

# NSF EPSCoR Funding Impacts in MISSISSIPPI



## Science and Engineering

- EPSCoR scientists are advancing the next generation of nanomaterials through the use of computational chemistry to guide synthesis of nanoparticles, and computational models to evaluate their environmental impact, for example, nanotoxicity in bacterial and animal species.
- EPSCoR researchers are using quantum mechanical/molecular mechanical (QM/MM) tools to study chemical reactions that can be used to improve the design of future biosensors.
- The success of EPSCoR scientists and engineers is readily apparent in one key metric. Since the current NSF RII project inception, 39% of NSF CAREER awards in the state of Mississippi have been made to EPSCoR researchers.

## Human Health

- Mississippi EPSCoR researchers are bridging computer science and biology by developing new algorithms to characterize biomolecular networks, leading to new techniques for genetic mapping and identification, for example, detection of genes known to increase the risk of cancer.
- EPSCoR researchers are significantly advancing the state of the art in biomedical simulations, including new models for prediction of physiological systems at the organism level, and mechanistic simulations of organ function.
- New insights into the structure and function of complex polymer-oligonucleotides have allowed EPSCoR researchers to begin constructing polymeric vehicles for tailored delivery of RNA to obtain a specific therapeutic response.

## Community Engagement

- Mississippi EPSCoR Education and Outreach program (2009 -2016) has reached more than 66,250 individuals.
- Through the current MS EPSCoR project, 675 K-12 teachers and more than 50,000 students have been impacted through teacher training programs.
- EPSCoR has produced more than 450 highly trained graduate and undergraduate students in the STEM area.



## Commercialization

- HC Simulation is a spinoff software company focused on delivering advanced health simulation software for use in research, teaching and clinical environments. An example product can be seen at <http://justphysiology.com>
- Advanced technologies developed as part of the Track 1 project are being utilized by Seacoast Science, Inc., which specializes in chemical sensor products and development.
- MS EPSCoR researchers have been awarded three patents and product licenses with four others currently pending.

## Cyberinfrastructure

- Significant state investments during the Track 1 RII have facilitated completion of the MS Optical Network (MISSION). MISSION increases by a factor of 10 (from 1 Gbps to 10 Gbps) the bandwidth connecting each of the state's four research universities with one another and federal facilities at Vicksburg and Stennis.
- An RII C2 award has complemented MISSION by bringing 1Gbps connectivity to a large number of workstations and research laboratories with a focus on those supporting the current Track 1 RII.
- The EPSCoR data Provenance, Archive and Retrieval System (PARS) serves as a clearinghouse for collection of data, models, and results from EPSCoR researchers, and for dissemination to the broader research community.



# IMPACT IN MISSISSIPPI FROM NASA EPSCOR AWARDS



## RESEARCH

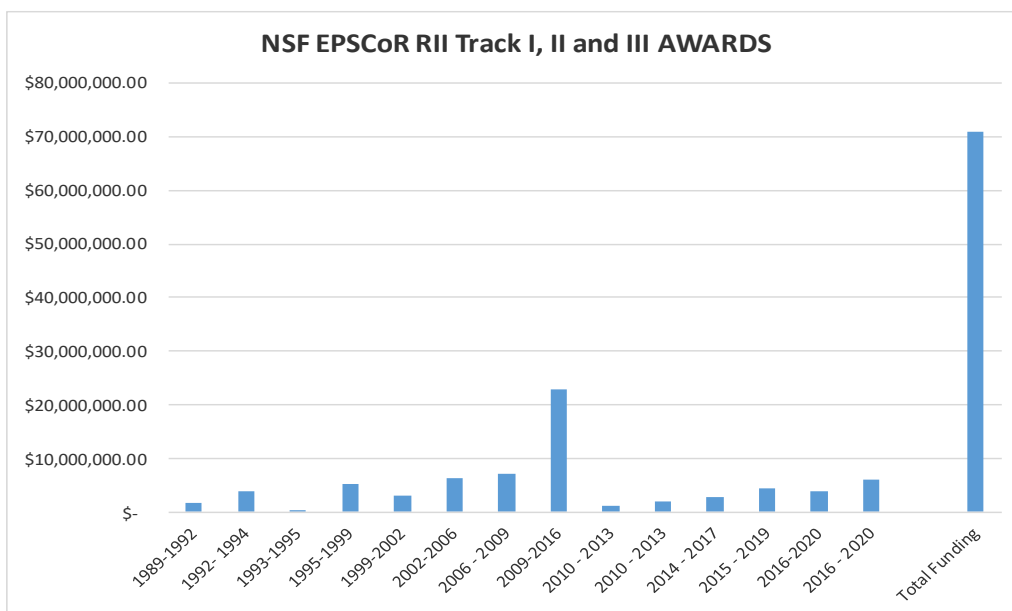
1. Increasing Mississippi's competitiveness for aerospace research grants by seeding multi-institutional research collaborations with NASA centers;
2. Addressing performance challenges in deep space communications;
3. Developing materials to allow space vehicles to withstand impacts from space debris, and technologies to shield space communication components from radiation damage;
4. Addressing adverse health effects of space travel, including high-energy radiation effects on astronauts' vestibular balance and immune functions, and microgravity-induced cardiac risks.

## EDUCATION/WORKFORCE DEVELOPMENT

1. Growing and diversifying the STEM workforce in Mississippi through outreach programs to nurture teachers and inspire students;
2. Promoting the alignment of Mississippi universities, students and researchers with the aerospace industry—a target industry of the Mississippi Development Authority;
3. Enhancing aerospace-related research opportunities for undergraduate and graduate students.

## CURRENT ACTIVE MISSISSIPPI EPSCoR/IDeA AWARDS

PROGRAM	AWARD	AMOUNT	TYPE OF AWARD	NO. OF AWARDS
NSF	EPSCoR	\$ 17,150,084	RII - Track II	4
NIH	IDeA	\$ 31,438,098	CoBRE	5
NIH	IDeA	\$ 14,236,616	INBRE	1
NIH	IDeA	\$ 19,856,370	CTR	1
NASA	EPSCoR	\$ 1,814,999	CAN/RID	5



\*In addition Mississippi received \$12,782,307 in EPSCoR co-funding.