



What is EPSCoR and what does it mean for Missouri?

EPSCoR
MISSOURI



EPSCoR Personnel

- **Joe Polacco, PI.** Office of Research (and Biochemistry Department)
- **Anna Waldron, co-PI.** Director, Science Outreach, Department of Learning, Teaching & Curriculum
- **Jeni Hart,** Educational Leadership and Policy Analysis

Women behind the scenes: Mary Licklider,
Sherri Sachdev and others



What is EPSCoR?

- The Experimental Program to Stimulate Competitive Research (EPSCoR)
- Fulfills the mandate of the National Science Foundation (NSF) to *promote scientific progress nationwide*.
- EPSCoR is directed at jurisdictions (states, mainly) that have *received lesser amounts of NSF Research and Development (R&D) funding* (0.75% of total pie).
- NSF EPSCoR establishes partnerships with government, higher education and industry to effect sustained improvements in a jurisdiction's R&D capacity.

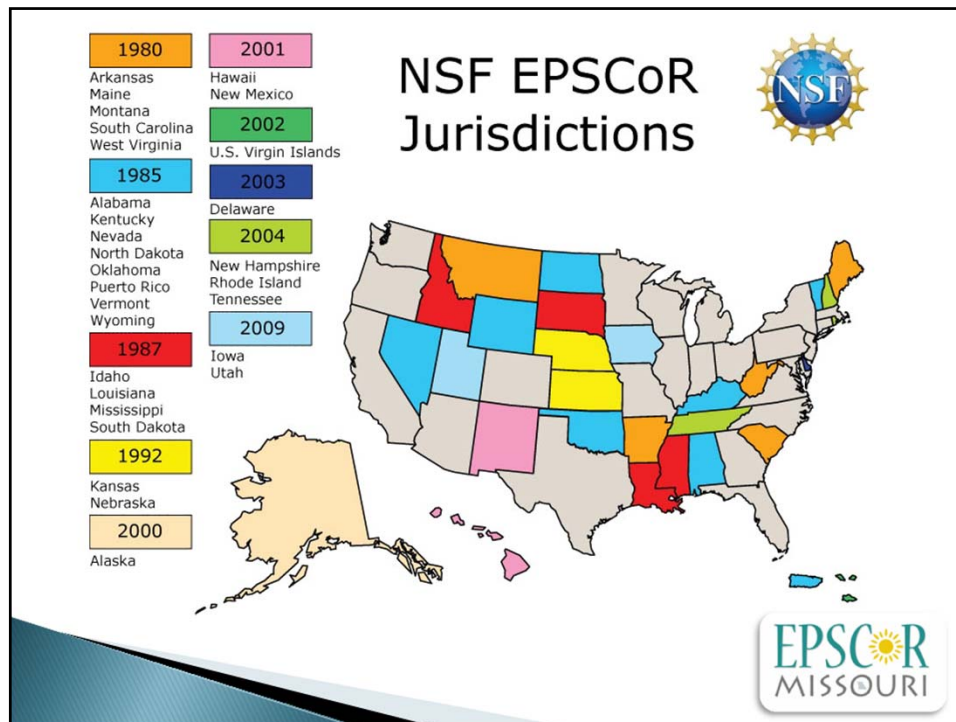


And what does EPSCoR mean for Missouri?

We are now EPSCoR-*Eligible*

Not MU, not UM, but
YOU, MISSOURI





Where are we now?

- Missouri's NSF funding made it EPSCoR-eligible in Fall 2011 (0.73% of NSF Total).
- A statewide team submitted a required planning grant proposal in January 2012.
- If that proposal is awarded, an RII Track-1 proposal will be submitted in October 2012.

