



## **S&E *sans* Borders**

# **Optimizing EPSCoR Multiagency Funding For a Transformational Reform of R&D and Innovation in a Jurisdiction**

**Dr. Manuel Gómez, Director  
Resource Center for Science and Engineering  
and  
Institute for Functional Nanomaterials (IFN) – Co PD  
October 20, 2009  
[mgomez@upr.edu](mailto:mgomez@upr.edu)  
<http://www.ifn.upr.edu>**

# Quotes from EPSCoR 2020 Report

“The essence of the EPSCoR Experiment is to **catalyze** an S&T **cultural transformation** that is **systemic** and **jurisdictional-wide** ...” that results in a highly competitive **S&T enterprise**

**Strategic Priority 5:** Develop “**State Strategic S&T Business Plan**” for Jurisdiction’s EPSCoR programs

# Quotes from EPSCoR 2020 Report (continued)

**Strategic Priority 3:** “Improve the **coordination** with departments and **agencies** that have **EPSCoR-like programs**” (“**communication** between **NSF** and the other **six EPSCoR-like programs**”)

“Use the Planning Grant process to **nurture** state **S&T Business Plan**”

“Component of the **short-term** plan or proposal must make a persuasive case that the short-term plan contributes on a **coherent** and **systemic** manner to the proposed **long-range plan**”

# AAAS Report for Puerto Rico Jurisdiction: Innovation Management: Establishing an Entrepreneurial Ecosystem (2005)

“The report states that the Jurisdiction has **all the pieces of the puzzle** to promote **innovation**, in good measure due to the Jurisdiction **EPSCoR and EPSCoR-like programs**, but it has **failed at putting the pieces together** to produce a **robust “Entrepreneurial Ecosystem”**”

“**A systemic approach is needed** that should be guided by the **“Public Policy for S&T”**”

## Response

“Creation of a Science, Technology and Research **Trust** to **implement the S&T Policy**”

# EPSCoR 2020 and AAAS Report Point to Five Key Words

**Synergy** - The interaction of two or more agents or forces so that their combined **effect is greater** than the **sum** of the **individual parts**.

**Systemic** (S&T and Innovation Enterprise is a complex system) – Of **affecting** the entire body or an **entire organism**.

**Catalyze** – To bring about; **initiate**.

**Cultural Transformation Needed for Innovation** – Changing **values, beliefs,** and **transactional activities** to make innovation central to the economy.

**Optimization** – The **procedures** used to make a system as **effective** or **functional** as possible.

# The Challenge

- **S&T and Innovation** enterprise is a large **complex and dynamic system**
- System reform has to overcome **stasis** and produce a **cultural transformation** that creates an **entrepreneurial ecosystem** in the Jurisdiction
- The **size** of the S&T and Innovation **enterprise** requires that EPSCoR and EPSCoR-like programs act as **catalyst of change** and **steer** and **harness** the **enterprise resources** to achieve the cultural transformation
- The design of the EPSCoR and EPSCoR-like funds have to be **strategic**

# The Barriers to Optimizing the EPSCoR and EPSCoR-Like Programs to Achieve Competitive R&D and Innovation

## Internal (within the Jurisdiction)

- **Impedance** to multicampus and multidisciplinary collaborations
- **Missing strategies** for **coordinating** and obtaining **synergy** between **S&T Policy, Innovation,** and **R&D**
- **Inability** of EPSCoR programs to **influence Jurisdictional S&T and Innovation Initiatives**

# The Barriers to Optimizing the EPSCoR and EPSCoR-Like Programs to Achieve Competitive R&D and Innovation

(continued)

## External (National)

- Inserting into peer-review process the **value** of **multidisciplinary** and **inter-agencies, collaborations**
- Changing the **beliefs** and **values** of **federal** and other **funding agencies** so they support **synergy** and **optimization** of **resources**
- Lack of **articulation** among **R&D related agencies** that result in **duplication of efforts**

