June 2012 COGR Meeting Guest Speaker - Kalil

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Grand Challenges

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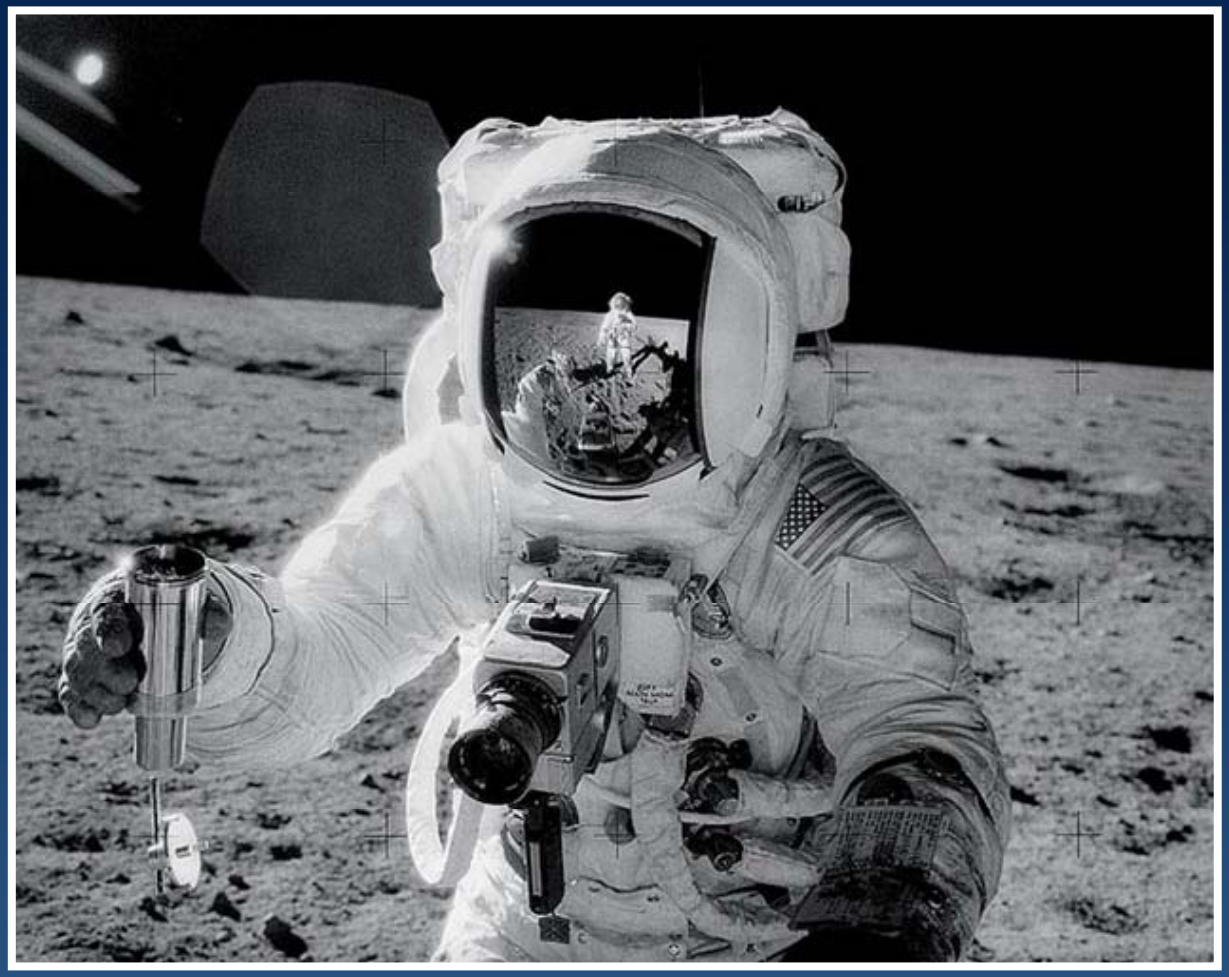
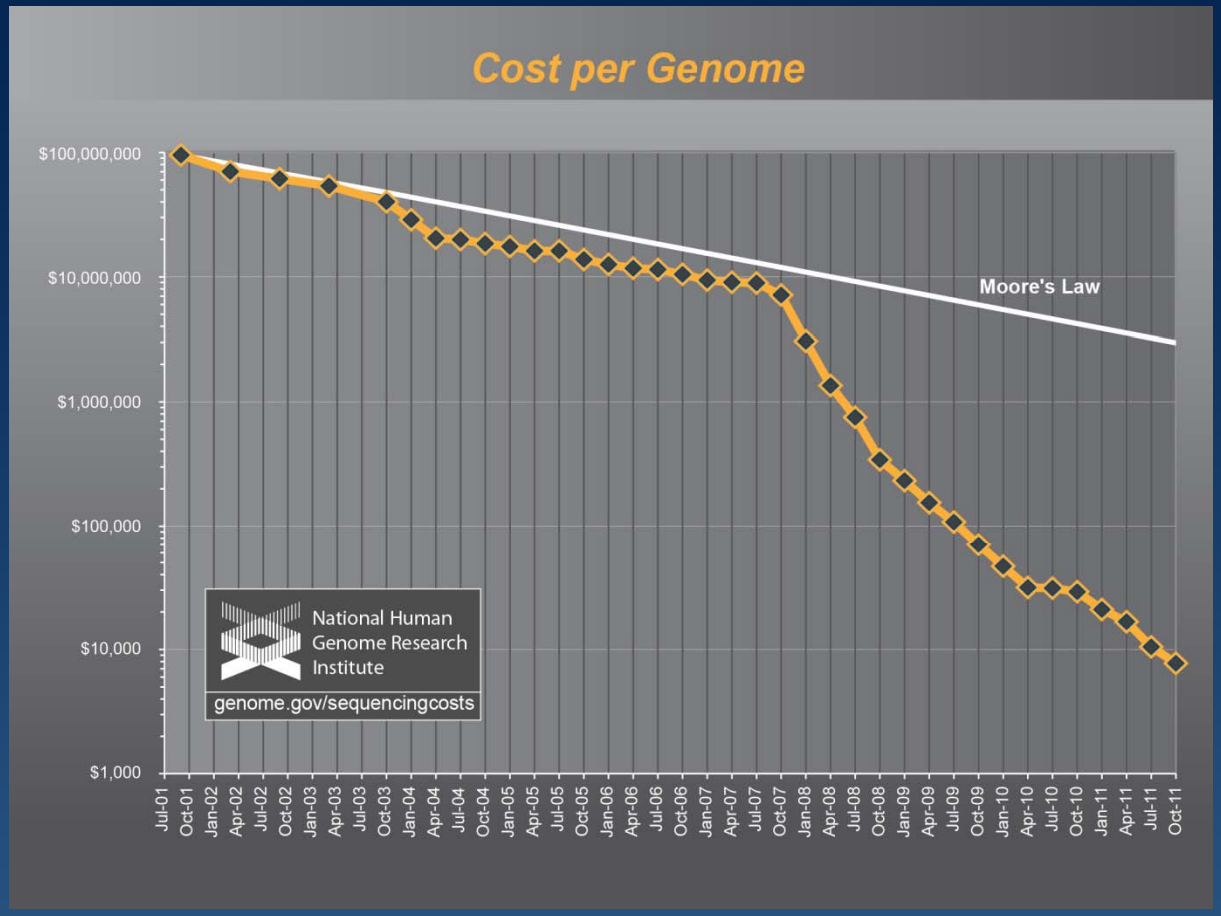
Grand Challenges



