontier Wright Project proposal.

Project title:	Pilot-scale Biorefining Separation and Extraction Capabilities
Lead Applicant's Name:	Ohio BioProducts Innovation Center
Contact Person:	Stephen Myers, Director
Address:	The Ohio State University 52 Howlett Hall, 2001 Fyffe Court Columbus, OH 43210
Phone Number:	(614) 292-2922
Email:	myers.603@osu.edu
Known Collaborators:	OBIC Alliance Member Companies and Research Institutions
Anticipated Grant Request:	\$3 million

Project description

Ohio, with its strong agbioscience and industry base, is uniquely poised to become a leader in the research and commercialization of renewable specialty chemicals, polymers, and advanced materials. It is well documented that currently, efforts to advance the research and commercialization of bioproducts are limited by the ability to create pre-commercial quantities of innovative materials for new product testing. Recent industry input has indicated that production of pilot scale quantities of novel biobased feedstocks is necessary for industry to prototype such materials for specific applications. This proposal provides capital for creation of a pilot scale refinery to separate and extract valuable compounds from biobased feedstocks. This enhanced processing capacity also provides workforce opportunities to develop the talent necessary to support Ohio's leadership position in the emerging bio-economy.

Sincerely,

Stephen Myers



NATIONAL COMPOSITE CENTER

2000 Composite Drive Kettering, OH 45420 (937) 297-9450 FAX (937) 297-9440
www.compositecenter.org

October 28, 2009

OTFWPP2010@development.ohio.gov

Subject: 2010 OTFWPP LOI

Estimated grant Amount: \$3,000,000

Lead Applicant's name:
National Composite Center
2000 Composite Drive
Kettering, OH 45420

Contact person:
Lisa A. Novelli
President
Tele 937-297-9440
Email lnovelli@compositecenter.org

Project Title: "Commercialization of Carbon Fiber for Large Scale Carbon/Graphite Materials Applications"

Known Collaborators:
University of Dayton
GrafTech International Holdings, Inc.
Oak Ridge National Lab
Honeywell International

Summary of Project:
NCC together with its collaborators has been pursuing an accelerated program to initiate commercialization channels for Low Cost Carbon Fiber for the State of Ohio. Many Industries are driving demand for a Low Cost Carbon Fiber with and anticipated growth of Carbon fiber from a production capacity in 2007 of 90M pounds per year to 750M pounds by 2017.

For purposes of this WC project we will create the platform to work closely with ORNL and the DOE to parallel their PAN processing initiatives with our Pitch-precursor processing ultimately fly wheeling the pilot plant line to include lignin/bio precursor carbon fiber process. This pilot facility will align many of the industries to work together at the NCC incubation and acceleration facility for the purpose of developing Low Cost Carbon Fiber.

Respectively,

Lisa Novelli
President
National Composite Center

Ohio Third Frontier Wright Projects Program

2010 Request for Proposals

Application Information Page

Letter of Intent (LOI) Notification Number (Issued by ODOT)	LOI #: OTFWPP 10-_____
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This Application:	<input type="checkbox"/> Does <input checked="" type="checkbox"/> Does Not	include information considered a "trade secret" under Ohio Revised Code Section 1333.61 (D)
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Lead Applicant Name	Case Western Reserve University, School of Medicine		
Lead Applicant Address	10900 Euclid Avenue		
	City: Cleveland	Ohio County: Cuyahoga	
	State: Ohio	Zip Code: 44106	

Project Title:	Development of a Quantitative Analysis System for Stem Cells		
State Funds:	OTFRDF (operating) funds requested: \$ 500,000	Cost Share:	\$2,000,000
	WCF (capital) funds requested: \$		
	Total State funds requested: \$ 2,000,000		

Project Focus:	<input type="checkbox"/> Advanced Materials <input type="checkbox"/> Instruments, Controls, & Electronics <input checked="" type="checkbox"/> Biomedical <input type="checkbox"/> Advanced Propulsion <input type="checkbox"/> Advanced/Alternative Energy
-----------------------	--

Is the Lead Applicant the lead in any other proposal submitted under this RFP?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--	---

If yes, provide the Other Project(s) Title/LOI #:

Robin L. Bissell	Director of Research, Accounting and Forecasting – School of Medicine
Typed Name of Authorizing Agent	Title of Authorizing Agent
 Signature	10/28/09 Date

