

## **Testimony of Dr. Keith McDowell**

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Subcommittee on Science, State, Justice and Commerce and Related Sciences

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Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to testify today regarding the NSF EPSCoR Program.

I am Keith McDowell and I am Vice President for Research at The University of Alabama. I came to Alabama in November of 2003 after spending time at the University of Texas, Arlington; Los Alamos National Laboratory; Clemson University in South Carolina; the State University of New York at Stony Brook; and Harvard University. My undergraduate degree is from Wake Forest University in North Carolina and my PhD in Chemical Physics is from Harvard.

I mention my background for several reasons. First, to describe my experiences in various institutions in various parts of the nation and, second, to relate that to my testimony on behalf of the NSF and NASA Experimental Program to Stimulate Competitive Research (EPSCoR) efforts. Alabama is one of the 25 states and 2 jurisdictions that participate in the EPSCoR program and I am a member of the Board of the EPSCoR Coalition.

EPSCoR was created at the National Science Foundation some years ago in response to Congressional concerns over the geographical imbalance in the allocation of funds for academic research and development (R&D). The National Science Foundation plays a vital role in academic - indeed, all - research in our nation. Research is at the crux of our efforts to harness science and technology to improve our lives. Research affects everything from our personal health to our economic security to our nation's defense.

Unfortunately, however, federal R&D funding is quite uneven. In 2004, the last year for which data has been published, the 27 EPSCoR jurisdictions (25 states and 2 territories) received only about 10 percent of all NSF funding. Out of a total NSF research budget of \$4.254 billion, only \$426 million went to all the researchers and all the colleges and universities in half of our states. By contrast, five states received \$1.8 billion or 43% of all NSF R&D funding. And, NSF is not alone. Similar figures can be cited for other departments and agencies of the federal government.

Why is this an issue? I submit that it is an issue because our goal should be a research community that extends across the nation. Each state deserves an opportunity to create a research infrastructure that can respond to the special needs of that state. Each state

deserves an opportunity to reap the educational, economic and technological benefits that come from having a strong research presence. And, students – most of whom will attend college within 100 miles of home – deserve an opportunity to be exposed to and participate in research activities. There is clear evidence that involvement in research experiences as an undergraduate is a key factor in whether a student goes on to a scientific career. There will always be preeminent research communities throughout our nation, but the benefits of a strong academic research infrastructure should be more widely dispersed than they are today.

One approach to addressing the current research funding disparity is the Experimental Program to Stimulate Competitive Research (EPSCoR). As I mentioned, this program was initiated by the National Science Foundation some years ago to assist in the development of a competitive research infrastructure in those states with a less intensive academic research capability. The program began with 5 states in 1980 with a \$3 million budget. In 1990, it was still a relatively small program, funded at \$8 million.

Initially, the program focused on individual researchers and while the program was quite successful at developing such researchers, there were several disadvantages. Participants in the program often left the state. Institutional infrastructure, including equipment, cluster of researchers and a research culture often did not result. Over the years, a three-pronged approach has evolved. One involves a research infrastructure improvement (RII) award, which enables a state to develop a competitive research base, with the people, equipment and focus to become competitive for NSF and other federal R&D funding. A second is a co-funding mechanism under which funds appropriated to the EPSCoR program are utilized to match funds from the research directorate programs in order to fund proposals that were meritorious but might not be otherwise funded. And, a third consists of SBIR and outreach efforts.

The research infrastructure improvement (RII) awards have been at the heart of the program. The reason most of the EPSCoR states are less competitive than they should be for NSF and other funding is that they do not have the research infrastructure – the facilities, the equipment, the number of researchers needed for competitive clusters or all the relevant expertise required for a cluster, the star-up packages for new hires, the time releases to pursue grants and collaborations that the more developed institutions have. Creating that infrastructure takes time and resources. The RIIs are beginning to create that infrastructure but they are far from having fulfilled that mission. I would suggest that EPSCoR states need 12-15 years of the current RIIs – certainly as long as an S&T center or ERC would run – and that they need several RIIs in order to create a fully competitive infrastructure.

Without the solid and sustained resources to create a competitive academic research environment, such as the RIIs provide, nothing else will progress. The co-funding effort is likely to falter, or at least become more costly to the EPSCoR programs itself. Fewer SIBRs will be awarded in EPSCoR states. Fewer NSF and other awards will be won

through the competitive process, which is, after all, the goal. Consequently, I argue for continuing the current RII program and expanding its funding so that our states can continue to build that infrastructure base.

Let me explain how EPSCoR has worked in Alabama and why the existing RII is so important.

In the 1990s, an EPSCoR RII grant supported the creation of the Center for Materials for Information Technology (MINT) at The University of Alabama. As a result of this funding MINT graduated from EPSCoR in 1998 and again in 2002, MINT was funded by the NSF as a Materials Research Science and Engineering Center. MINT is a very successful research center and is a perfect example of how EPSCoR RII funding should work. I can name similar RII success stories which spawned other centers of excellence in Alabama: The Center for Freshwater Studies that focuses on all the biological and physical issues of the water systems in Alabama; the Integrated Micro-Electromechanical Systems Laboratory, a nanotechnology center located in Huntsville; and about ten more centers of excellence graduated from EPSCoR RII funding. These centers of excellence are multidisciplinary and multi-campus. They integrate the research infrastructure in Alabama while involving HBCUs such as Tuskegee and Alabama A&M. They involve a diverse spectrum of students in all kinds of summer and academic year research opportunities. In summary, these centers of excellence are the fuel for the growth of technology in Alabama as well as the US. We are all the beneficiaries of EPSCoR RII funding of these centers in the early states. However, this success notwithstanding, the state of Alabama only receives less than 1/2 of 1 percent of NSF research dollars every year. We have a long way to go.

In closing, let me mention the specific requests from the EPSCoR Coalition, a non-profit organization of the states that participate in the EPSCoR program. For the NSF program, we are requesting an appropriation of \$120 million for the core program, which is operated out of the Education and Human Resources Directorate of NSF. We believe that the foremost priority is to support and extend the existing RII program and that approximately \$70 million is required to do this. Another \$40 million could be used for co-funding and approximately \$10 million for the SBIR tax and outreach.

For the NASA EPSCoR program, we are requesting \$15 million. There are two components to the NASA EPSCoR Program: core grants and research cluster awards. A core-funding award is made to each eligible state to develop a program, secure collaborations with NASA centers and programs and cover related administrative expenses. The remaining funds have been granted to the eligible states to support specific, competitively selected research clusters. The intent is for these clusters to develop an infrastructure in key NASA related research areas within the state, which will then be competitive for other NASA funding. We know that NASA had more meritorious proposals than it could fund during the last competition and we believe

that there are even more qualified proposals to be submitted pursuant to the next solicitation.

Again, I commend both NSF and NASA for the R&D, which they support. I believe firmly in the contributions that both make. I urge you to be generous with both. At the same time, however, I ask that you insure that the EPSCoR program is funded in NSF at the \$120 million level and that the academic research infrastructure improvement awards remain the primary focus. And, I ask that the NASA EPSCoR program be funded at the \$15 million level. Such an action would promote the development of a nationwide research infrastructure and help guarantee that all states participate in and benefit from a competitive research infrastructure. I am grateful for the opportunity to address the Subcommittee today. Thank you.