

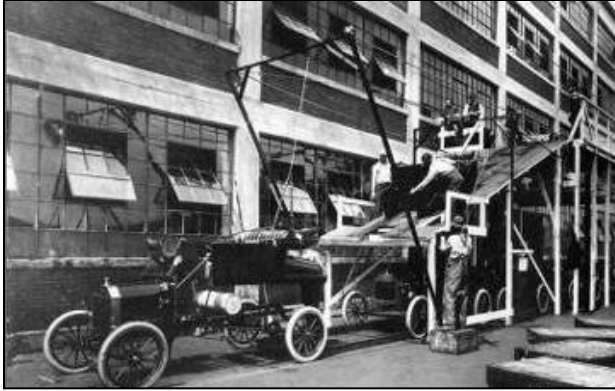
Materials Genome Initiative Grand Challenges Summit

Nov 19-20, 2013

Institute of Bioscience & Biotechnology Research
Rockville, MD



The U.S. innovation machine has been the greatest in the world



Model T Ford assembly line



First transistor



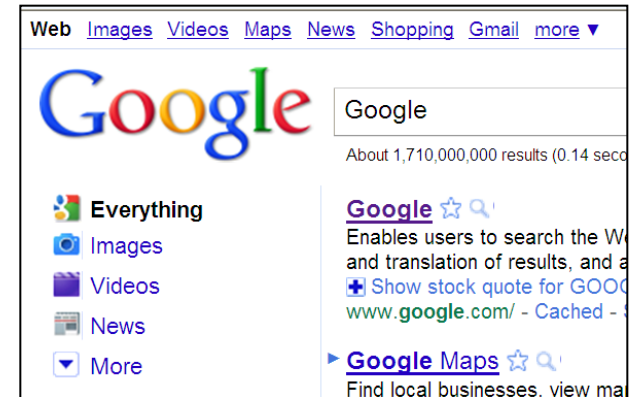
Integrated circuits



First airplane