Much comes between January and October
(to turn *eligibility* to reality)



Research Infrastructure Improvement Program

- Track-1 (RII Track-1) awards provide up to \$4 million per year for up to 5 years
- Support **physical**, **human**, and **cyber** infrastructure improvements in research areas *selected by the jurisdiction's EPSCoR Governing Committee*



Planning Grant: Planning for Planning

- a. Organize a GOVERNING COMMITTEE that represents business, workforce, research and academic sectors
- b. Compare Missouri's success at NSF with its strengths in R & D
- c. Identify key limiting factors for enhancement of Missouri's R & D success
- d. Solicit input from the state: info on how to "de-limit" those factors (open the bottleneck) -- sustainable infrastructure improvement



Governing Committee

Rob Duncan	MU (Vice-Provost for Research)
Lisa K. Bonneau	2-year institutions
Chris Chung	Missouri Partnership (Business Recruitment)
Gary Clapp	Animal health corridor business interests
Carmen DeHart	Small Business
Dan Getman (Keith Gary)	Kansas City Area Life Sciences Institute
Gale "Hap" Hairston	Missouri Department of Education
Jason Hall	Missouri Technology Corporation
Deb Hollingsworth	AT&T
Even Kharasch	Washington University
Krishna Krishnamurthy	Missouri S&T
Todd Mockler	Danforth Plant Sciences Center
Wenping Qiu	4-year institutions (Missouri State)
David Russell	Commissioner of Higher Education
Gouranga Saha	Lincoln University
Kurt Schaefer	Chair, Senate Appropriations
Bill Simon	Center for Emerging Technologies
Raymond Tait	(SLU) Chair of RAM
Carter Ward	Missouri School Boards Association



Planning Grant: Planning for Planning

- b. Compare Missouri's success at NSF with its strengths in R & D
- Top-funded Institutions
 - Top-funded Disciplines
 - Overlap with Missouri's Target Clusters (for economic development)
 - Does a Consensus for Infrastructure Improvement Clearly Emerge from Disciplines and Target Clusters?



We're Strong in Biosciences at NSF

Overview of Missouri NSF Bioscience Awards				
Institution	FY09	FY10	FY11	Total
MU	21	37	26	84
Washington University	17	25	34	76
UMSL	8	9	6	23
SLU	6	1	5	12
MS&T	1	5	2	8
TOTAL BIOSCIENCE AWARDS (5 Institutions)	53	76	73	203
TOTAL BIOSCIENCE AWARDS (STATEWIDE)	58	92	86	236



We're Coming on at NSF in Information Technology

Overview of Missouri NSF INFORMATION TECHNOLOGY Awards				
Institution	FY09	FY10	FY11	Total
MU	0	3	4	7
UMKC	0	3	1	4
UMSL	1	0	6	7
Washington University	3	9	7	19
MS&T	0	2	1	3
TOTAL INFORMATION AWARDS (TOP 5 Institutions)	4	17	19	40
TOTAL INFORMATION AWARDS (STATEWIDE)	7	18	21	46



Target Clusters

	Advanced Manufacturing	Energy Solutions*	Biosciences*	Health Sciences & Services	Information Technology*	Financial & Professional Services	Transportation & Logistics
Percent of Missouri workers	22.7	12	2	15 or 16.4	<4	8.3	17
Percent with LQ ≥ 1.0	19.5	15	26	30.8	41	28.1	<23
Occupations with salaries ≥ \$39,250	>90	92	>60	65.4	82.4	65.6	61
Multiplier effects	2.02-3.73		1.26-5.55	1.28-2.81	2.7-3.72	1.42-2.77	1.25-4.83
Average wage	\$73,023	\$57,346	\$61,814	\$51,303	\$62,882	\$55,304	\$49,639

* NSF "Target Disciplines"



FY 09-11 NSF Awards to Missouri By Target Cluster

TARGET CLUSTER/ Organization	FY09	FY10	FY11	Total
Advanced Manufacturing (nano & engineering)	10	22	16	46
Bioscience (all inclusive)	58	92	86	236
Avila University	0	1	0	1
Botanical Society of America	0	0	1	1
Donald Danforth Plant Sci Ctr	1	3	1	5
Equinosis LLC	0	0	1	1
Lincoln University	0	0	2	2
Missouri Botanical Garden	1	1	4	6
Missouri State University	0	3	0	3
Missouri S&T	1	5	2	8
Missouri Western State Univ.	0	1	0	1
Rocco, Nicholas T	0	0	1	1
Saint Louis University	6	1	5	12
Southeast Missouri State Univ.	0	1	1	2
Truman State University	0	3	1	4
University of Missouri	21	37	26	84
Univ. of Missouri-Kansas City	3	2	1	6
Univ. of Missouri-St. Louis	8	9	6	23
Washington University	17	25	34	76
Energy Solutions	1	6	9	16
Financial/Professional Services	3	6	9	18
Health Care Sciences/Services	0	2	4	6
Information Technology	7	18	21	46
Transportation and Logistics	0	0	2	2
TOTAL AWARDS	79	146	147	372



