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Inside View
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Throughout his campaign, President Donald Trump was largely silent about his views on science, technology and innovation. This uncertainty has left the science and technology community scrambling to scrutinize tweets, pore over published plans and read between the lines of campaign promises. Trump "landing teams" have spread out across Federal agencies, asking questions, surveying the landscape, and making employees nervous. Typical for changes in Administration, advisory white papers and reams of recommendations on science and technology are swirling around town.

> Science and technology have delivered 50 percent of U.S. long-term economic growth over several decades and, therefore, should be a cornerstone of the Trump Administration's economic agenda.

Uncertainty Reigns - But Opportunities Abound

First, the uncertainties:

In addition to concerns about the new administration's rejection of climate change science, the science and technology community is concerned that the Trump Administration will embrace the *Heritage Foundation's Blueprint for a New Administration*, which calls for **eliminating Federal spending on research, development and demonstration of new technologies** in the energy sector, the Department of Energy (DOE) offices that oversee these programs, NIST's Manufacturing Extension Partnership and the "Manufacturing USA" innovation network.

Then there's the issue of **who will lead the science and technology agencies**. As if demonstrating the uncertainty, the homepage of the White House Office of Science and Technology Policy website was replaced with a picture of an empty lectern following the departure of John Holdren, President Obama's Science Advisor.

Two names have surfaced to stand at that lectern in the new Administration, both of whom have met with Trump recently: Yale Computer Science Professor and parallel processing pioneer David Gelernter, and Princeton Physicist William Happer, who excelled at previous posts including director of DOE's Office of Energy Research. Secretary of Energy-designate Rick Perry—who as a Presidential candidate promised to shut down DOE— said at his confirmation hearings that he changed his mind, and sang the praises of our "crown jewel" national labs, exascale computing and nano-photonics.

Another major area of uncertainty is **how President Trump will work with conservatives on Capitol Hill on science and technology policy, and R&D investment.** Historically, conservatives have promoted technology policies in line with free market principles, and generally have opposed an expanded role of government in developing technologies with commercial potential as "industrial policy" by which government rather than the marketplace "picks winners and losers." However, President Trump is a disruptor and lacks ties to the policies that have governed the Federal role in science and technology. Perhaps the President will take a fresh approach to promoting American innovation, which could shake up the current order in a positive way.

Potential New Institutes

Several topics for new institutes have been under consideration. Topics in this mix that are a high priority are: cyber security for manufacturing, and virtual assessment and certification of products and manufacturing processes. Using 3-D models, virtual prototyping and virtual testing, this type of product and process testing, certification and qualification could save significant funds in innovation and stimulate more innovation, as the cost to test and validate drops. Other topics under consideration include: assistive and soft robotics, bioprinting, advanced machine tools and control systems, materials for harsh service conditions, high-value roll-to-roll manufacturing, and an open topic competition.

Two other topics we suggest adding to the list are: detecting nanotechnology defects, and advanced sensors. Cost-effective nano-defect detection is needed for widespread nanotechnology-based manufacturing and materials. Sensors will be widely deployed across the IoT, in natural and built environments, in numerous new products and systems, in defense and medical applications, and nearly every area of relevance to society, generating new markets and underpinning new innovations, businesses, industries, jobs and productivity growth. Sensors were among the top technologies identified by respondents to the 2013 NIST Request for Information to inform Manufacturing USA, which sought input on technologies with broad impact.

Should the Trump Administration extend the Manufacturing USA network, and you consider competing for one of these high dollar manufacturing institute grants, we recommend—based on our decades of experience with creating industrial consortia, and assisting proposers for manufacturing innovation institutes—that you take early action to develop preliminary concepts and identify potential partners.

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