Welcome to
2013 LA EPSCoR Symposium

Michael Khonsari

Louisiana EPSCoR Project Director

Associate Commissioner for Sponsored Programs Research & Development, Louisiana Board of Regents

Professor and Dow Chemical Endowed Chair in Rotating Machinery
LSU College of Engineering

NSF RII Award (2010-2015)
Statewide Research Focus

National Science Foundation

Sean Kennan
NSF EPSCoR Program Director

External Review Board

William Lester
UC Berkeley

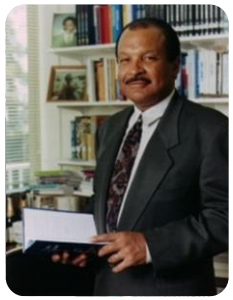
Vincent McKoy
Caltech

Harold Silverman
SUNY (retired)

Susan Sinnott
University of Florida

James Hoehn
EPSCoR/IDeA Foundation

Diversity Advisory Council



William Lester

University of California, Berkeley

DiOnetta Jones

Massachusetts Institute of Technology

Sheila Edwards Lange

University of Washington

Zakiya Wilson

Louisiana State University

Betsy Willis

Southern Methodist University

Jenna Carpenter

Louisiana Tech University

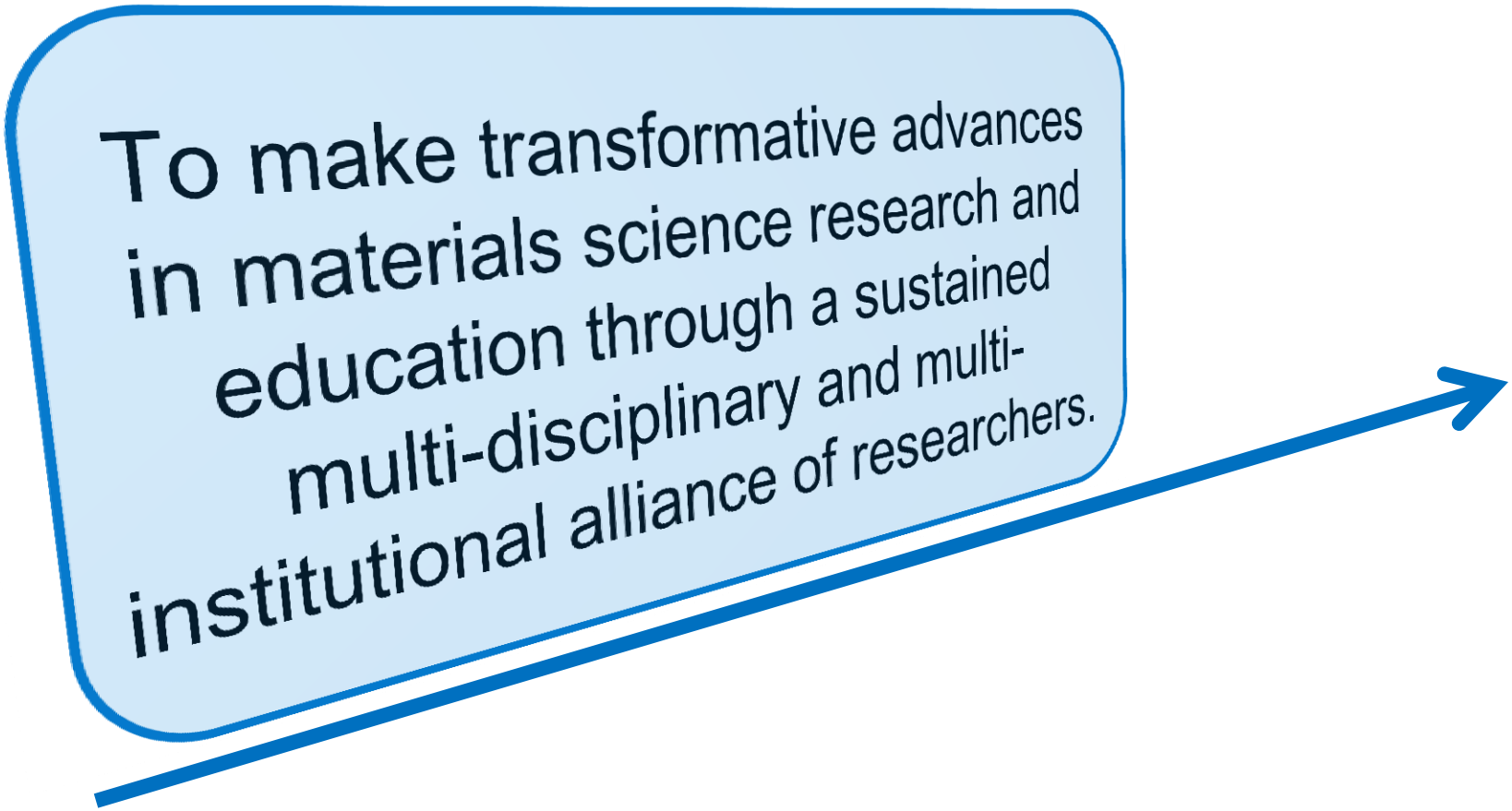
Stephanie Adams

Virginia Commonwealth University

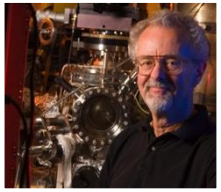
Janet Ruscher

Tulane University

