"Data to Knowledge to Action" Event
Remarks by Farnam Jahanian

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Good afternoon, everyone.

My name is Farnam Jahanian, and I am Assistant Director for Computer and Information Science and Engineering at the National Science Foundation. I also serve as co-chair of the Networking and Information Technology Research and Development, or NITRD, Subcommittee of the National Science and Technology Council.

Today, we live in the "Era of Data and Information," enabled by scientific instruments, large-scale simulations, Internet transactions, videos, images, … Not to mention the widespread deployment of embedded sensors … For example, sensors in bridges alert us to emerging stress fractures; in smart grids, they enable efficient management of precious resources, and in the environment, they can detect the earliest signs of geological instability.

We find ourselves inundated with data, characterized not only by its enormous volume or the velocity of its generation, but also by its heterogeneity, diversity, and complexity.

As data gathers at an ever-increasing rate across all scales and complexities, there are enormous opportunities:
- to harness data;
- to extract knowledge from them;
- to provide powerful new approaches to drive discovery and decision-making;
- to make increasingly accurate predictions based on data; and
- to gain a deeper understanding of causal relationships based on advanced data analysis.

That is what we mean by "Data to Knowledge to Action."

Some have referred to data as "a transformative new currency for science, engineering, education and commerce."

But, consider the implications for our nation's discovery and innovation ecosystem:
- First, there are profound implications for the economy. Insights and more accurate predictions from large and complex datasets drive creation of new products and services, boost the productivity of businesses, and potentially transform business models. According to a recent IDC report,[1] the data technology and services market alone is expected to grow from $3.2 billion in 2010 to $16.9 billion in 2015.

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[1] Vesset, D., Woo, B., Morris, H.D., Villars, R.L., Little, G., Bozman, J.S., Borovick, L., Olofson, C.W., Feldman, S., Conway, S., Eastwood, M., and Yezhkova, N. 2012. *Worldwide Big Data Technology and Services 2012-2015 Forecast.* IDC. Available at: http://www.idc.com/research/viewtoc.jsp?containerId=233485.

- Second, advances in our ability to store, integrate, and analyze data are accelerating the pace of discovery in almost every science and engineering discipline ... from biology and chemistry to astronomy and material science.
- Finally, data analytics has the potential to solve some of the Nation's most pressing challenges in healthcare, sustainability, education, and public safety.

We can envision a day when:
- By integrating biomedical, clinical, and scientific data, we can predict the onset of diseases and identify unwanted drug interactions.
- By accurately predicting natural disasters such as hurricanes and tornadoes, we can employ life-saving and preventative measures that mitigate their potential impact.
- By integrating emerging technology-based approaches, such as MOOCS, with knowledge from research about how people learn, we can transform formal and informal education.

In March of 2012, the Federal Government launched the National Big Data Research and Development Initiative to advance foundational research, tools and technologies required to make these possibilities a reality. The NITRD program – in particular its Big Data Senior Steering Group – provides the framework and mechanisms to coordinate data-related research and development activities across federal agencies.

I want to thank the members of the Senior Steering Group for facilitating and furthering the national agenda for data R&D. I especially want to acknowledge Suzi Iacono, Allen Dearry, and George Strawn for their leadership of this group.

As we just heard from Dr. Holdren, the NITRD agencies have made extraordinary progress in the past 20 months.

But harnessing the promise of data requires us to seize upon three outstanding opportunities:

First, we must catalyze and nurture a thriving discovery and innovation ecosystem across all sectors. This includes not only government investments in research, education and infrastructure, but also the engagement of:
- Foundations and non-profit organizations
- Leading-edge universities and research labs;
- Scientists and engineers in a flexible talent-rich labor market;
- A vibrant private sector catalyzed by the American entrepreneurial spirit;
- And, partnerships across all sectors – as you will hear about today.

Second, we need people with the skills to analyze, understand and make decisions based on data. A recent report by the McKinsey Global Institute[2] estimated that, "By 2018, the

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[2] Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., and Byers, A.H. 2011. *Big data: The next frontier for innovation, competition, and productivity.* McKinsey Global Institute. Available at: http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation.

United States alone faces a shortage of 140,000 to 190,000 people with analytical expertise and 1.5 million managers and analysts with the skills to understand and make decisions based on the analysis of big data."

There is an enormous opportunity to prepare the next generation for the jobs of tomorrow.

Finally, we must develop new technical solutions for elastic and scalable data management, storage and sharing that also preserve privacy and confidentiality. And, we must ensure the responsible use of data to gain new insights and to motivate action.

In closing, what we are witnessing today is that realizing the enormous potential of data requires a bold, comprehensive, national effort, with engagement of stakeholders from all sectors.

These partnerships lay the groundwork for advances that will strengthen the foundations of U.S. competitiveness for decades to come.

We look forward to the discoveries and innovations that will result from these collaborations.

Thank you all for your role in making these partnerships happen.

Now it's my pleasure to turn the podium over my friend, Tom Kalil, whose leadership has catalyzed the big data R&D initiative across the nation.