For ODOT Use Only	
Date Received	Proposal ID #

Ohio Third Frontier Wright Projects Program

Lead Applicant Contact Information

Authorizing Agent	Name	Robin L. Bissell		
	Title	Director of Research, Accounting and Forecasting – School of Medicine		
	Organization	Case Western Reserve University		
	Address	School of Medicine		
		10900 Euclid Avenue		
	City, State, Zip	Cleveland, OH 44106		
	Telephone	216-844-4432	Fax	216-368-4805
	E-Mail	medres@case.edu		

Project Director	Name	Mary J. Laughlin, MD		
	Title	Associate Professor of Medicine and Pathology		
	Organization	Case Western Reserve University		
	Address	10900 Euclid Ave, WRB 2-124		
	City, State, Zip	Cleveland, OH 44106-7284		
	Telephone	216-368-5693	Fax	216-368-1166
	E-Mail	mary.laughlin@case.edu		

Fiscal Agent	Name	Holly Lipkovich		
	Title	Manager, Departmental Research Accounting & Business Operations		
	Organization	Case Western Reserve University		
	Address	10900 Euclid Ave		
	City, State, Zip	Cleveland, OH 44106-4916		
	Telephone	216-368-3068	Fax	216-368-2153
	E-Mail	holly@case.edu		

Grant Administrator	Name	Salene Sanderson		
	Title	Division Manager, Hematology/Oncology		
	Organization	Case Western Reserve University		
	Address	10900 Euclid Avenue, Mail Code 7284		
	City, State, Zip	Cleveland, OH 44106-5036		
	Telephone	216-368-1180	Fax	216-368-1166
	E-Mail	mary.sanderson@uhhospitals.org		

Authorizing Agent – the individual authorized by the Lead Applicant to accept the terms and conditions of an award of Grant Funds.

Project Director – the individual authorized by the Lead Applicant to direct the Project for which the Grant Funds have been awarded.

Fiscal Agent – the individual authorized by the Lead Applicant to sign Grant-related financial documents, e.g., Requests for Payment, Grant financial reports, etc.

Grant Administrator – the individual authorized by the Lead Applicant to oversee the day-to-day administration of the Grant Funds, including preparing progress reports, monitoring project progress, etc.

Note: The same individual may hold more than one of these positions.

Ohio Third Frontier Wright Projects Program Collaborator Information

List each Collaborator identified in the Proposal, including a contact name and contact information for each. Attach additional forms as needed.

Name	George F. Muschler, MD		
Title	Director, Clinical Tissue Engineering Center		
Organization	Cleveland Clinic Foundation		
Address	9500 Euclid Avenue, Mail Stop ND20		
City, State, Zip	Cleveland, OH 44195		
Telephone	216-445-8393	Fax	216-444-9198
E-Mail	muschlg@ccf.org		

Name	Robert Deans		
Title	VP of Regenerative Medicine		
Organization	Athersys		
Address	3201 Carnegie Avenue		
City, State, Zip	Cleveland, OH 44115		
Telephone	216-426-3594	Fax	216-361-9495
E-Mail	RDeans@athersys.com		

Name	Morey Kraus		
Title	Chief Scientific Officer, Genetic Screening		
Organization	Perkin Elmer		
Address	245 First Street		
City, State, Zip	Cambridge MA 02142		
Telephone	508-524-4480	Fax	617-914-3900
E-Mail	Morey.Kraus@PERKINELMER.COM		

Name	Paul Olivo MD PhD		
Title	Vice President of Research		
Organization	Diagnostic Hybrids Inc.		
Address	1055 East State Street, Suite 100		
City, State, Zip	Athens, OH 45701		
Telephone	740-589-3426 Office	Fax	740-592-9820
E-Mail	Paul_Olivo@dhiusa.com		

Name	Tim Biro		
Title	President		
Organization	SIRE		
Address	234 Bersham Drive		
City, State, Zip	Hudson OH 44236		
Telephone	216-533-3082	Fax	
E-Mail	tgboif@aol.com		

Name	Stanton L. Gerson MD	
Title	Director	
Organization	Center for Stem Cell and Regenerative Medicine	
Address	10900 Euclid Avenue	
City, State, Zip	Cleveland OH 44106	
Telephone	216-844-8565	Fax
E-Mail	Slg5@case.edu	