Optical and satellite communication, GPS

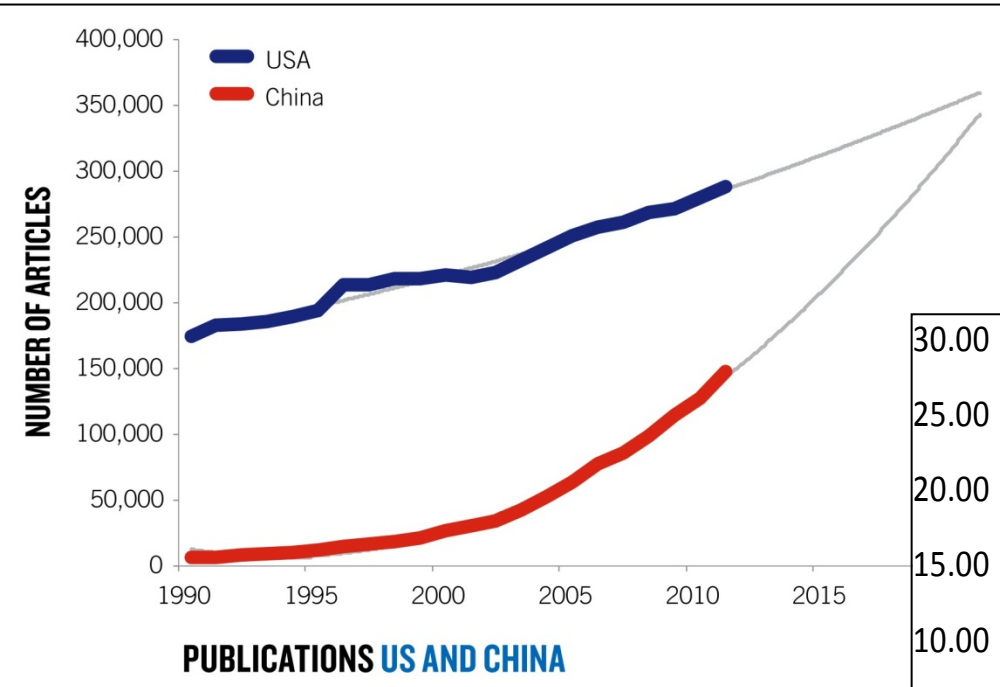


The Internet

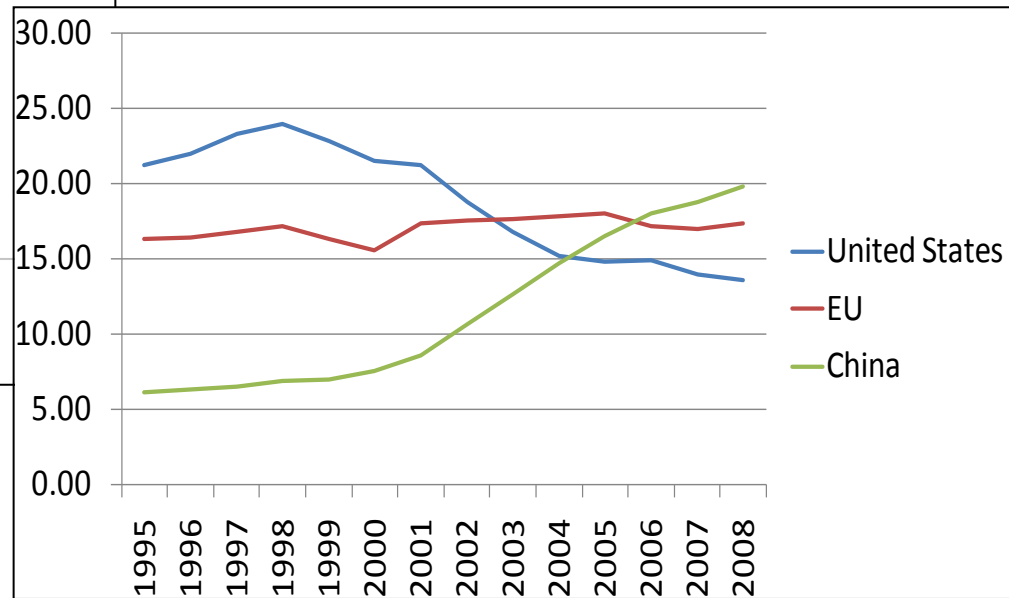
1.7 Billion hits in 0.14 seconds

The U.S. leadership in science & high-tech manufacturing is at risk

Comparison of U.S. and China Publications



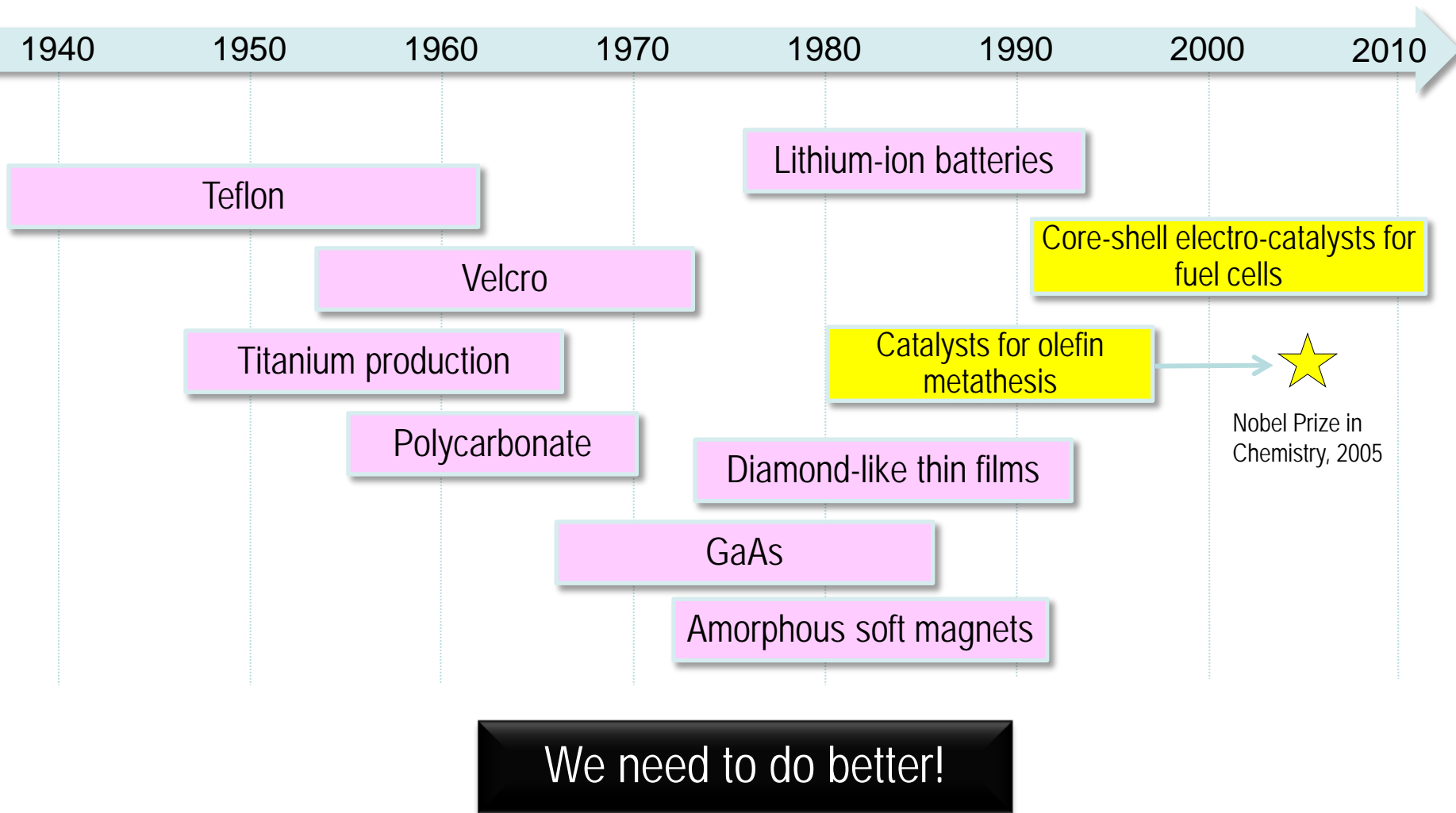
Percentage of global high tech exports



NSF Science and Engineering Indicators 2010