Planning Grant: Planning for Planning

- c. Identify key limiting factors for enhancement of Missouri's R & D success Top-funded Institutions
- Top-funded **institutions**
 - Top-funded **disciplines**
 - Overlap with Missouri's **Target Clusters** (for economic development)
 - Does a Consensus for Infrastructure Improvement Clearly Emerge from Disciplines and Target Clusters?

Well, yes, we have identified
the cyber-bioscience interface



Planning Grant: Planning for Planning

- d. Solicit input from the state, info on how to “de-limit” those factors (open the bottleneck)-- sustainable infrastructure improvement

How can you get involved?

- Submit a concept paper
- Due May 1
- Think BIG!
- Think statewide, regional!
- Think national model!



Concept Paper

- <http://www.epscormissouri.org>
- Maximum 6 pages (including the cover page and narrative)
- 2-page NSF-formatted biographical sketch for each author listed (not counted in page limit)
- Maximum of THREE authors of a concept paper.
- Maximum of THREE papers per author
- Maximum of ONE senior-authored paper per individual

Pays to Interdigitate



Concept Paper To RII-Track 1 Proposal

- Name External Advisory Committee
- Share papers among External Advisory and Governing Committees and EPSCoR Consultant
- Finalize objectives, based on recommendations



Types of Infrastructure

- Physical
- Cyber
- Personnel
- And, of course, combinations of the above

In the next few slides, I am just letting my imagination skip free-form.



Types of Infrastructure

Leverage state resources . . . For example, [drought studies](#) and [crop performance](#) in different state regions -- analysis under FIELD conditions:

- Rain shelters (physical)
- Real-time data sharing (cyber-infrastructure)
- Genomics/transcriptomics (core Facilities, HPC)
- Start-up Packages (personnel)
- Broader impacts/STEM



Types of Infrastructure

Expand regional initiatives and resources statewide

- **Grapevine** genomics initiated in Mountain Grove, Missouri State University
- Collaborations with Danforth Plant Science Center
- Now a strong presence in Columbia
- Dedicated facilities for examining gas/water exchange, gene expression in scion and root stock under osmotic stress.
- Dedicated growth facilities, robotics, EM, computation [applied to many disciplines]: Wine Quality = $f(G \times E)$
- We're a center of GRAPE DIVERSITY, fercryinoutloud.



Types of Infrastructure

Cyber Infrastructure

- MU Informatics Institute (MUII) -- MU Strategic Plan for Bioinformatics (2004) already has a strong bioscience component
- Linkages with KC area HPC collaboration (KU, KSU, UM)
- Connectivity via MOREnet
- Connections with our neighbors (7 of 8 are/were EPSCoR states)
- "Virtual Hallways"



Types of Collaboration

Examples in Bioinformatics

- Metabolic-to-ecological scaling
- Complex phenotypes from complex genotypes
- Protein and RNA modeling (drug-binding, protein engineering, etc.)
- Bio-energy conversions-- grain/forage to chicken, beef, fish
- Microorganisms as diode detectors/reporters (not so crazy)
- MO-specific systems biology-- maize, soybean, grapevine.
- The Human Circuits Project (Why not a plant?)



Types of Collaboration

Examples: connections with our neighbors (7 of 8 are EPSCoR)-- leveraging leveraged dollars

- Natural products → pharmaceuticals- tap plant diversity (IA, AK, KS) -- employ high school students
- Plant genomics initiatives with IA, KS (maize, wheat, soybean)
- Watershed management, climatological studies with Arkansas, Oklahoma and other states (Panama Canal Zone-- \$3M from NSF Bio)
- Modeling spillway release and recovery of Mississippi delta
- (ALL OF THE ABOVE HAVE CYBER COMPONENTS)



Types of Collaboration

Build on Missouri STRENGTHS -- animal and plant agriculture, for instance:

- Dog models of human cancers (genomics, GWAS in humans vs genetic mapping of “pre-conditioned” dog genes
- Animal-plant-human nexus in nutrition
- Adaptation to a warmer, drier/wetter Missouri -- animals AND plants