Project Summary for Case WP FY 2009

This Wright Project proposal is being led by Case Western Reserve University (CWRU) and is comprised of the following partners: University of Cincinnati, Cleveland Cord Blood Center (CCBC), Center for Stem Cell and Regenerative Medicine (CSCRM), Clinical Tissue Engineering Center (CTEC), the Cleveland Clinic Foundation (CCF), University Hospitals Case Medical Center (UHCMC), Athersys, Inc., Diagnostic Hybrids Inc., Perkin-Elmer, SIRE, and a startup company (one proposal outcome) which will develop appropriate stem cell therapeutics into clinical therapies and commercial products. Further, this consortium will fulfill a major goal of Ohio Third Frontier Wright Projects Program (OTFWPP) to provide capital equipment which will support a commercial purpose in the short-term (sale of imaging platform to validate potency assays) and, in the longer-term, to contribute to the training and education of the current and future workforce within the ACGME accredited program in Transfusion Medicine for pathology fellows in training and for hematology fellows and pathology fellows at UHCMC and CCF.

The Abraham and Phyllis Katz Cord Blood Foundation dba as CCBC is a non-profit 501(c)(3) public umbilical cord bank with a research and development institute. Pre-clinical research activities seek to enhance stem cell durable engraftment umbilical cord blood (UCB) and extend UCB use in regenerative medicine. Funds are requested to purchase as shared resources liquid nitrogen cryogenic storage dewars, a HLA sequencer, biosafety hoods, and centrifuges to increase banking operations for collaborative research activities.

CWRU will leverage expertise and core competencies in stem cell therapeutics to continue to aggressively move new technologies from the bench to the bedside. These efforts will result in efficient clinical applications and commercialization of stem cells to benefit patients and citizens throughout Ohio. There is the need to support the rapid preparation of autologous cells, the expansion and manipulation of allogeneic or autologous cells as well as the manufacture of extensively cultured, genetically-modified cell lines. This focus on translational cellular therapy represents an innovative, biomedical technology which has proven attractive to commercial development. Cardiovascular Disease (CVD) causes 60% of all deaths in the US and is expected to cost the American economy an estimated \$475B in 2009. There are over 200 companies (worldwide) developing stem cell and cell therapy products, which collectively represent a U.S. market of \$4B in 2008, and is forecast to reach \$10B by late 2010. Applications for myocardial infarction and congestive heart failure comprise approximately 50% of this market. Quality assurance (QA) and cell source validation are a key production represent more than 50% of total production costs for cell therapy manufacturers, and can present a serious barrier to approval of new products. As such, the market for cell source QA and validation for cardiovascular cell therapies in 2008 was roughly \$1B and is forecast to reach \$2.5B in 2010. With a compound annual growth rate of approximately 58%, this market could potentially reach \$38.8B by late 2016. **The gold standard for validating the biological potential (potency) of cell sources, manual enumeration of cells and colonies by technicians is extremely cost-, labor-, and time-intensive, lacks reproducibility, and is prone to high levels of statistical variability.** For companies to succeed, they will need a robust, reproducible and cost-effective tool for quality control and validate a wide range of cell sources (cord blood, marrow, etc.). Developing this technology, creating a startup company, and launching the first product represent an excellent opportunity for Cleveland and the State of Ohio.

To accomplish the objectives in this proposal, CWRU will team with commercial partners Athersys Inc., Diagnostic Hybrids Inc. SIRE, and Perkin Elmer to establish release criteria services for cell transplantation, core facilities for preclinical cell production and for human stem cell and gene therapy monitoring, characterization, analysis and imaging as part of human clinical trials. We propose a pivotal role for imaging in validation of potency assays required by the FDA for manufactured cellular products which will be provided by the Colonyze technology, whose commercialization will yield a startup company as an outcome of this proposal. The Wright Center for Stem Cell and Regenerative Medicine is uniquely positioned to play a pivotal role in establishing the quality standards applied to cell therapy products.

This proposal will continue the effective partnership of academic and commercial researchers in the development of stem cell applications with well-defined scientific goals, achievement of commercialization milestones, and training and education for a medical-based workforce.



