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Submitted to the House Committee on Appropriations
Subcommittee on Commerce, Justice, Science and Related Agencies
March 21, 2013

Mr. Chairman and Members of the Subcommittee, my name is Christopher Lawson and I am the Executive Director of the Alabama Experimental Program to Stimulate Competitive Research (Alabama EPSCoR). I am also a professor of physics at the University of Alabama at Birmingham (UAB). Thank you for this opportunity to testify today regarding the National Science Foundation's (NSF) and the National Aeronautics and Space Administration's (NASA) EPSCoR programs. For Fiscal Year 2014, we respectfully request that you fund the NSF EPSCoR program at last year's funding level of approximately $160 million, and fund the NASA EPSCoR program at last year's request level of $25 million.

Congress established the EPSCoR program to ensure that research universities in all states participate in and benefit from Federal science and technology activities. Although EPSCoR states have 20% of the nation's population, and close to 25% of its doctoral research universities, these states only receive about 10% of the Federal research outlays. EPSCoR provides a mechanism to address these geographical imbalances. The program has been a huge success—investments have generated growth in state economies, attracted students into STEM fields, and created a broader base of research expertise available to the agencies to meet their missions.

Ensuring that we have a national research community and strengthening the EPSCoR program is, in my opinion, more important than ever. In an increasingly competitive world, we need the talents and expertise of all our states and people. The EPSCoR states have provided a sizeable number of our nation's scientists and engineers and supported our nation's industries and government activities from the Corps of Engineers projects to space launches. We need to continue this work.

When our nation seeks a broader geographic distribution of research funding through a program like EPSCoR, our states are more economically viable locally and regionally. Several states have noted that the development of research concentrations and business clusters has led to increased economic activity and new jobs. In a knowledge-based society, where technology changes rapidly, it is essential that faculty in all parts of the nation are engaged in research that keeps them current in their field and provides students with the latest scientific advances. Today, the opportunities for our citizens to benefit from scientific and technological developments are perhaps greater than ever before. At the same time, investments in equipment, computing, networking, expertise and other resources requires far more resources than it has in the past. Limiting these resources to a few institutions is self-defeating for our nation -- and 27 states -- in the long run.

NSF EPSCoR is a proven program that Congress created with the stated goals of "providing strategic programs and opportunities for EPSCoR participants that stimulate sustainable improvements in their R&D capacity and competitiveness, and advance science and engineering capabilities in EPSCoR jurisdictions for discovery, innovation, and overall knowledge-based prosperity." There are currently 27 states and 2 jurisdictions that participate in EPSCoR.

NSF provides funding through the EPSCoR Research Infrastructure Improvement (RII) awards. These awards are divided into two tracks—track-1 awards provide up to $4 million annually to support academic research infrastructure improvement in R&D areas critical to a state's competitiveness and economic development. Track-2 awards provide up to $2 million annually to support enhancements in the development of broadband connections and cyberinfrastructure components of EPSCoR states to promote cyberinfrastructure based research and education. Importantly, NSF EPSCoR funding is matched by the states, and in this way the states are helping to leverage Federal investments to deliver results.

A second NSF EPSCoR funding mechanism is "co-funding", where a proposal submitted according to normal NSF procedures is eligible to be

partially funded from NSF EPSCoR if the applicant is from an EPSCoR state.

In my home state of Alabama, NSF EPSCoR funding has generated revolutionary advancements in science and engineering that have led to new business growth and high-paying jobs. For example, EPSCoR funded research at UAB has seeded the development of a new type of ultra-sensitive laser based sensor, an "optical nose", that can be used to detect and characterize environmental toxins from spills caused by natural disasters. The same technology could ultimately be used for medical diagnosis of diseases such as lung cancer by the rapid analysis of the breath of patients during routine visits to the dentist. Finally, it may enable remote "sniffing" of explosives for detection of improvised explosive devices (IUD's). This new technology led directly to the creation of a new multi-million dollar startup company in Alabama.