Types of Collaboration

We have a strong tradition mining (UMRolla) and in mineral nutrition

- Mineral::Bio Interface
- Bio-mining (rare earths?)
- Mineral markers in animal and plant phenotypes
- Nanotechnology, “Cold Fusion,” Plant-based metal catalysts/reactive surfaces.
- MURR involvement



Types of Collaboration

- I think an audience of engaged and driven scientists will have no problem making connections
- BUT do not neglect the “Broader Impacts”
- EMBRACE them, make them part of the science -- engage multiple demographic segments of the state



**BUT DON'T TAKE
MY WORD FOR IT**



Admonition from Jim Gosz (Idaho EPSCoR)
Senior Program Director, NSF EPSCoR Program
(2005-2007)
Merit Review Criteria

- Intellectual Merit is the easy part!
- Broader Impacts continue to be difficult for research proposals, however, if the diversity, education and outreach plans are developed well, EPSCoR proposals fare well
- Pay close attention to the additional review criteria in the RII announcement. Panels are instructed to review those criteria and expertise is built into the panel to do that rigorously



Thank you for your time.

I will be happy to TRY to answer your
questions
(I have a few cheat sheet slides)

You know where to find me



FAQs (Mine, at least)

Upon receipt of a planning grant award, will Missouri be eligible for NSF “match” funding for individual investigators?

Yes, Missouri is eligible for co-funding upon award of a planning grant (for at least 3 years).

BIG THANKS: Denise Barnes at NSF



FAQs (Mine, at least)

What about “match” funding (for individual investigators) at other agencies that use NSF eligibility criteria?

Other federal agencies with active EPSCoR or EPSCoR-like programs are DOE, NASA, NIH, and USDA. Of these, **DOE and NASA base eligibility to participate in their programs upon NSF EPSCoR eligibility requirements.** NIH and USDA have different eligibility requirements and should be contacted.



FAQs (Mine, at least)

If at any point Missouri exceeds the 0.75% criterion, will it immediately be ineligible to apply for direct EPSCoR funding from the NSF or from other agencies that use NSF eligibility criteria?

If Missouri goes above the 0.75% of NSF research funds criterion, Missouri can no longer submit proposals to the NSF EPSCoR RII and workshop programs.

BUT other agencies should be contacted directly regarding continued eligibility if this should occur.



FAQs (Mine, at least)

If Missouri is found to exceed the 0.75% criterion after a Track-1 grant has been awarded, will the state receive awards for the remaining years on the Track-1 award?

(Yes) “. active awards will continue as **stated in the award letter** from DGA contingent upon satisfactory progress towards project goals, including compliance with all Programmatic Terms and Conditions.”



FAQs (Mine, at least)

If Missouri is found to exceed the 0.75% criterion after a Track-1 grant has been awarded, will the state continue to be eligible for NSF “match” funding for a period of 3 years.

[we are]. eligible for co-funding and outreach for 3 years after exceeding the criterion.

If Missouri should fall below the 0.75 (if this continues to be the eligibility criterion), Missouri is again eligible to participate in all NSF EPSCoR investment programs.



FAQs (Mine, at least)

Is the three-year average NSF funding proportion to a jurisdiction based on CONSECUTIVE three-year terms? Or, is it based on a SLIDING three-year window, that ratchets up to include the newest complete year?

Eligibility is based upon a jurisdiction’s **most recent three year history of research funds awarded by NSF** relative to the Foundation’s total research budget for that same period.



FAQs (Mine, at least)

What are the other EPSCoR states doing?

Iowa and Utah are the 2009 recipients of new EPSCoR support.

IA: Harnessing Energy Flows in the Biosphere to Build Sustainable Energy Systems

UT: Appears to be Neuroscience-centered: “The Brain Institute 3rd Annual Spring Symposium, March 2012”



FAQs (Mine, at least)

What are the other EPSCoR states doing?

Tennessee and Rhode Island 2004 recipients

TN: Advanced Solar Research; Nanostructures for Enhancing Energy Efficiency; Devices for Energy Storage and Conversion

RI: Strong in Traineeships (SURFs), and Entrepreneurship; Coastal Biology, Climate Change