**Letter of Intent
Ohio Third Frontier Wright Projects Program**

Lead Applicant

Name

Case Western Reserve University

Address

10900 Euclid Avenue, Cleveland, Ohio 44106

Contact Person

Kenneth Singer, Ph.D.
Professor, Department of Physics

Phone

216.368.4017

E-mail

kenneth.singer@cwru.edu

Project Title

Laboratory for Optical Imaging and Spectroscopy (LOIS)

Grant Funds

\$ 3,000,000 (estimated)

Collaborators

***Confirmed:* Kent State University; Youngstown State University; *Unconfirmed:* Nanofilm, Ltd.; Gooch & Housego (Ohio) LLC; Essential Research, Inc.; DeNora (Fairport Harbor, OH)**

Laboratory for Optical Imaging and Spectroscopy (LOIS)

The development and commercialization of a variety of products by Ohio industries in the areas of Advanced Materials, Biomedical Technology, Advanced/Alternative Energy, and Power and Propulsion depend critically on the characterization of the materials, especially surfaces and interfaces, comprising the technology. Methods for determining the composition, structure and function of materials provide key information that can determine whether a technology crosses the "Valley of Death" to become manufacturable and economically viable. Determining important physical constants is important to design, while determination of impurities, defects, morphology, and structure are important to function, reproducibility and process and quality control.

Often, Ohio companies will not find it economical to invest in all of the costly instrumentation to provide this information, nor do they possess the expertise to perform these studies. These companies can find both the equipment and expertise at University facilities, such as the Swagelok Center for Surface Analysis (SCSAM) at Case Western Reserve University. The proposal seeks to provide a new catalog of optical techniques that complements SCSAM facilities by creating a Laboratory for Optical Imaging and Spectroscopy (LOIS). LOIS will provide advanced spectroscopic and imaging techniques currently unavailable as a university-based service center that will be critical to the development and commercialization of a wide range of emerging technologies.

LOIS will also build on the collaboration and capability enabled in the Research Cluster on the Surfaces of Advanced Materials (RC-SAM) recently awarded as part of the Third Frontier Ohio Research Scholars Program to Kent State University, Case Western Reserve University and Youngstown State University. This project will provide northeast Ohio with a most powerful set of surface and material characterization techniques and expertise for accelerating technology and job creation.

The instrumentation to be purchased will provide the latest in linear and nonlinear optical spectroscopies and imaging techniques capable of the most sensitive detection of impurities, surface structure, and molecular surfactants, which will complement and augment characterization equipment already available at Case and other participating institutions.

Equipment to be purchased includes:

1. A regeneratively amplified Ti:Sapphire laser system with 3 optical parametric amplifiers, a transient absorption spectrometer, and a fluorescence upconversion spectrometer. This system will be used for an array of nonlinear optical spectroscopies including, resonant Raman scattering, coherent anti-Stokes Raman scattering, sum frequency generation, second harmonic generation, transient absorption and fluorescence upconversion. Such a system provides unparalleled information and sensitivity to structure and dynamics.
2. A nonlinear microscopy system capable of near-field and confocal microscopy with a tunable femtosecond laser source. This system provides surface sensitive and high spatial resolution in all dimensions down to the nanoscale.
3. An optical coherence tomography microscope system for determination of the structure and morphology of layered systems. This noninvasive technique provides information in cross-section of layered and systems unavailable by any other technique.
4. A microspectrophotometer system for microscale imaging characterization of optical transmission, absorption, reflection, polarization, and luminescence.
5. An optical profilometer that determines surface topography by white-light interference.
6. A micro Raman imaging system.
7. A spectroscopic ellipsometer for determining the optical constants of thin films.

The establishment of LOIS will place Northern Ohio as one of the premier regional materials characterization sites in the US, and will undoubtedly serve to attract high tech businesses and thus foster economic and industrial development in the State.

OTFWPP 10-533

Ohio Department of Development
Ohio Third Frontier Wright Projects
77 South High Street, 25th Floor
Columbus, OH 43215

Dear Members of the Ohio Department of Development:

Case Western Reserve University is pleased to submit this Letter of Intent in response to the Ohio Third Frontier Wright Project FY 2010.

