

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

The National Materials Advisory Board Activities (along with BICE and BMED)

Presentation to University Materials Council – June 1, 2009

Gary Fischman

Director

The National Materials Advisory Board

The Board on Manufacturing and Engineering Design

Board on Infrastructure and Constructed Environments

National Academies

Washington, DC

THE NATIONAL ACADEMIES™ Division on Engineering and Physical Sciences
Advisers to the Nation on Science, Engineering, and Medicine

National Materials Advisory Board

National Academies

o Purpose

- To advance science and technology
- To advise government
 - On policy institutions for science, engineering and health care
 - On applications of science and engineering to policy
- We do this mainly through meetings and the development of conclusions and recommendations via NRC reports

“... shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art ...”

–National Academies Charter, Section 3 – March 3, 1863

A (very) short History

- o 1863 National Academy of Science incorporated (charter signed by Lincoln)
- o 1916 National Research Council established as a wartime effort
 - *In 1941, responding to a request by Vannevar Bush, the National Academy of Science and National Research Council stood up the War Metallurgical Committee.*
 - *In 1951 the Metallurgical Advisory Board was established from the War Metallurgical Committee. This is the first iteration of the National Materials Advisory Board.*
- o 1964 National Academy of Engineering established under NAS auspices
 - *1968 final name change to the National Materials Advisory Board*
- o 1970 Institute Of Medicine established under NAS auspices

Methods of Operation

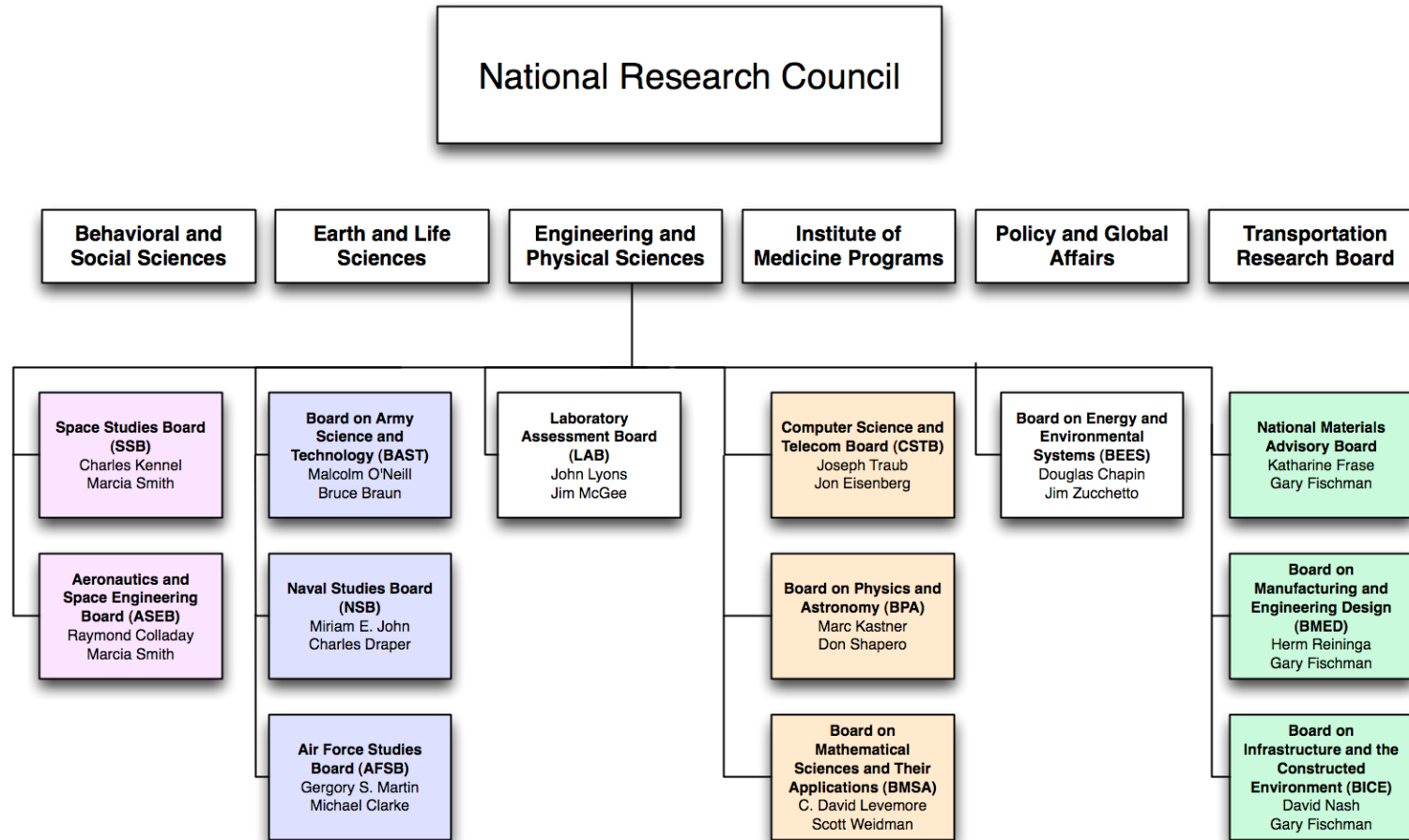
o Consensus Studies

- Balance and Composition of Committees
- Committee consensus on report
- External review of report