# Case Study of Barriers that Impede Optimization of EPSCoR and EPSCoR-Like Projects

Puerto Rico's only NSF-EPSCoR proposal that did **not pass peer-review**

## “The Fatal Flaw”

We featured the **synergy** between **NSF-EPSCoR**, and **EPSCoR-like** programs in the context of the Jurisdiction's **S&T Policy**

# NSF EPSCoR

Development of target areas based on existing capabilities, growth potential, and contribution to the Island's economy

## PR-EPSCoR Thrust Areas Evolution

### NSF EPSCoR Phase IV

Biotechnology

Engineering

Infrastructure

Environmental Research

High Performance Computing

Materials Science



### NSF EPSCoR Phase V

Integrative Biomolecular Processes (Biotechnology)

Environmental Science and Engineering

Information Technology Research

Materials Science (Nanotechnology)

NIH IDeA

NASA EPSCoR

DEPSCoR

DoE EPSCoR

NSF EPSCoR

External Peer Assessment

American Association for the Advancement of Science

NSF EPSCoR Phase V Funds: \$9.5M

## Preamble to the Four Thrust Areas

“What follows is a brief description of the new thrust areas and the new foci targeted with them. The intellectual leaders and their campuses are given for each trust. **It is important to understand that these thrust areas are for all of the EPSCoR and EPSCoR-like programs and are not limited to NSF.** These currently include NASA-EPSCoR, DEPSCoR, DOE-EPSCoR, EPA-EPSCoR, and NIH-IDeA. However, since NSF EPSCoR remains the central strategy for the overall development of R&D with Puerto Rico, it is critical to describe the complete thrust area scheme here.”

# Preamble to the Four Thrust Areas

(continued)

## Referees' Response

**Four** of **five reviewers** failed to grasp the nature of the ongoing **systemic reform** in **Puerto Rico**

Failed to see that “**17+ research focused areas** under the **four thrusts** went beyond **NSF-EPSCoR** proposal; they included: **NASA-EPSCoR**, **DEPSCoR**, **DOE-EPSCoR**, and **NIH-IDeA**”

This led reviewers to state:

“That **multiple focus areas (17)** are too **diffused** for effectiveness”

# Preamble to the Four Thrust Areas

(continued)

## Referees' Response

and to summarize:

“Because of **lack of focus**, the likelihood that the proposal will result in more successful **competition** for **research dollars** .....is **not compelling**”

## We Learned our Lesson

In the next competition **no mention** was made of **synergy** and **optimization** of **EPSCoR and EPSCoR-like programs** to advance the Jurisdiction R&D and Innovation Agenda