Lead Applicant: Case Western Reserve University,
10900 Euclid Avenue
Cleveland, OH 44106

Administrative contact: Cena Hilliard, Department of Radiology
(216) 844-8076, cdm20@case.edu

Project Directors: Jeffrey L. Sunshine, Vice Chairman, Department of Radiology
Pablo R. Ros, Chairman, Department of Radiology, Co-Director Case Center for Imaging Research

(216) 844-3116, jeffrey.sunshine@UHhospitals.org

(216) 983-4829, pablo.ros@UHhospitals.org

Project title: **Enhanced MRI-PET Imaging**

Estimated funds to be requested: \$3 million

Known Collaborators: University Hospitals Case Medical Center, Siemens Medical Solutions (In Negotiation- includes PETNET, Inc.), Philips Medical Solutions (In Negotiation), MIMVista, Inc., QED, Inc. (In Negotiation)

Description: The academic and industrial foundation for biomedical imaging in northeastern Ohio provides a unique opportunity for continued innovation and job creation. Founded on over 4000 existing jobs in academia, industry and health care, biomedical imaging represents a unique collection of international research and academic excellence leading to an exceptionally well qualified work force with industry leaders creating new technologies. These highly trained people uniquely located in our region will work synergistically with several biomedical imaging centers such as the Small Animal Imaging Center and Biomedical Image Processing Laboratory at Case. The Department of Radiology at University Hospitals continues to emphasize the definition, development and application of novel trend setting new imaging techniques to generate improved imaging across the range of medical sciences which yield high quality and innovative clinical imaging. An emerging state-of-the-art innovation in medical imaging is the combination of technologies with both magnetic resonance imaging and positron emission tomography. Case Western Reserve University has internationally recognized academic programs in magnetic resonance (MR) and positron emission tomography (PET) imaging that have been the focus of significant institutional investment with subsequent results of expansion of the research portfolio and clinical translation of these new technologies. Today, new opportunities exist for the combination of both MR and PET, both in new imaging instrumentation, but also new basic science discovery via new acquisition methods, new quantitative tools to probe physiology non-invasively, new imaging contrast agents to improve diagnosis or therapy assessment, new clinical applications and the resultant creation of a new breed of scientist capable of working across previously disparate fields. Hence, MRI-PET imaging has the potential to be more useful than either imaging modality used alone for disease diagnosis and detection. While MRI offers structural detail on soft-tissue and high spatial resolution anatomical information, PET scans provide layered functional details. MRI also can provide information related to perfusion and permeability, while PET can provide specific molecular information related to cell surface receptors, enzymes, and gene expression. The MRI-PET combination represents a powerful diagnostic tool in cancers throughout the body and Alzheimer's and other neurologic diseases. Combining the MR, PET and clinical expertise of Case Western Reserve University and University Hospitals Case Medical Center with a major multinational industry collaborator will result in the development and commercialization of the significant MRI/PET opportunity. focused here in Ohio but certain to affect global trends. Further, partnering with local startup businesses focusing on image analysis tools, hardware components and software and RF coil systems development will ensure unique competitive advantages supporting our regional growth.



October 28, 2009

Ms. Lisa Patt-McDaniel
Interim Director
Ohio Department of Development
ATTN: Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Dear Ms. Patt-McDaniel:

Please accept this Letter of Intent to apply for Ohio Third Frontier Wright Projects Program funding.

- Lead Applicant: Cuyahoga Community College District
- Address: 700 Carnegie Avenue, Cleveland, OH 44115
- Contact person: John Gajewski, Executive Director, Workforce and Economic Development
- Phone: 216-987-3048
- Email: john.gajewski@tri-c.edu
- Project title: Commercialization of SmartShingles
- Estimated grant funding: \$1,000,000
- Collaborators: Winston Products LLC

The proposed project will support major acquisition and improvements at Cuyahoga Community College to support the near-term commercialization objectives of Winston Products. Ohio-based Winston Products is in the commercialization phase of a new product for building efficiency, called SmartShingles. SmartShingles is a polyurethane based coating that can be used when it's time to reroof over existing, worn shingles, seal and restore a faded or stained roof or to protect against the elements like wind, hail and other storm damage. SmartShingles will help eliminate the need for roof tear-offs which create nearly 22 million pounds of landfill waste every year and increase fossil fuel demand in manufacturing new shingles. In addition, by embedding special particles into the polyurethane, energy efficiency of the building or home can be improved through the reflection of sunlight. The cost savings afforded to homeowners who opt to apply SmartShingles is also significant- coming in at about two thirds of the cost of a complete tear off and one third of the cost of a re - shingle. SmartShingles will initially be franchised with a business plan calling for the creation of 500 jobs across Ohio, of which 50 will be at Winston Products LLC.