Nature Publishing Group 2011

Discovery to Application in the 20th Century



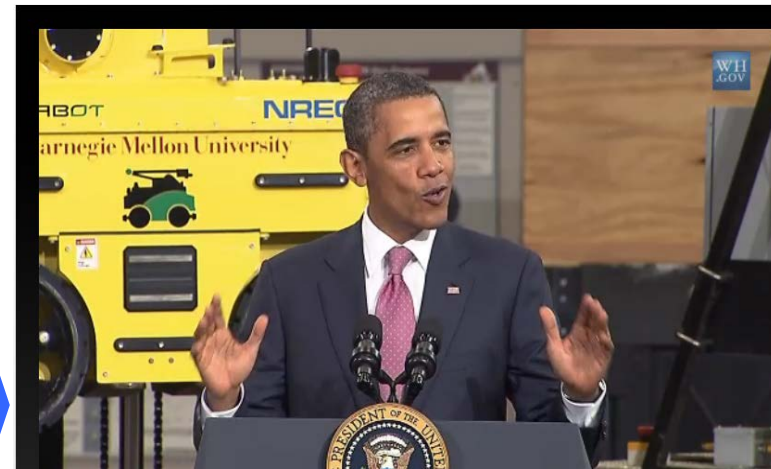
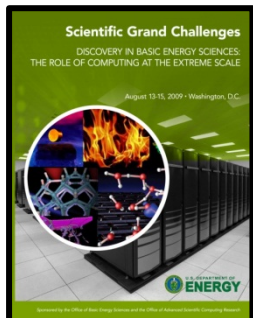
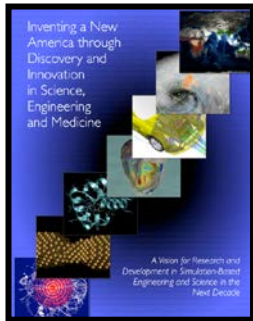
After Gerd Ceder (MIT); materials information from T. W. Eagar and M. King, Technology Review 98 (2), 42 (1995).
Catalysis information from R. Schrock et al. and R. Adzic et al.