But, we still use the **optimization** and **synergistic strategy** and

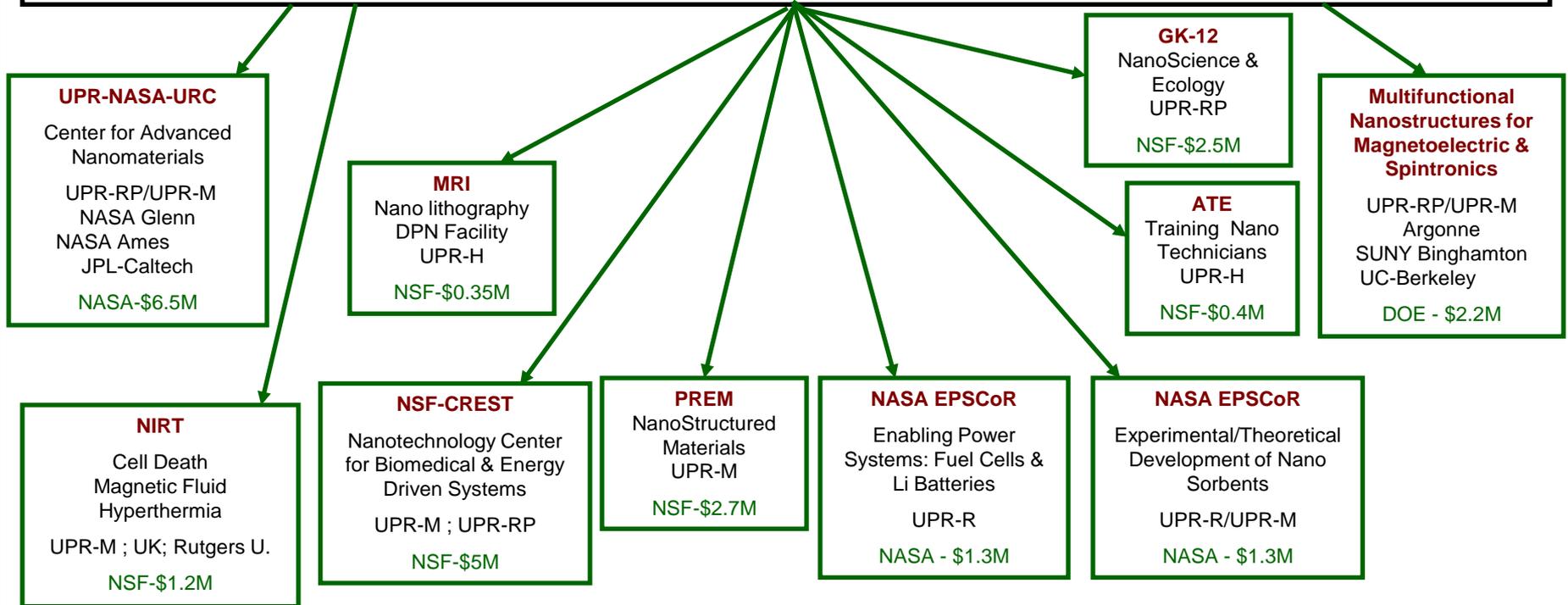
**Voilà**

**Success**



**Multi-Campus/Multi-Disciplinary Institute for Functional Nanomaterials**  
**The Institute articulates all major efforts in Nano Science and Technology in the Jurisdiction**

# Institute for Functional Nanomaterials



**Total Funds Received for 10 Projects: \$23.45M**

# Strategies to Overcome the Barriers

## Intra Jurisdictional Barriers

- Create a strong **EPSCoR State Committee** that has **representation** from the **different types** of **academic institutions** and includes **industrialists** and **entrepreneurs**
- Have the **leadership** of the **EPSCoR** and **EPSCoR-like programs** and members of the **EPSCoR State Committee** participate **as active members** in the **Jurisdiction Policy making bodies**
- **Select** leadership for the **EPSCoR** and **EPSCoR-like programs** for their **vision** and **leadership** in harnessing and **promoting unity** among **diverse groups**; **diverse** by **institutions**, **disciplines**, and **demographics** (**diversity** is the mother of **creativity**)

# Strategies to Overcome the Barriers

## External Barriers

- **Promote** a culture among peer reviewers that foster multidisciplinary and systemic vision; incorporate the **S&T Policy of the Jurisdictions** as a **key criteria** for the evaluation of **synergy** and **optimization** of resources
- Act on **2020 recommendations** and use **NSF leadership** to **enact coordination** with **other agencies** that have **EPSCoR-like** programs to promote **synergy**, **systemic thinking**, and **optimization** of resources
- **Require** that the **EPSCoR State Committee** act as the **coordinator** of all **EPSCoR** and **EPSCoR-like initiatives** in a **Jurisdiction**

# Strategies to Overcome the Barriers

(continued)

## External Barriers

- Use the **Office of Science and Technology Policy's** leadership to **orchestrate a coherent plan to articulate all EPSCoR and EPSCoR-like programs** so that they all work to **achieve the common goal of nurturing the Jurisdiction's "S&T Business Plan"**

# The Mission of the Office of Science & Technology Policy (OSTP) Includes:

“**Lead interagency efforts** to develop and implement sound science and technology **policies** and **budgets**”

“**Build strong partnerships** among **federal, State,** and **local governments...**”

“Evaluate...**effectiveness** of the **federal effort** in science and technology”