Project Outcomes Report

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Award Title: Workshop on Big Data: From Signal Processing to Systems Engineering; to be held at Arlington Virginia, March 21-22, 2013.
Federal Award ID: 1327148
Report Submission Period: 02/15/2013 to 01/31/2014

On March 29, 2012, the White House announced the Big Data Research and Development Initiative to mobilize the research and development community towards Big Data analytics for solving some of the nation’s most pressing challenges. A year later, NSF’s Engineering Directorate sponsored this workshop on signals and systems aspects of Big Data, under stewardship of the Electrical Communications and Cyber Systems (ECOS) program.

The objectives of the workshop were to i) Gather and synthesize engineering perspectives on grand challenges in Big Data, and how engineers can contribute to Big Data systems research; ii) Discuss the role that NSF’s Engineering Directorate should play in Big Data research; and iii) Discuss ways to educate engineers about Big Data.

The workshop brought together some of the most prominent researchers on the subject matter in the relevant disciplines, with a total of 85 participants from academia, industry, and government agencies (NSF, ARL, AFOSR, NRL, and DARPA).

Intellectual merit: The workshop helped outline what is truly unique and challenging in modern massive datasets in general, and big engineering data in particular - which tend to be more tightly structured. The research directions and recommendations that have emerged from the workshop deliberations were distilled in three research thrusts:

1. Statistical Signal and Systems Theory and Optimization;
2. Hardware-Software and Analog-Digital Hybrid Systems for Big Data; and

For each of these thrusts, important and timely research directions were outlined to assist NSF and the engineering research community to better navigate Big Data challenges in engineering and beyond.

Broader impacts: Big data is a multi-disciplinary area that draws upon data mining, machine learning, signal processing, statistics, applied mathematics, and computer engineering. This workshop has addressed one of the constituent communities, with the aim of raising awareness and interest in this exciting cross-disciplinary research area. Faculty, graduate students, researchers from industry, and program managers from the major government agencies have attended talks and panel discussions with leading experts on some of the latest topics in Big Data research.

Last Modified: 01/21/2014
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