Materials Genome Initiative: The Innovation Engine

Community-based Workshops

National Science and Technology Council
Office of Science and Technology Policy

A Renaissance in American Manufacturing
President Obama Speech on June 24, 2011



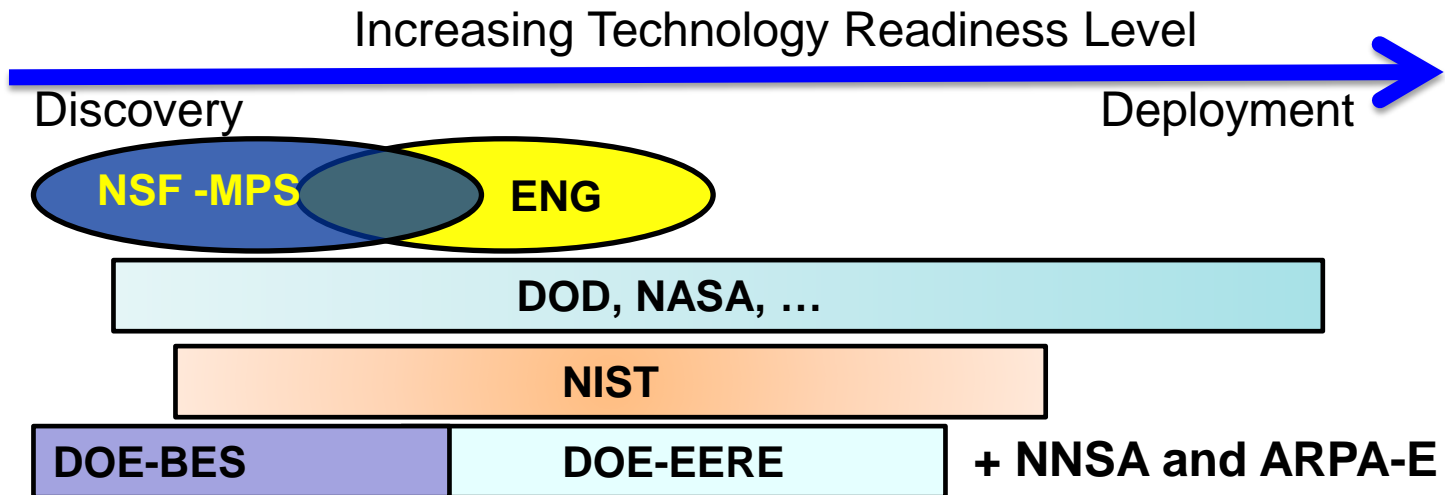
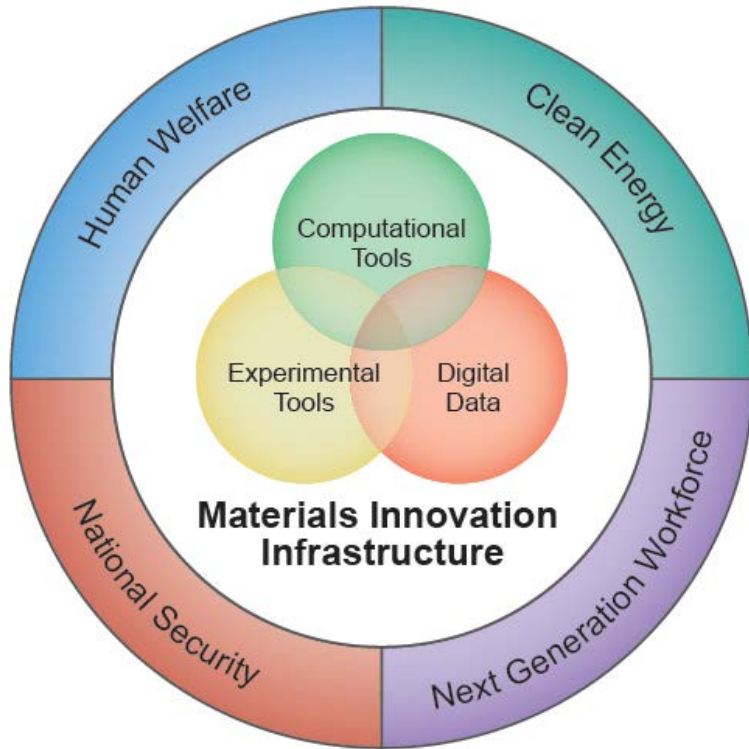
President Obama kicks off the **Advanced Manufacturing Partnership (AMP)**, a national collaboration between the government, industries, and universities to invest in cutting-edge technologies, create new jobs and bring about a renaissance in American manufacturing. As part of his new AMP, the President is announcing an ambitious plan, the **Materials Genome Initiative**, to **double the speed with which we discover, develop, and manufacture new materials.**

