We will begin momentarily at 2pm ET

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“Why am I muted?”
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Thursday, July 9, 2015
“The Entrepreneurial Chemist: Bridging the Bench and the Boardroom”
Tashni-Ann Dubroy, President-Elect, Shaw University and Entrepreneur, Tea and Honey Blends
Steven Isaacman, Founder and CEO, Biosciences

Thursday, July 16, 2015
“Catalyzing Innovation through Molecular Design”
LIVE From the Green Chemistry & Engineering Conference
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Anthony Rappé, Professor of Chemistry, Colorado State University
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“Nanotechnology-Inspired Grand Challenges”
Paul Weiss
California NanoSystems Institute
Lloyd Whitman
White House Office of Science and Technology Policy

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A Special Message from Diane Grob Schmidt
2015 ACS President

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A Call for Nanotechnology-Inspired Grand Challenges
https://federalregister.gov/a/2015-14914

Lloyd Whitman
Assistant Director for Nanotechnology
White House Office of Science and Technology Policy
ACS Webinar, July 7, 2015

National Nanotechnology Initiative (NNI)

20 Federal Departments and Independent Agencies
11 with nanotech budgets

2015 budget: $1.5 billion
$22 billion since 2001

www.nano.gov
15 Years of Presidential Nanotechnology

“Just imagine materials with 10 times the strength of steel and only a fraction of the weight... it was a real thrill for me to meet Dr. Moore, ...even I knew what Moore’s Law was.”

*President Clinton at CalTech, January 21, 2000*

Discussing nanomanufacturing at Boise State, the President invoked Moore’s law, and later remarked “Some of your faculty and students are working with next-generation materials like graphene, which is a material that’s thinner than paper and stronger than steel.”

*President Obama at Boise State, January 21, 2015*

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Fifth Assessment of NNI by PCAST

NNI has delivered significant S&T progress

*Healthy research should continue*

International competition has increased

*U.S. now behind in infrastructure, workforce*

“NNI 2.0” should focus on nano-systems and commercialization

Agencies should facilitate commercialization through *Grand Challenges*

Need formal system of metrics to track progress
Innovating Through Grand Challenges

Ambitious but achievable goals that harness science, technology, and innovation to solve important national or global problems and have the potential to capture the public’s imagination.

DOE SunShot Grand Challenge
Make solar energy cost competitive with coal by 2020

DOE EV Everywhere Grand Challenge
Make electric vehicles that are as affordable as today’s gasoline-powered vehicles by 2022

NASA’s Asteroid Grand Challenge
Find all asteroid threats to human populations and know what to do about them

Characteristics of a Grand Challenge

Measurable end-point
Advances in fundamental scientific knowledge
Clear intermediate milestones
Drives the need for collaboration
Catalyzes the transition of technologies
Too big to be undertaken by one or even a few organizations
Exciting enough to motivate decision makers
Captures the imagination of the public
Nanotechnology-Inspired Grand Challenges for the Next Decade

Ambitious but achievable goal that harnesses nanoscience, nanotechnology, and innovation...

Not every important challenge will be solved using nanotech

_Aim is to identify those where benefits of nano likely to play an important role in solving the problem_

Six examples developed by agencies, NNCO, & OSTP

Example Nano-Inspired Grand Challenges

By 2025, achieve the following:

*Increase the five-year survival rates by 50% for the most difficult to treat cancers*

*Create devices no bigger than a grain of rice that can sense, compute, and communicate without wires or maintenance for 10 years, enabling an “internet of things” revolution*

*Create computer chips that are 100x faster yet consume less power*

*Manufacture atomically-precise materials with fifty times the strength of aluminum at half the weight and the same cost*

*Reduce the cost of turning sea water into drinkable water by a factor of four*

*Determine the environmental, health, and safety characteristics of a nanomaterial in a month*
Information Requested

Your ideas for grand challenges
How to improve any of the examples offered
For each grand challenge discussed, answer some key questions

Responses accepted through 11:59 pm Eastern Time on July 16, 2015

Email preferred: NNIChallenges@nnco.nano.gov

Depending upon responses, may select a few to announce this fall, possibly in partnership with other organizations

Grand Challenges

National Academy of Engineering
www.engineeringchallenges.org
BRAIN Initiative: Understanding Functioning & Malfunctioning Neural Circuits in the Brain

Approaches:
- Dynamic voltage mapping
- Dynamic chemical mapping
- Physical connectome
- Computer simulations

Human brain:
- ~100 non-orthogonal chemical neurotransmitters
- ~85 billion neurons
- ~100 trillion synapses

Alivisatos et al., ACS Nano 7, 1850 (2013)

www.whitehouse.gov/share/brain-initiative


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