Statement of Marc A. Kastner
Nominee to be Director of the Office of Science
U.S. Department of Energy

Before the
Committee on Energy and Natural Resources
United States Senate

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Chairman Wyden, Ranking Member Murkowski, and Members of the Committee, thank you for the opportunity to appear before you today as you consider my nomination for the position of Director of the Office of Science at the Department of Energy (DOE). I am honored and humbled to be nominated by President Obama and supported by Secretary Moniz to lead this enterprise, which is the largest supporter of physical sciences in the United States. If confirmed, I look forward to working with this Committee to address the challenges of maintaining the Nation's leadership in fundamental science, which is so critical to our security and economic health.

I am pleased that some members of my family are here today: My spouse of more than 46 years, Marcia Kastner, has a Ph. D. in applied mathematics. Although most of her career was in the private sector, her last job was supervising all of the standardized mathematics tests for the children of the Commonwealth of Massachusetts. Our two daughters are here, who are both business women; one has worked at startups in California, the other is starting a company of her own in Brooklyn, New York. Finally my two sisters are here with their partners, one from Maryland and one from North Carolina.

I was born in Canada, but moved with my family at the age of 7 to Cleveland, Ohio. In college, at the University of Chicago, I studied Chemistry as an undergraduate and then switched to Physics in graduate school. In a sense, I have come full circle, because my first scientific publication, of which there are now about 270, was based on research done as an undergraduate, at Argonne National Laboratory in Illinois, one of the great National Labs supported by the Office of Science.

In nearly 50 years of research, I have worked on fundamental questions related to how electrons move inside solids, a field that has provided the science underpinning the electronics and computer industries. Since joining the faculty of MIT just over 40 years ago, I have led extremely talented graduate students and postdoctoral scientists in experiments that have contributed to the understanding of novel semiconductors and superconductors. Our early research was on amorphous semiconductors, some of which are now used for solar energy conversion and others as the active memory material in DVDs. When high-temperature superconductivity was discovered in 1986, I began a 15-year collaboration with Robert Birgeneau, who recently stepped down as Chancellor of the University of California at Berkeley, and the late great Brookhaven National Laboratory scientist Gen Shirane. We used the High Flux

Beam Reactor at Brookhaven to study the magnetic properties of the fascinating materials, whose ability to transmit electricity without loss has the potential for increasing the efficiency of the electricity grid. The research at the reactor gave me a deep appreciation of the value of the large facilities than can only be built and maintained by the Office of Science. The work for which I am perhaps best known, was the discovery of a transistor that turns on and off again every time one electron is added to it; this should be compared with the transistors in your cell phone, which take several hundred electrons and can turn on only once before they are turned off. This single-electron transistor, may someday help to make computers with greater computing power and lower energy consumption.

Twenty years ago, I began to take on administrative responsibilities at MIT, which gave me an appreciation of ever expanding areas of science. As Director of the Materials Research Science and Engineering Center, funded by NSF, I organized the research of about 50 faculty members from the Schools of Science and Engineering working on interdisciplinary projects. When I became Head of the Department of Physics, I was responsible for a faculty carrying out research in high energy, nuclear, atomic, condensed matter and astrophysics. Finally, for the past six years, I have been Dean of the School of Science, which has given me oversight of the life sciences, chemistry, earth sciences and mathematics, including some computer science. Thus, I have had administrative responsibility for research in almost all the fields supported by the Office of Science.

MIT has an outstanding record of turning scientific discoveries into technology and bringing the latter to the market place by starting new companies. I am enthusiastic about working with the Undersecretary for Science and the Director of ARPA-E and others at the Department, to explore new ways of increasing the speed with which technology transfer happens at DOE.

In the past decade, I was privileged to serve as the chair of two committees of the National Research Council, which oversaw numerous studies requested by the Office of Science. I also served on several committees of the Basic Energy Sciences Advisory Committee. These have given me a view of some of the policy challenges and opportunities that I will face if I am confirmed.

I have been privileged to have had my own research supported by government agencies, including the NSF and Department of Defense, as well as DOE, for nearly half a century. I look forward, if confirmed, to helping younger scientists make progress at the frontiers of knowledge.

Let me close by reiterating that our quality of life, the health of our economy, the strength of our national defense and the security of our energy future all stem from discoveries in basic science. I look forward to working with members of this Committee to ensure that basic science continues to thrive at DOE and that its discoveries are turned efficiently into technologies that serve the American people.

I thank you again for considering my nomination, and I will be happy to answer any questions you may have.