President's Council of Advisors on Science and Technology (PCAST)

NINETEENTH MEETING

May 25, 2012

MINUTES
Washington DC

Members Present: John P. Holdren (Co-Chair), Eric Lander (Co-Chair), William Press (Vice Chair), Maxine Savitz (Vice Chair), Rosina Bierbaum, Christine Cassel, S. James Gates Jr., Mark Gorenberg, Mario Molina, Ernest J. Moniz, Craig Mundie, Daniel Schrag, Ahmed Zewail; Chris Chyba, Chad Mirkin, Ed Penhoet, David E. Shaw

Members Absent: Eric Schmidt, Shirley Ann Jackson, Richard C. Levin, Barbara Schaal

Staff: Danielle Evers, Amber Hartman Scholz, Deborah Stine

Public Attendance: Approximately 50 observers attended.

Video Webcast Archive: The archive of the video webcast is available at www.whitehouse.gov/ostp/pcast.

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The President's Council of Advisors on Science and Technology (PCAST) convened in open session at 9:00 am with Dr. John Holdren and Dr. Eric Lander presiding on Friday, May 25, 2012.

Agenda Item 1: Welcome from PCAST Co-Chairs

Dr. Holdren greeted the PCAST members and members of the public in attendance. He noted how productive and active this PCAST has been. Dr. Lander expressed enthusiasm about bringing the scientific and technology community together to look at opportunities to unlock economic potential.

Agenda Item 2: PCAST Study Updates

Dr. Holdren introduced Mark Gorenberg to provide an update on a study realizing the full potential of government-held spectrum to spur economic growth. Mr. Gorenberg noted similar work already going on in the government that provided a starting point for PCAST's deliberations on its findings and recommendations. He explained that more spectrum will be needed in the future because of the anticipated accelerated growth of spectrum use by 2020. Sharing Federal spectrum would be more efficient than current practices of clearing and auctioning Federal spectrum. Mr. Gorenberg noted two trends that would allow for spectrum sharing: first, advances in new technologies in the past decade; and second, t movement to smaller cells rather than cell towers in the last few years.

Mr. Gorenberg highlighted the overarching recommendations in the report. The report recommends the President issue a new memorandum on spectrum use, which would state the policy of the U.S. Government is to share under-utilized spectrum, and identify 1,000 MHz of Federal spectrum for sharing. This would eventually create the first shared use spectrum superhighways.

Mr. Gorenberg then spoke about the potential implementation of a Federal Spectrum Access System, the role of receivers, and immediate actions that could be taken such as creating an advisory committee of industry representatives and enhancing Federal spectrum management.

PCAST members asked about spectrum access for first responders and public safety officers, the role of Federal agencies, the importance of registration, sensing, and licensing; a new metric to measure spectrum efficiency; and the international implications of shared spectrum.

After general discussion of the report, a motion was made and seconded to approve the report pending editorial revisions. PCAST approved the report by a unanimous vote.

Dr. Holdren then introduced Dr. William Press to provide an update on the study of the Future of the U.S. Science and Technology Research Enterprise. Dr. Press reported good progress on the report.

Agenda Item 3: National Institute of Food and Agriculture

Dr. Sonny Ramaswamy, director of the National Institute of Food and Agriculture (NIFA) was introduced by Dr. Holdren. Dr. Ramaswamy thanked PCAST for their attention to agricultural issues. He discussed his background and how it influenced his outlook on food and agriculture, including the role of the United States in helping India create its own version of Land Grant Universities, United States food aid, the discovery of dwarfing crops, and the work of others in the field. He then spoke about his vision for NIFA, by bringing in the best minds to create an innovation ecosystem. Dr. Ramaswamy then provided a short-, medium-, and long-term outlook on food and agriculture. He noted challenges and opportunities related to areas such as transportation logistics, education, natural resources, and public and private investment and funding.

PCAST members inquired about Dr. Ramaswamy's thoughts about the structure of agricultural research, partnerships for educating and training the future farming workforce, the interaction between universities and industry, the role of big data, and approaches to integrating "new biology" (an allusion to a 2011 NRC report).

Agenda Item 4: U.S. CTO Team Agenda 2012

Todd Park, Chief Technology Officer of the United States, spoke about the three goals for his team: liberating data to spur innovation and entrepreneurship, unleashing the innovation "mojo" of the Federal Government, and functioning as a senior advisor on key data and technology entrepreneurship issues. Mr. Park spoke about past GPS and weather data liberation, future possibilities for data liberation, and current health data initiatives. He highlighted the role of innovators in the private sector in finding new uses for the data, and initiatives to help encourage them to do so. Mr. Park introduced the new Presidential Innovation Fellows program, and its

initiatives. He then spoke about his role as a senior advisor as well as how PCAST can help further these initiatives.

PCAST Members asked Mr. Park about the quality and context of data being released, as well as possible uses for healthcare, environmental, and pricing data.

Agenda Item 5: Information Technology Applications: IBM's Watson Project and Google's Self-Driving Car

Dr. Holdren introduced Dr. David Ferrucci, an IBM fellow and principal investigator on the Watson Project, and Anthony Levandowski, project manager for Google's self-driving car. Dr. Holdren noted the interest in both information technology applications.

Dr. David Ferrucci spoke about building Watson. He noted that one of the prevailing challenges in artificial intelligence is to get computers to answer open domain and natural language questions. The Jeopardy challenge let them focus on several aspect, such as a broad domain of topics, complex language, need for high precision and accurate confidence, and high speed response time. Dr. Ferrucci illustrated how Watson worked, by parsing sentences and generating candidate answers. Candidate answers are weighed as Watson finds evidence supporting and refuting each one answer. Dr. Ferrucci also spoke about strategies regarding confidence and precision in the Jeopardy game, and how that affected the project. He then provided insight into the research process and organization of the project, as well as possible applications.

Anthony Levandowski then introduced the Google Car project. He noted that over 90 percent of car collisions are caused by human error. He posed the question of what a vehicle might look like if the computer had been invented before the car. Mr. Levandowski explained how the car uses a laser scanner, radar, cameras, GPS, computers, and other technology to perceive its surroundings and move through space. He provided examples of how the vehicle performed in certain complex situations. Mr. Levandowski shared some of the personal impact a self-driving car can have, such as increased productivity and increased mobility for the elderly and the blind. He also provided metrics describing situations in which the self-driving car is safer than a human driver. He then noted that while the presentation may seem futuristic, it is only a couple of years away from becoming a reality.

PCAST members asked questions of both Dr. Ferrucci and Levandowski. They inquired about the rollout of the technologies into society and the regulatory paths, infrastructure needed for self-driving cars, the extent to which Watson technology could replace a human, applications of Watson in cloud computing, and the implications for car ownership.

Agenda Item 6: Public Comment
Five members of the public provided comments to PCAST in person. The following individuals provided oral comment:

Michael Pearson, Executive Director of the Mathematical Association of America

William Fisher, Vice President of the Institute of Food Technologists, Secretary of the Riley Foundation, speaking on behalf of the Riley Foundation

Karl Glasener, Director of Science Policy, Soil Science Society of America

Charla Rath, Vice President for Wireless Policy Development, Verizon

Derek Shannon, Director of Business Development and Lab Coordinator, Lawrenceville Plasma Physics Incorporated

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Dr. Holdren adjourned the meeting at approximately 3:00 pm.

Respectfully Submitted:

Deborah D. Stine
Executive Director
President's Council of Advisors on Science and Technology

Approved:

John P. Holdren
Co-Chair
President's Council of Advisors on Science and Technology

Eric Lander
Co-Chair
President's Council of Advisors on Science and Technology