o Convening Activities

- Workshops
- Standing Committees
- Roundtables

A Synoptic Org Chart



NMAB Roster

- o Katharine Frase – Chair
- o Lyle Schwartz – Vice Chair
- o Peter Bridenbaugh
- o Valerie Brown
- o L Catharine Brinson
- o John Cahn
- o Yet-Ming Chiang
- o Paul Citron
- o Dianne Chong
- o George (Rusty) Gray
- o Sossina Haile
- o Liz Holm
- o Carol Handwerker
- o Dave Johnson
- o Tom King
- o Bob Latiff
- o Ken Sandhage
- o Bob Schafrik
- o Steve Wax

Gary Fischman – Director

Technical Staff

Kevin Lewis
Emily Ann Meyer
Lynda Stanley
Erik Svedberg

Administrative and Financial Staff

Heather Lozowski
Teri Thorowgood
Laura Toth

How I Perceive the individual Boards

- o The principal source of objective independent and informed scientific, technological and policy assessments for:
 - The National Materials Advisory Board (NMAB)
 - Materials engineering and materials science
 - Materials processing and processes
 - Materials applications
 - The Board on Manufacturing and Engineering Design (BMED)
 - Manufacturing
 - Supply Chains
 - Systems engineering
 - Engineering design
 - The Board on Infrastructure and the Constructed Environment (BICE)
 - National through local Infrastructure issues
 - High Performance – low carbon footprint structures and environments
 - Issues dealing with constructed and natural environments.
 - Interaction of environments with human activities

Recent Reports

o 2008 - 2009

- Review of the Bureau of Reclamation's Corrosion Prevention Standards for Ductile Iron Pipe (NMAB)
- Assessment of Corrosion Education (NMAB)
- Proceedings of a Workshop on Materials State Awareness (NMAB)
- Integrated Computational Materials Engineering for A Transformational Discipline for Improved Competitiveness and National Security (NMAB)
- Managing Materials for a Twenty-first Century Military (NMAB)
- Sustainable Critical Infrastructure Systems: A Framework for Meeting 21st Century Imperatives (BICE)
- Assessment of the Bureau of Reclamations Security Program (BICE)
- Construction Research at NIOSH: Reviews of Research Programs of the National Institute for Occupational Safety and Health (BICE)



Current Activities

- o Materials Needs and R&D Strategy for Future Military Aerospace Propulsion Systems (NMAB)
- o Research Opportunities in Corrosion Science and Engineering (NMAB)
- o Roundtable on Biomedical Engineering Materials and Applications (NMAB)
- o Understanding the Impact of Selling the Helium Reserve (NMAB, with the Board on Physics and Astronomy)
- o Engineering Aviation Security Environments – False Positives from Explosive Detection Systems (BMED)
- o Federal Facilities Council (BICE)
- o Advancing the Competitiveness and Productivity in the U.S. Construction Industry (BICE)
- o Evaluation of Future Strategic and Energy Efficient Alternatives for the Delivery of Utility Services to the U.S. Capitol Complex (BICE)