LA-SiGMA Vision



Participants in LA-SiGMA: 205



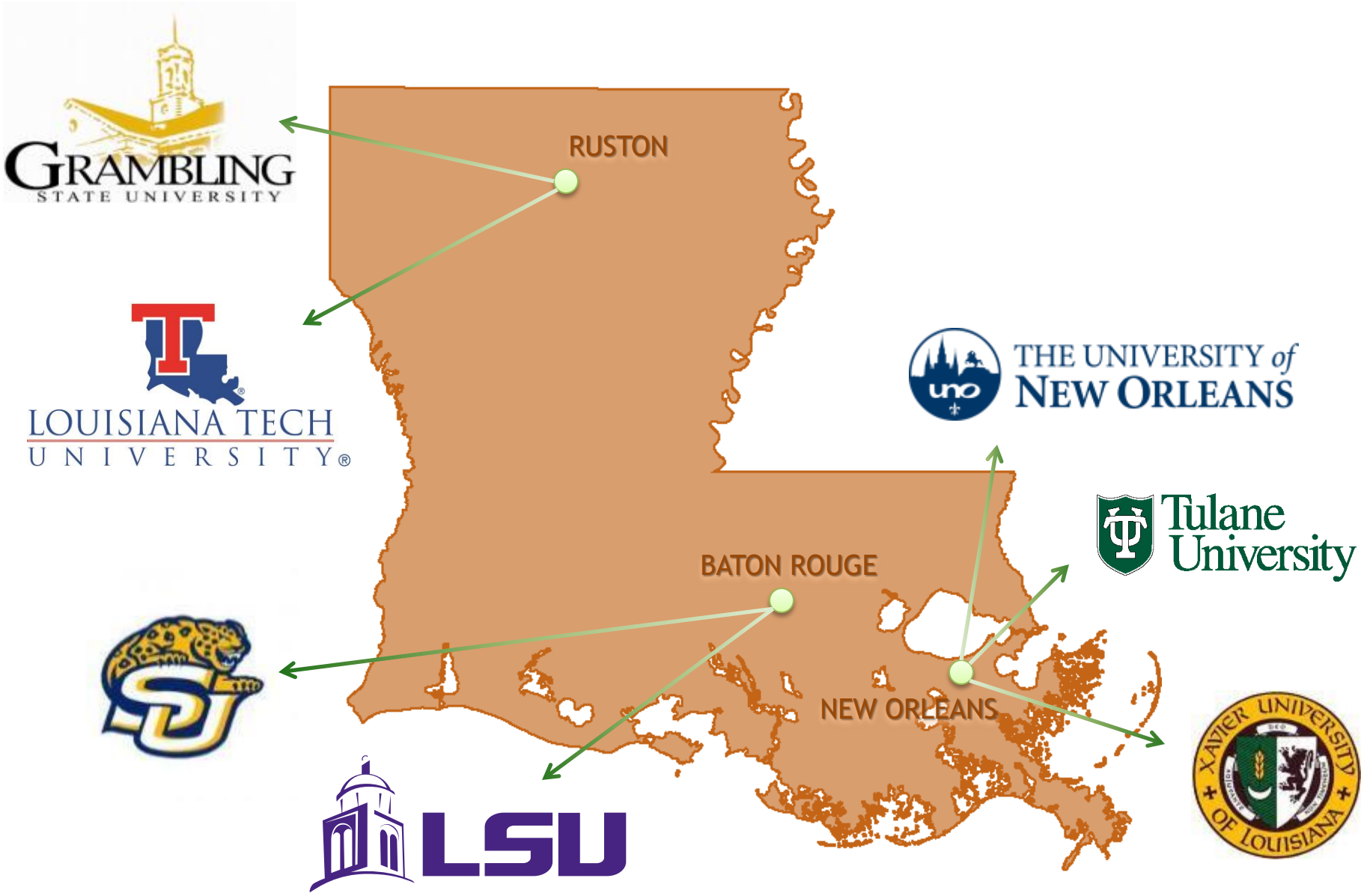
70 Faculty

8 Post-Doc

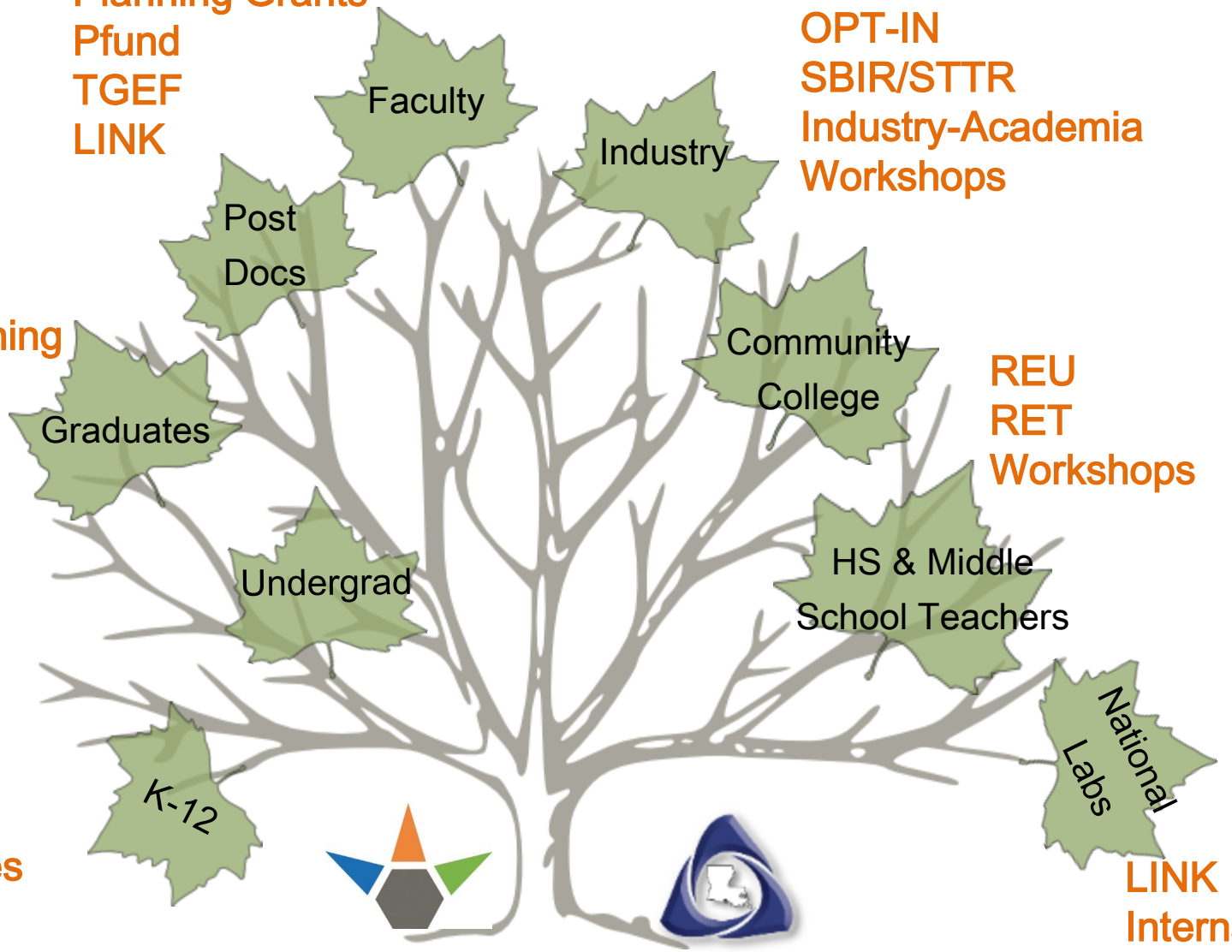
65 Graduate

62 Under-graduate

Partnering Institutions



Traveling the STEM Pipeline and Strengthening Workforce Development



Planning Grants
Pfund
TGEF
LINK

OPT-IN
SBIR/STTR
Industry-Academia
Workshops

Mentoring
Retreat
Distance Learning

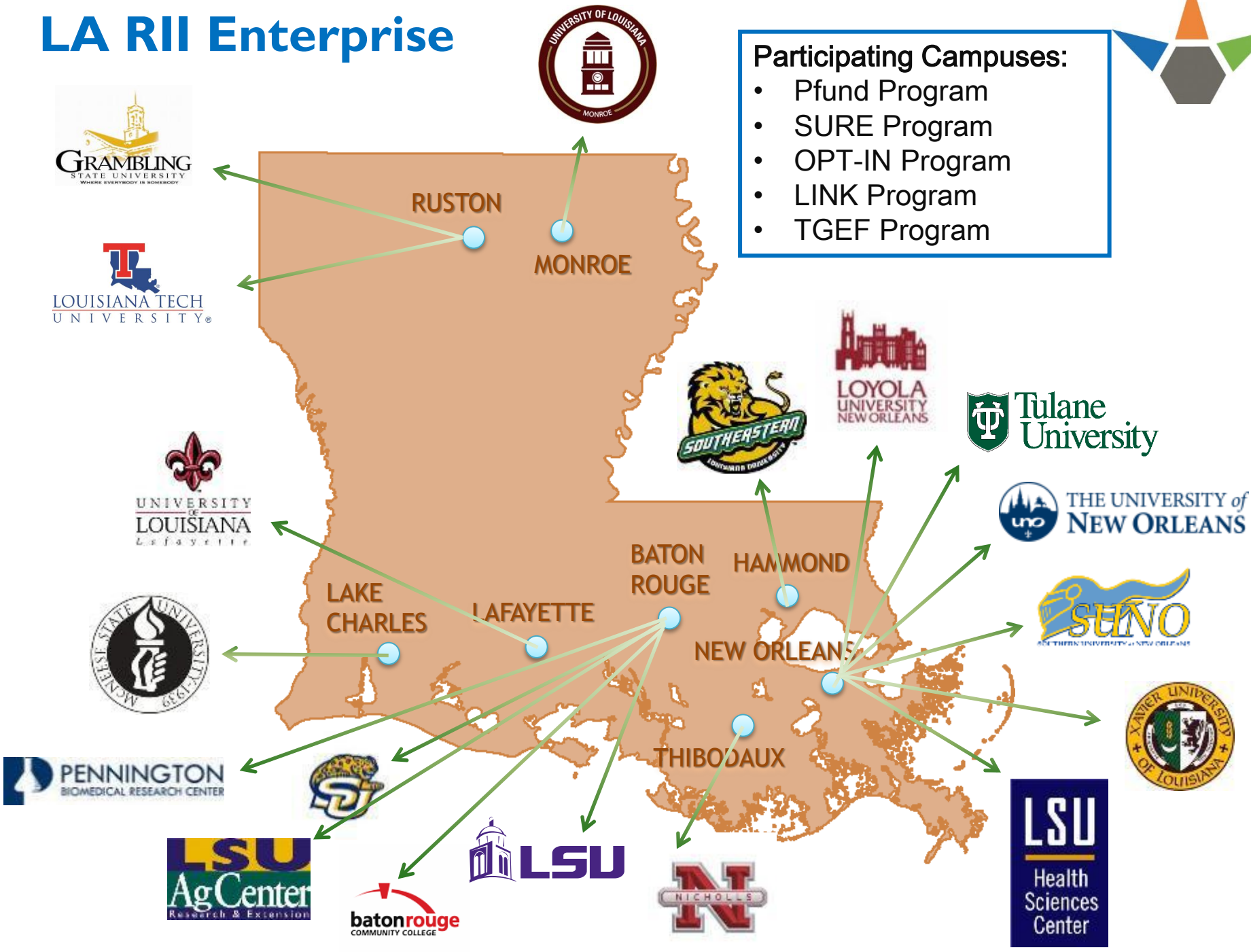
REU
RET
Workshops

SURE
REU

Speaking of
Science
Open houses

LINK
Internship

LA RII Enterprise



Industry-Academia Collaborative Workshops

Materials & Energy

Biosciences

Software Development & Digital Media

Next Generation Energy Technology

Opportunities for Partnership in Technology with OPT-IN

May/June 2012 Vol. 9, No. 1

Louisiana EPSCoR

Louisiana Experimental Program to Stimulate Competitive Research

New, Eco-Friendly Material Serves As Sustainable Solution In Construction

Buildings and structures shape our physical landscape; they provide a better quality of life and guarantee our shelter and safety. Unfortunately, they are also one of the largest consumers of global resources and contributors to pollution emissions—which continues to rise as global construction booms.