Sequencing the Human Genome



Grand Challenges

- Role in President Obama's innovation strategy
- Attributes and benefits
- Examples
- Involving more individuals and institutions

Strategy for American Innovation

"The Federal government should ... use high-risk, high-reward policy tools such as prizes and challenges to solve tough problems."

-President Barack Obama

August 5, 2009

President Obama's Innovation Strategy

Innovation for Sustainable Growth and Quality Jobs

Catalyze Breakthroughs for National Priorities

- Unleash a clean energy revolution
- Support advanced vehicle technology
- Drive breakthroughs in health IT
- Address the "grand challenges" of the 21st century

Promote Competitive Markets that Spur Productive Entrepreneurship

- Promote American exports
- Support open capital markets that allocate resources to the most promising ideas
- Encourage high-growth and innovation-based entrepreneurship
- Improve public sector innovation and support community innovation

Invest in the Building Blocks of American Innovation

- Restore American leadership in fundamental research
- Educate the next generation with 21st century knowledge and skills while creating a world-class workforce
- Build a leading physical infrastructure
- Develop an advanced information technology ecosystem

Source: www.whitehouse.gov

Current Public Sector Grand Challenges

Department of Energy: Clean Energy Grand Challenges

- **SunShot:** To make solar energy cost competitive with other forms of energy by 2020
- **EV Everywhere:** To make electric vehicles as affordable and convenient to own as gas-powered vehicles by 2020

USAID: Grand Challenges for Development

- **Saving Lives at Birth**: To increase access to primary health care for pregnant women and newborns by at least 50%
- **All Children Reading**: To have students in low-income countries leave primary school with basic reading skills

Prizes: Long Track Record of Spurring Innovation

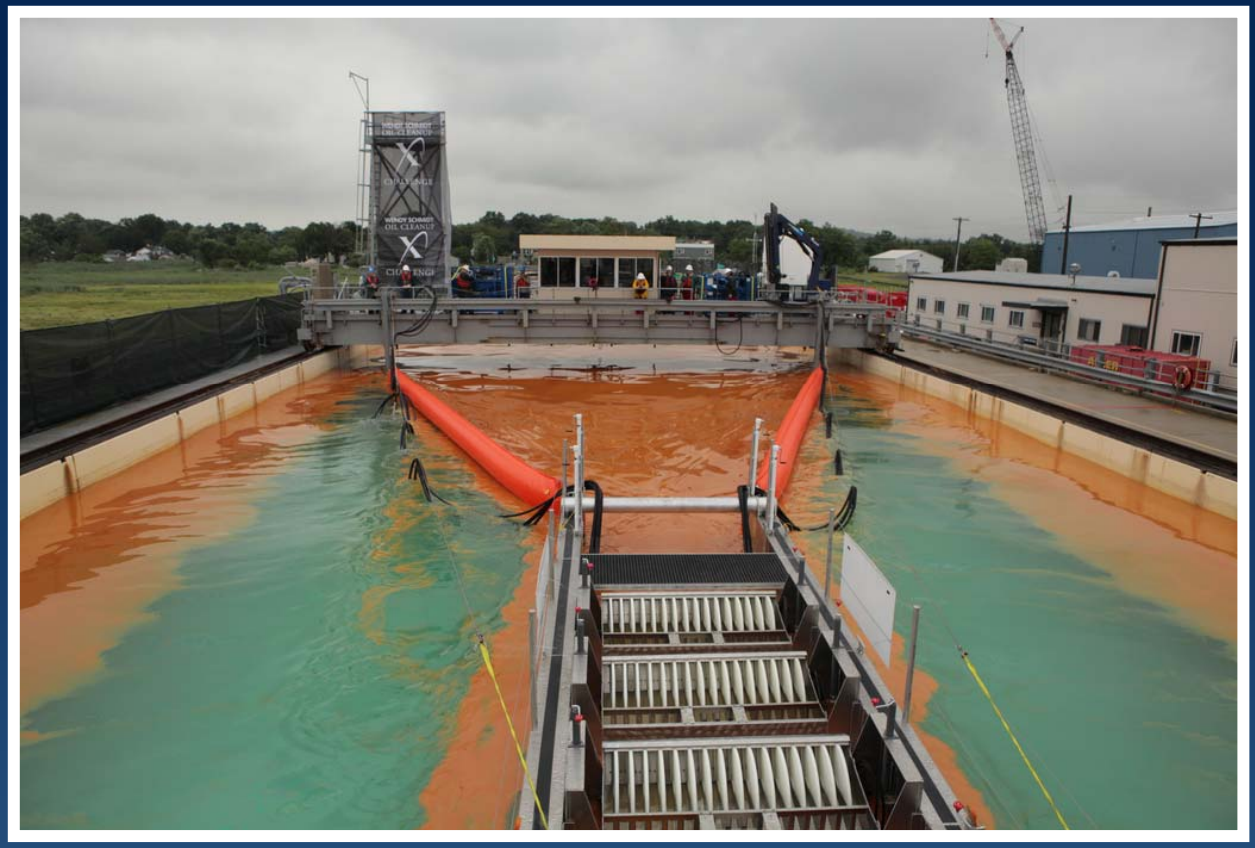
"[T]otal funds from large prizes have more than tripled over the last decade to surpass $375 million."