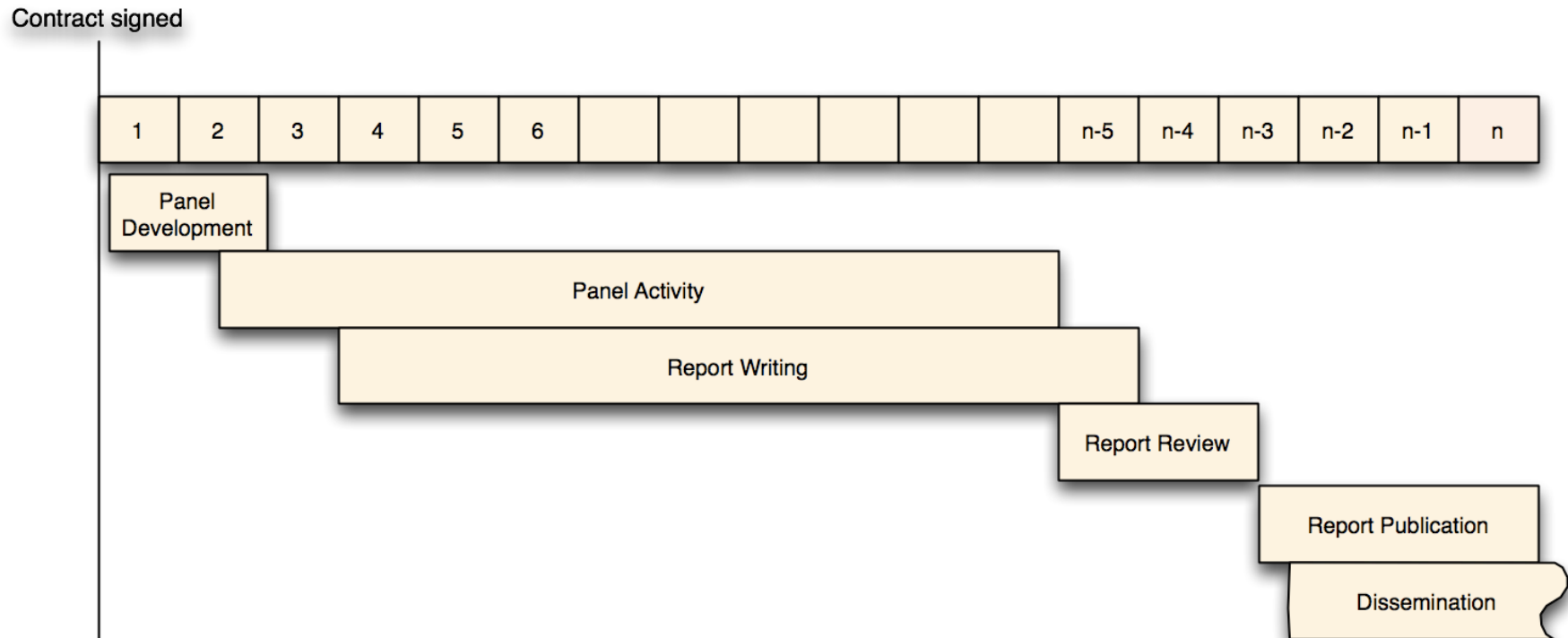
Some of the Things on My Radar

- o Armor Materials (with the Board on Army Science and Technology)
- o Materials by Design (NMAB)
- o Lightweight/multifunctional materials (NMAB)
- o At the interface of materials, nanomaterials and biologicals(NMAB)
- o Tools for Materials Education (NMAB)
- o Thermal management (NMAB/BMED)
- o NNI triennial review (NMAB)
- o Harnessing Light II – Manufacturing of Photonic based systems (BMED)
- o Meeting the Nation’s Defense Needs: A Blueprint for the 2030 Industrial Base (BMED)
- o Advanced Energy Technology Manufacturing Supply Chains (BMED)
- o Developing an “Engineering Aviation Security Environments” series (BMED/NMAB/BICE) – the first project is underway
 - Alternatives to Shoe Removal
 - Maintenance of Baggage Scanning Equipment
- o Integrated Circuits and Trusted Foundries (NMAB)
- o The Readiness of the Manufacturing Infrastructure to support Large-scale Nanomanufacturing (BMED/BICE)
- o Reviewing the FDA’s Good Manufacturing Practices - Vaccines (BMED)
- o Infrastructure projects
 - Grand Challenges
 - From local to global – optimized infrastructural system development for the 21st century
- o Adaptive and High Performance Property Asset projects (BICE with others as appropriate)
 - Terminals, Ports and Parks
 - Schools
 - Buildings
 - Workshops
 - Hospitals

On the Horizon

- o NMAB Focused session – a workshop like program is being put on with the Department of Defense for a second time next week – topics this time are: (a) hybrid materials; (b) lightweight materials; and (c) bio-inspired materials
- o NMAB's goal is to start up 2 projects per year (total of 6 projects for the three boards)
- o Dissemination - MS&T Symposium
- o Interaction and name recognition
 - While the NMAB is well-recognized within many parts of the federal government, we are seeking to develop further name recognition within the materials community
 - We are interested in thinking up new ways of interacting both within and beyond the academies
- o As a grouping of three boards, we are focused on our materials, manufacturing and infrastructure missions and are able to take on relevant issues in any way that is appropriate and useful to both the community and the nation.

Project Timelines



The usual NRC project has activities that simply take pretty well known amounts of time and we try to build those into the project during its development. A standard study that does well is an 18 month study.

Materials/Education– Where do we want to go?

What is Being Taught?

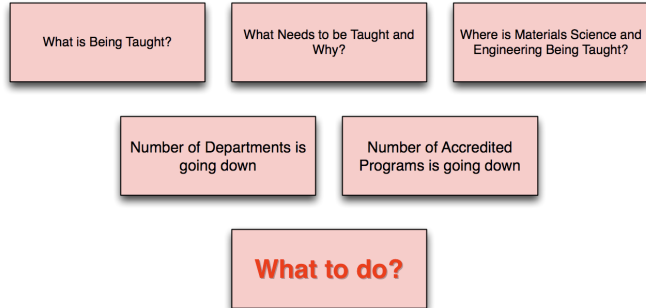
What Needs to be Taught and Why?

Where is Materials Science and Engineering Being Taught?

Number of Departments is going down

Number of Accredited Programs is going down

What to do?



At this point, I am going to rely on Lyle Schwartz to deal specifically with the educational tools issue.