However, research and recent innovations in the construction industry reveal solutions that could significantly slash the amount of energy used throughout the entire life cycle of a building or structure.

Research conducted by Dr. Erez Allouche, an Associate Professor of Civil Engineering at Louisiana Tech University, finds that if eco-friendly alternatives are used in construction materials, such as concrete, the technology could result in the development of a more sustainable construction industry.

Dr. Allouche's research shows that investigating the properties of geopolymer binders in concrete (when used as an alternative to industry standard concrete binders) can lead to significant energy and cost benefits for many of its commercial applications. These developments can generate a safer and more profitable construction industry, and increase sustainability both during construction and throughout the life of a structure.

Concrete Binders: OPC vs. GPC

A building designed and constructed in a sustainable way minimizes the use of land, energy, water and materials, like concrete.

Concrete is the second most used processed material in the world by weight, after water. The annual global consumption of concrete is 20 billion tons per year, or 3 tons for every person on earth, and carries a market value of approximately $1.8 trillion.

Dr. Erez Allouche presenting at LA EPSCoR 2012 LA-SiGMA All-Hands Meeting on April 2 in Baton Rouge, LA.

Currently, ordinary portland cement (OPC) is the most common binder used in concrete. The production of OPC requires large amounts of energy, and has a large carbon footprint, contributing 3.6 billion tons of CO_2 per year, or 1 ton of CO_2 for each ton of cement produced, and emitting approximately 7% of the total global CO_2 emissions to the earth's atmosphere annually.

Geopolymer cement concrete (GPC) is a relatively new material, with the potential to serve as a "green" alternative to OPC in construction and commercial applications. Compared to OPC, GPC has a significantly lower environmental impact with approximately 90% less energy consumption and 85% less CO_2 emissions.

GPC also offers a higher mechanical strength and resistance to elevated temperatures (up to 2800°F) along with a corrosion resistance that is 8 times higher than OPC. This translates to an approximate 250-year design life. GPC is produced from a combination of fly ash (fine solid particles of ashes, dust, and soot carried out from burning fuel), sodium hydroxide and sodium silicate.

OPT-IN Program

Dr. Allouche's research is supported by the Louisiana EPSCoR Opportunities for Partnerships in Technology with Industry (OPT-IN) program, and could potentially have a substantial impact on the construction industry, especially in Louisiana. The OPT-IN program is designed to promote meaningful university-industry partnerships while facilitating the commercialization of research and ultimately contributing to the economic development of Louisiana.

Impact On Louisiana

Louisiana is one of only five states in the U.S. that does not have an "in-

Geopolymer concrete offers a corrosion resistance that is 8-times higher than Portland Cement (illustrated above).