TRANSFORMING THE DISCOVERY PROCESS

21st CENTURY

- **Presently**
 - **Have developed and deployed powerful collections of research facilities and tools for materials and chemical sciences**
 - ⑩ **Able to synthesize, characterize, and model materials and chemical behavior at the length scale where this behavior is controlled**
- **MGI Vision**
 - **Develop and build infrastructure to enable materials on demand**
 - **Enable teams of researchers with expertise in modeling/theory, synthesis and characterization to work in a synergistic and iterative mode**
 - **Build infrastructure to enable access to results and data of others**

MGI - A Multi-agency Partnership



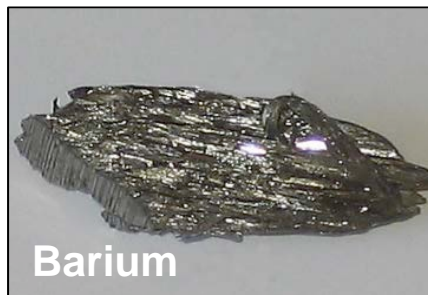
YBCO Coated Conductor Wires

From Discovery to Deployment

Normal metal elements



Yttrium

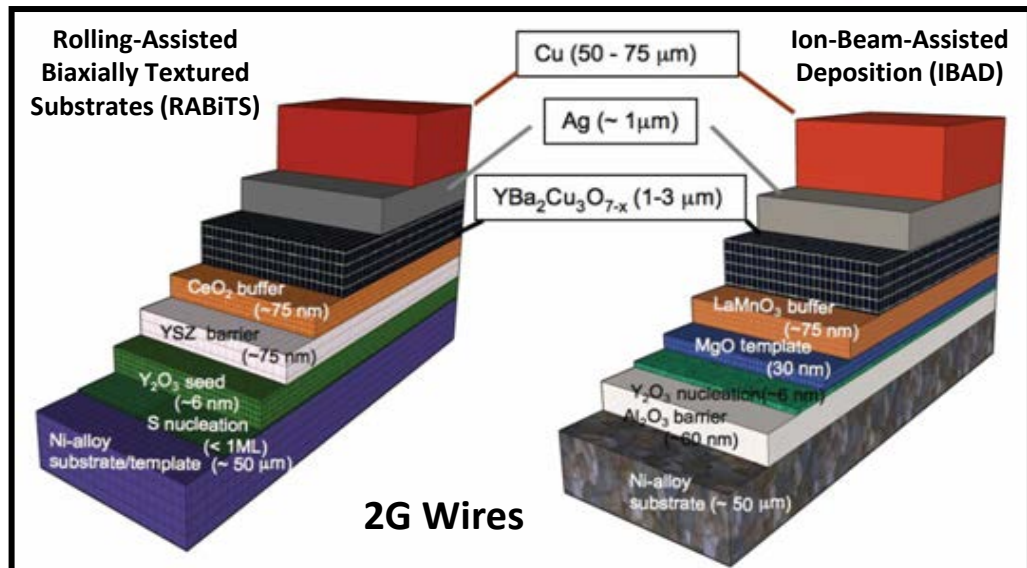
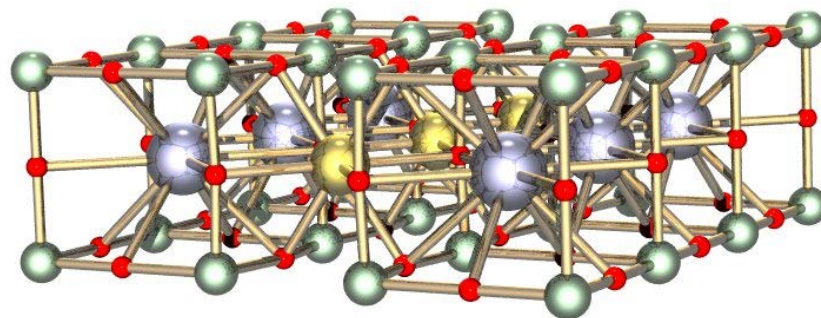


Barium



Copper

$\text{YBa}_2\text{Cu}_3\text{O}_7 - 90^\circ \text{K}$
superconductor alloy



Demonstration Projects



Albany, NY



Long Island, NY



Columbus, OH

MGI Grand Challenges Summit

Purpose:

- identify the key challenges and opportunities where the Materials Genome Initiative must focus its efforts;
- with viewpoints balanced across the academic-industrial-government spectrum;
- 4 sectors have been selected for the 1st meeting in the Summit series:
 - Biomaterials
 - Organic Electronics