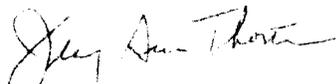
Office of the President
District Administrative Services
700 Carnegie Avenue
Cleveland, Ohio 44115-2878

216•987•4851 FAX 216•987•4895

Equipment and facilities investments by Winston Products will be a significant contribution to overall project cost share. The grant funding will foster commercial market entry, workforce development and training. The long term use of the capital and equipment will promote educational and training programs for technical workers in advanced materials and advanced energy fields.

We look forward to an opportunity to submit a full proposal. Please contact Mr. John Gajewski if you should require any additional information at this time.

Sincerely,



Jerry Sue Thornton, Ph.D.
President

c: Dr. Craig Follins, Executive Vice President, Workforce and Economic Development
Ms. Gloria Moosmann, Vice President, Resource Development and Tri-C Foundation
Ms. Claire Rosacco, Vice President, Governmental Relations and Community Outreach
Mr. John Gajewski, Executive Director, Workforce and Economic Development



NATIONAL COMPOSITE CENTER

2000 Composite Drive Kettering, OH 45420 (937) 297-9450 FAX (937) 297-9440
www.compositecenter.org

October 28, 2009

OTFWPP2010@development.ohio.gov

Subject: 2010 OTFWPP LOI

Estimated grant Amount: \$3,000,000

Lead Applicant's name:
National Composite Center
2000 Composite Drive
Kettering, OH 45420

Contact person:
Lisa A. Novelli
President
Tele 937-297-9440
Email lnovelli@compositecenter.org

Project Title: "Mono-structure Lighting for Increased Area Lighting Coverage and Cost Controls"

Known Collaborators:
OSU
Cycloptics
Phillips
DP&L

Summary of Project:

The intent of this proposal is to develop and commercialize the Cycloptics intellectual property/trade secret mono-structure design, material and process for the outdoor lighting industry.

The NCC and their collaborators have identified this project to provide the street lighting industry with an efficient mono-structure that significantly improves surface lighting area in addition to reducing maintenance costs and replacement safety standards.

Respectively,



Lisa Novelli
President
National Composite Center



NATIONAL COMPOSITE CENTER

2000 Composite Drive Kettering, OH 45420 (937) 297-9450 FAX (937) 297-9440
www.compositecenter.org

October 28, 2009

OTFWPP2010@development.ohio.gov

Subject: 2010 OTFWPP LOI

Estimated grant Amount: \$3,000,000

Lead Applicant's name:
National Composite Center
2000 Composite Drive
Kettering, OH 45420

Contact person:
Lisa A. Novelli
President
Tele 937-297-9440
Email lnovelli@compositecenter.org

Project Title: "Advanced Materials Process - Composite Rim/Wheel for the Transportation Industry"

Known Collaborators:
University of Akron
Cycloptics

Summary of Project:

The intent of this proposal is to commercialize the NCC intellectual property/trade secret in design, material and process a composite Rim/Wheel for light weight trucks and the automotive industry once we achieve the established customer and SAE requirements. Dymag, a motorcycle composite rim manufacturer supplies a composite rim (via infusion molding process) out of England to HRE in California, that manufacturers the aluminum center. This rim is advertised to meet the German TUV requirements.

The NCC, Forgeline and collaborators have identified this project to be in the Incubation and Demonstration phase. As CAFÉ regulations and standards have established, the need for light weight Rims is a necessary requirement to meet these constraints.

Respectively,



Lisa Novelli
President
National Composite Center



Office of the Vice President for Research and Dean of the Graduate School

Akron, OH 44325-4717
(330) 972-6458 Office
(330) 972-2413 Fax

October 26, 2009

Ohio Third Frontier Wright Projects Program 2010 (OTFWPP)
The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215-6130

RE: Letter of Intent to Submit an OTFWPP Proposal to ODOD

Dear Sir or Madam:

The University of Akron and our industrial collaborators hereby submit a Letter of Intent in response to the Ohio Department of Development Third Frontier Wright Projects Program 2010 Request for Proposals.