Louisiana EPSCoR

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH VOL.9 NO.5 MARCH 2013

Economic Development Comes Full Circle with OPT-IN

This is part 2 of a 2 part series on the benefits & successes of OPT-IN.

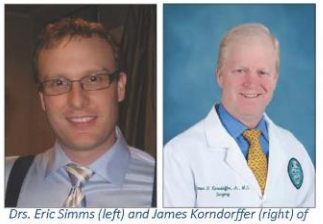
The State is already seeing immediate results from the opportunities granted by OPT-IN. Tulane University, the 7th largest employer in Louisiana, is the current host institution of a patent-pending laparoscopic surgical device invented by Tulane General Surgery Resident, Dr. Eric Simms.

"As a surgical resident, it became clear to me that minimally invasive surgery was missing something not only practical, but something necessary. It sounds a little sensationalistic, I know – the idea came to me in a dream, and it wasn't until after my second cup of coffee that morning that my conscious mind concluded that my idea may actually be one worth pursuing." *And indeed it has been.*

Dr. Simms received his undergraduate degree from Oberlin College in Ohio, and then received his post-baccalaureate from Cleveland State University, also in Ohio. Dr. Simms attended Tulane Medical School and is currently a general surgery resident there.

In December of 2011, Dr. Simms, along with his faculty advisor, an experienced minimally invasive surgeon (MIS) and the Director of the Tulane General Surgery Residency Program, Dr. James R. Korndorffer, applied for a Category II grant of $11,416 to begin the process for developing a prototype of what Dr. Simms calls the Hydra. "I drew pictures of it. I wrote descriptions of it, and of the concept, and I marveled at the fact that no one else had thought of it yet. It's not that it was obvious, but was just so necessary. I had it all figured out. Except how to make it, that is."

So he set out to establish a team to build, refine and prototype the idea and ultimately bring it to the market. By February of 2012, Dr. Simms had assembled the Hydra Laparoscopic Surgical System Invention Team, known as the "Hydra Team," which consists of: Justin Levy and John Christie from Tulane's Office of Technology Transfer (TOTT) and Intellectual Property Development; Joseph Young and Jordan Vance, Tulane Biomedical Engineering students; and Dr. Korndorffer. In coordination with the Hydra Team and TOTT, the Tulane Biomedical Engineering (BME) Department pledged two additional BME undergraduate students to help develop a functioning prototype of the Hydra. "Joe and Jordan wasted little time in materializing the idea," said Dr. Simms. "And with the funds provided by the OPT-IN grant, we were able to create several iterations of functional prototypes, now deemed the Hydra Minimally Invasive Surgical System."



Drs. Eric Simms (left) and James Korndorffer (right) of Tulane University, received an OPT-IN Phase 2 grant to create the Hydra, a tool for minimally invasive surgeons.

> *Our success has now brought us to the formation of Nikola Tech, a company that represents the spirit of multidisciplinary collaboration between medical and physical sciences.*
>
> *Eric Simms, Tulane General Surgery Resident*

The Hydra has the capacity to dramatically increase the efficiency of minimally invasive surgery (MIS) and to improve safety. According to Dr. Simms, the basic concept of the Hydra is a single device that contains multiple instruments, eliminating the need for surgeons to constantly insert and remove various instruments throughout the procedure. The device includes multiple automatically advanceable and retractable instruments in a single "housing" sheath. All instruments are interchangeable within the housing sheath, allowing surgeons to select specific arrays of instruments, which Dr. Simms calls "instrument profiles," to suit their preferences or to suit the specific surgery being performed. Each instrument also has basic retraction safety mechanisms, to assure that individual instruments cannot be accidentally retracted while still grasping tissue, assuring that no tissue, vessels and/or structures will be accidentally torn.