 - Polymers
 - Polymer Composites

Interagency Organizing Committee:

- Co-Chairs: Laurie Locascio (NIST) and Linda Horton (DOE-BES)
- Executive Committee Workshop: Jonathan Guyer (NIST), Mary Galvin (NSF), Will Joost (DOE-EERE), Chuck Ward (DoD-AFRL), and Jim Warren (NIST)
- Meredith Drosback (OSTP)

MGI Grand Challenges Summit

Special thanks to Session Chairs:

- Biomaterials:

- Sam Stupp (northwestern) and Rajesh Naik (AFRL)

- Composite Materials

- Byron Pipes (Purdue) and Rani Richardson (Dassault Systems)

- Organic Electronics

- Howard Katz (JHU) and Gregory Whiting (PARC)

- Polymers

- Juan de Pablo (U Chicago) and Todd Younkin (Intel)

Agenda

Nov 19

- 8:00 Breakfast/coffee
- 8:30-8:45 Opening Remarks – (Linda Horton, Laurie Locascio, Mary Galvin)
- 8:45-9:15 *Materials Genome Initiative*, Meredith Drosback, Office of Science and Technology Policy
- 9:15-9:45 Hugh Helferty, ExxonMobil Research and Engineering Company
- 9:45-10:15 Peter Cummings, Vanderbilt School of Engineering
- 10:15-10:45 Break
- 10:45-11:15 Theresa Kotanchek, Evolved Analytics
- 11:15-12:00 Instruction to Breakout Sessions – (Linda Horton or Laurie Locascio)
- 12:00 – 1:00 Lunch
- 1:00 – 5:00 Breakout Sessions

Nov 20

- 8:00 Breakfast/Coffee
- 8:30 – 10:00 Breakout Sessions
- 10:00-10:30 Break
- 10:30 – 11:45 Reports from Breakout Sessions
- 11:45 – 12:00 Looking Forward – (Linda Horton or Laurie Locascio)