Prospective Lead Applicant's Name: The University of Akron

Prospective Lead Applicant's Address: Department of Electrical and Computer Engineering,
College of Engineering
The University of Akron
Akron, OH 44325-3904

Contact Name: J. Alexis De Abreu-García
Contact Phone Number: (330) 972-6709
Contact E Mail: alexis4@uakron.edu

Project Title: Mixed Signal Sensor Modules

Estimated Funds Requested: \$3,000,000

Collaborators:

Collaborator's Name: Essential Research Inc.
Collaborator's Address: 6410 Eastland Rd, Suite D
Cleveland, OH 44142

Contact Name: William King
Contact Phone Number: (440) 816-9850
Contact E Mail: king@essential-research.com

October 23, 2009

Ohio Third Frontier Wright Projects Program 2010 (OTFWPP)

RE: Letter of Intent to Submit an OTFWPP Proposal to ODOD

Project Title: Mixed Signal Sensor Modules

Collaborators:

Collaborator's Name: Linear Dimensions Inc.
Collaborator's Address: 445 E Ohio Street, Suite 350
Chicago, IL 60614

Contact Name: Ravi Rudraraju
Contact Phone Number: (312) 404-9283
Contact E Mail:

Collaborator's Name: Sensiics Inc.
Collaborator's Address: 284 E Exchange St.
Akron, Ohio 44304

Contact Name: Mike A. Ward
Contact Phone Number: (330) 431-6154
Contact E Mail: mike@lineardimensions.com

Collaborator's Name: Volovox LLC
Collaborator's Address: 112 Ellsworth Place
Chapel Hill, NC 27516

Contact Name: Darin Davis
Contact Phone Number: (919) 539-8821
Contact E Mail:

With best regards, I remain

Sincerely,



George R. Newkome, Ph.D.
Vice President for Research and Dean, Graduate School
Oelschlager Professor of Science and Technology
Professor of Polymer Science and Chemistry

xc: Luis Proenza, President, The University of Akron
Katie Wendell-Watkins, Director, Research Services and Sponsored Programs

OTFWPP 2010: Mixed Signal Sensor Modules

Testing is a critical step in the integrated circuit (IC) development process as it serves as the interface between design and manufacturing. Testing ensures that the final product meets functionality and quality standards, and provides measurable feedback into the design and fabrication of devices. There are several key areas that we will address with our testing, that will help propagate the synergies of semiconductor and sensors technologies here in the State of Ohio.

The plan is to develop an IC testing facility in a clean room environment that will include automatic and manual testers of analog and mixed-signal integrated circuits. We will furnish this facility with probing stations and environmental chambers to allow for on-wafer testing of dice in harsh environments including high temperature and vibration.

We will furnish a Sensor Testing area that will have equipment and capabilities for testing commercial sensors and systems involving ICs, sensors, wired and wireless communications, etc. Test equipment will include logic analyzers, scopes, probes, interface hardware and data collection work-stations.

Another critical part of the design-to-manufacturing process is prototype building and packaging. We plan to include a prototyping laboratory with wafer sawing, bonding, epoxy curing, soldering and general mechanical packaging capabilities. Our aim is to produce small quantity prototypes as well as ramp up production volumes of ICs and sensors developed at The University of Akron, at our program partners, in Ohio generally, and elsewhere if it brings jobs to our area.

We will also be bolstering our IC design center and will add a commercial license of Cadence Encounter to allow for digital design, synthesis, and layout at The University of Akron.

Our basic strategy is to commercialize existing IP that has been developed and is ready to prototype. There are two main categories of IP that are currently available for prototype production. Sensor interface ICs and sensor modules.

Our commercialization plan is to form partnerships with companies who have a proven track record of commercializing ICs and sensors. Micrel Inc. located in San Jose California would be an ideal choice for small high-performance analog ICs including high-temp and other harsh environment devices. Volvox and Cypress are embarking on a processing agreement where Cypress will be installing a new process platform and will need to implement designs such as A/D and D/A converters as well as some small digital and analog components designed to be High-Temp or Rad-Hard.

Sensor modules that include a communication interface are also going to be prototyped and packaged in our facility. Companies like Essential Research (ER) in Cleveland, Ohio have new sensor technologies that need special interfacing to communicate to the main sensor system. Essential Research will sell its sensors packaged with our proprietary interface in a module that can be plugged directly into any system. The commercialization advantage for ER is that their sensor alone may sell in the neighborhood of \$5-\$10, but with the interface included, sensor modules can sell in the \$100-\$200 range.

We will also be seeking any companies in Ohio to further commercialize our technologies as they become available in prototype form. Partnering with other Ohio entities will further ensure that jobs created by our efforts remain here.