Even very basic MIS requires the switching of instruments approximately ten times. For more complex surgeries, that number can be greater than 50 and if you add to that difficult patient characteristics, a surgeon may be switching his instruments hundreds of times during one surgery. Given an estimation of 3 to 30 seconds of time per instrument switch, Dr. Simms notes that in-

continued on page 2

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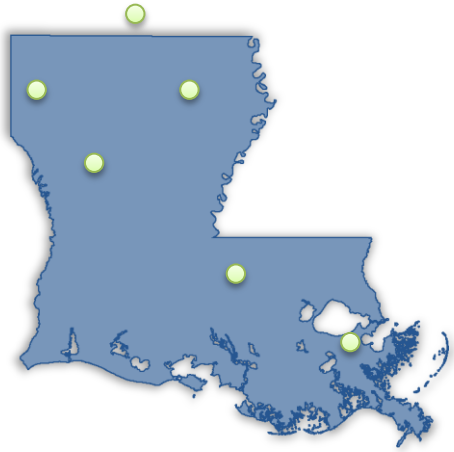
Partnerships



- Baton Rouge Community College
- Bossier Parish Community College
- Louisiana Delta Community College
- Louisiana School for Math, Science & the Arts
- South Arkansas Community College

- Brookhaven National Lab
- Eidgenössische Technische Hochschule Zürich, Switzerland
- Göttingen University, Germany
- Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India
- Max Planck Institute for Colloids and Interfaces, Potsdam, Germany
- National Institute for Materials Science, Tsukuba, Japan
- Pacific Northwest National Lab
- Sandia National Lab
- Shodor Education Foundation
- S.N. Bose National Centre for Basic Sciences, Kolkata, India
- Technischen Universität Dortmund, Germany
- Texas A&M University
- University of Hertfordshire, Great Britain
- Universität Würzburg, Germany
- Karlsruhe Institute, Germany
- Neel Institut, Grenoble, France
- Argonne Nat. Lab, Illinois
- SciDAC Institutes

RII - Track 1: Management

State EPSCoR Committee

Michael Khonsari
Project Director
LA EPSCoR Staff

External Review Board (ERB) & External Evaluator

Diversity Advisory Council (DAC)

Outreach Coordinator

Project Execution Team (PET)

Communication Manager

Project Execution Team (PET)

Co PIs
Representatives from each participating campus
External Evaluator

Science Driver and Computational Teams
Faculty, Students, and Postdocs

Thank you for your attention.

FUNDING OPPORTUNITIES

Dr. Sean Kennan
NSF EPSCoR Program Director

Agenda

NSF EPSCoR Research Infrastructure Improvement (RII) Award

2013 *LA-SiGMA* RII Symposium

July 29, 2013
Marriott Hotel
5500 Hilton Avenue, Baton Rouge, Louisiana 70808

Agenda

7:00 – 8:00	Registration, Coffee & Bagels
8:00 – 8:20	Welcoming Remarks, Project Update and Industrial Outreach (Khonsari)
8:20 – 8:40	Sean Kennan, NSF Program Director
Science Drivers (SD) and CyberTools and CyberInfrastructure Group (CTCI)	
8:40 – 9:00 9:00 – 9:10	*Project Overview* (Jarrell) *Q&A*
9:10 – 9:30 9:30 – 9:40	*Electronic and Magnetic Materials* (Moreno) Q&A
9:40 - 10:00	**Break**
10:00 -10:20 10:20 -10:30	*Materials for Energy storage and Generation* (Ramachandran) Q&A
10:30 -10:50 10:50 -11:00	*Biomolecular Materials* (Ashbaugh) Q&A
11:00 -11:20 11:20 -11:30	*Computational Tools for Multiscale Simulations* (Bishop) Q&A
11:30 -11:45	Data Management Plan (Pratt)
11:45 – 2:00	**Lunch and poster session**
Assessment and Broader Impacts	
2:00 – 2:15 2:15 – 2:25	*Diversity and Workforce Development* (Derosa) Q&A
2:25 – 2:40 2:40 – 2:50	*External Engagement, Sustainability* (Pesika and Patton) Q&A
2:50 – 3:20	Presentations by invited recipients of EPSCoR awards, and Q&A
3:20 – 3:35	Graduate Student Retreat (Rick)
3:35 – 3:50	Evaluation and Assessment (Dunn)
3:50 – 4:05	Break
Planning Session	
4:05 – 5:15	**Simultaneous sessions:** ERB Deliberations – Bonaparte Room DAC Deliberations – Camellia Room
5:15 – 5:30	DAC and ERB debriefing to LA-SiGMA
5:30	Concluding Remarks (Khonsari)

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EPSCoR Video

Karthik will insert EPSCoR Video