- And the winner is...
McKinsey 2009

Benefits of Prizes

1. Shine a spotlight on a problem or opportunity
2. Pay only for results
3. Target an ambitious goal without predicting which team or approach is most likely to succeed
4. Reach beyond usual suspects to tap top talent
5. Stimulate private sector investment many times greater than the prize purse
6. Bring out-of-discipline perspectives to bear
7. Inspire risk-taking by offering a level playing field
8. Establish clear target metrics and validation protocols

Wendy Schmidt Oil Cleanup X Challenge



- Target: 2500 gpm at 70% efficiency, 2x today's standard oil recovery rate
- 350+ narrowed down to 10 finalist teams
- $1,000,000 First Place Winner **Elastec** (Illinois)
- Achieved **4x** today's standard oil recovery rate in <6 months product development
- 4670 gallons per minute at 89.5% efficiency

NASA Green Flight Challenge

- $1.65 million prize purse
- 14 teams invested >$6 million
- 2 winning teams exceeded requirements by nearly a factor of two
- >200 miles on energy equivalent of half a gallon of gas

"By defining our goal more clearly, by making it seem more manageable and less remote, we can help all peoples to see it, to draw hope from it, and to move irresistibly towards it."

- President John F. Kennedy

June 10, 1963,
Commencement Address,
American University

Attributes of Grand Challenges

1. Significant impact in areas of national and global priority
2. Ambitious yet achievable
3. Compelling and intrinsically motivating
4. “Goldilocks” level of specificity and focus
5. Able to harness innovation and advances in science and technology

Benefits of Grand Challenges

1. Help solve important economic and societal problems
2. Serve as a “North Star” for high-impact, multi-disciplinary collaborations and public-private partnerships
3. Create the foundation for the industries and jobs of the future
4. Capture public imagination and increase support for public policies that foster science, technology and innovation
5. Inspire the next generation of scientists, engineers, and entrepreneurs

What if…?

1. A digital tutor allows recent high school graduates to gain the skills and an industry-recognized certificate they need to increase their income by 50 -100 percent in 4 months
2. Regenerative medicine routinely replaces damaged tissues or organs – ending the agonizing wait for an organ transplant
3. We can increase the efficiency with which we produce proteins and other essential nutrients by a factor of 100 or more

What if…?

5. We put the tools to design and make just about anything (e.g. 3-D printers, TechShops, Maker Spaces, FabLabs) at the fingertips of every child
6. Self-driving cars reduce traffic fatalities by 80 percent, while freeing up our commute time for work, leisure, or a nap

All Hands on Deck

1. Foundations and donors: 0rganize philanthropic giving around Grand Challenges
2. Universities: organize research initiatives to meet ambitious Grand Challenge goals, educational programs such as Grand Challenge Scholars Program
3. Companies:
   - Identify a Grand Challenge they can contribute to
   - Sponsor major incentive prizes designed to address a Grand Challenge
   - Be early customers, provide capital, or provide mentoring to startups pursuing a Grand Challenge
4. Angel, venture, and impact investors can back startups that are pursuing Grand Challenges
5. Media companies and America's storytellers can help make engineers and entrepreneurs pursuing Grand Challenges the rock stars of the 21st century

"What would you attempt to do if you knew you could not fail?"

Thank You

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