As another example, current composite materials are petroleum based with synthetic fibers that require large amounts of energy to produce. NSF EPSCoR funded research at Tuskegee University has led to advanced green composites that use plant oil based polymers and fibers. These materials will lead to reduced dependency on fossil fuels, and because they are biodegradable, they will not have to end up in landfills like traditional composite materials.

NSF EPSCoR dollars have also been central to the dissemination of STEM ideas to students, teachers, and industry officials. EPSCoR infrastructure programs introduced more than 2,000 individuals across Alabama to science and technology concepts in one year alone. In a time when the President and Congress talk about the urgency of getting more of our students engaged in STEM fields, it only makes sense to build on this success and continue to fund the NSF EPSCoR program.

Continuing to fund NSF EPSCoR at last year's funding level of $160 million will ensure that states such as Alabama continue to develop a robust research infrastructure so that they can compete for Federal research grants and continue to prepare a skilled, "high tech" workforce capable of delivering innovation in the future.

For NASA EPSCoR in FY 2014, we respectfully ask for funding at last year's request level of $25 million. Like its NSF companion, Congress designed NASA EPSCoR to increase the research capacity of states that traditionally have had limited NASA R&D funding. The program helps states compete for funding in areas that are directly relevant to NASA's mission in earth and space science, human spaceflight, and aerospace technology.

NASA EPSCoR uses two funding mechanisms to carry out the program. The first, the Research Infrastructure Development Cooperative Agreement Awards (RID), provide up to $125,000 to participating states to improve research capacity. The second, the Cooperative Agreement Notice (CAN) Awards, allocate up to $750,000 over a 3-year period for research projects. Together, they attract students into STEM fields, allow more states to participate in NASA's research enterprise, and provide opportunities for high tech economic growth in local communities nationwide. Like the NSF EPSCoR program, states help increase the Federal benefit by matching funds. It is truly a "win-win" program for states and our nation.

In Alabama, NASA EPSCoR funding has allowed researchers in the state to team up with officials at the Marshall Space Flight Center to work on solutions for our nation's space program. EPSCoR researchers are developing shape alloys, a unique and revolutionary class of materials that can recover from structural loads. These materials have the potential for future applications in higher temperature applications, such as those used in aerospace. The research that the program funds enhances Alabama's capabilities and also contributes to NASA's mission.

As another example, NASA EPSCoR research at the University of Alabama on fluid dynamics has the potential to reduce airflow drag by 30%. A 1% reduction in drag can save an airline company $100,000 to $200,000 in fuel per year per aircraft. Thus, this research could ultimately reduce the nation's dependency on fossil fuels, CO2 emissions into the atmosphere, and costs.

Funding the NASA EPSCoR program last year's request level of $25 million would allow NASA to maintain the RID awards at $125,000 per year for participating states and provide additional Implementation grants to seed important national research. With this program, the funding level directly

impacts the number of research grants that can be awarded in a single year. Since the purpose of the program is to broaden the research base, the more research grants that can be funded, the better.

At a time of economic challenges and tight budgets, programs like EPSCoR that seek a broader distribution of research funding make solid fiscal sense. Limiting these resources to a few states and institutions is self-defeating for our nation in the long run. NSF and NASA EPSCoR help all states to benefit from taxpayer investments in Federal research and development, and they generate long-term growth and a skilled workforce for the future. NSF and NASA EPSCoR stretch limited Federal dollars further through state matching. Not only do states benefit from increased research capacity and growth, but our nation benefits from the rich and diverse pool of talent that our entire country can provide. In a time that 33 percent of all bachelors degrees in China are in Engineering, compared to 4½ percent of bachelor degrees in the U.S., if we are to remain globally competitive, instead of restricting ourselves to a few states and institutions, we need to be training and harnessing *all* of our nation's brainpower, and EPSCoR is working to achieve this goal.

Thank you for inviting me to testify before the subcommittee today.