The Materials Genome Initiative
TechConnect World 2012
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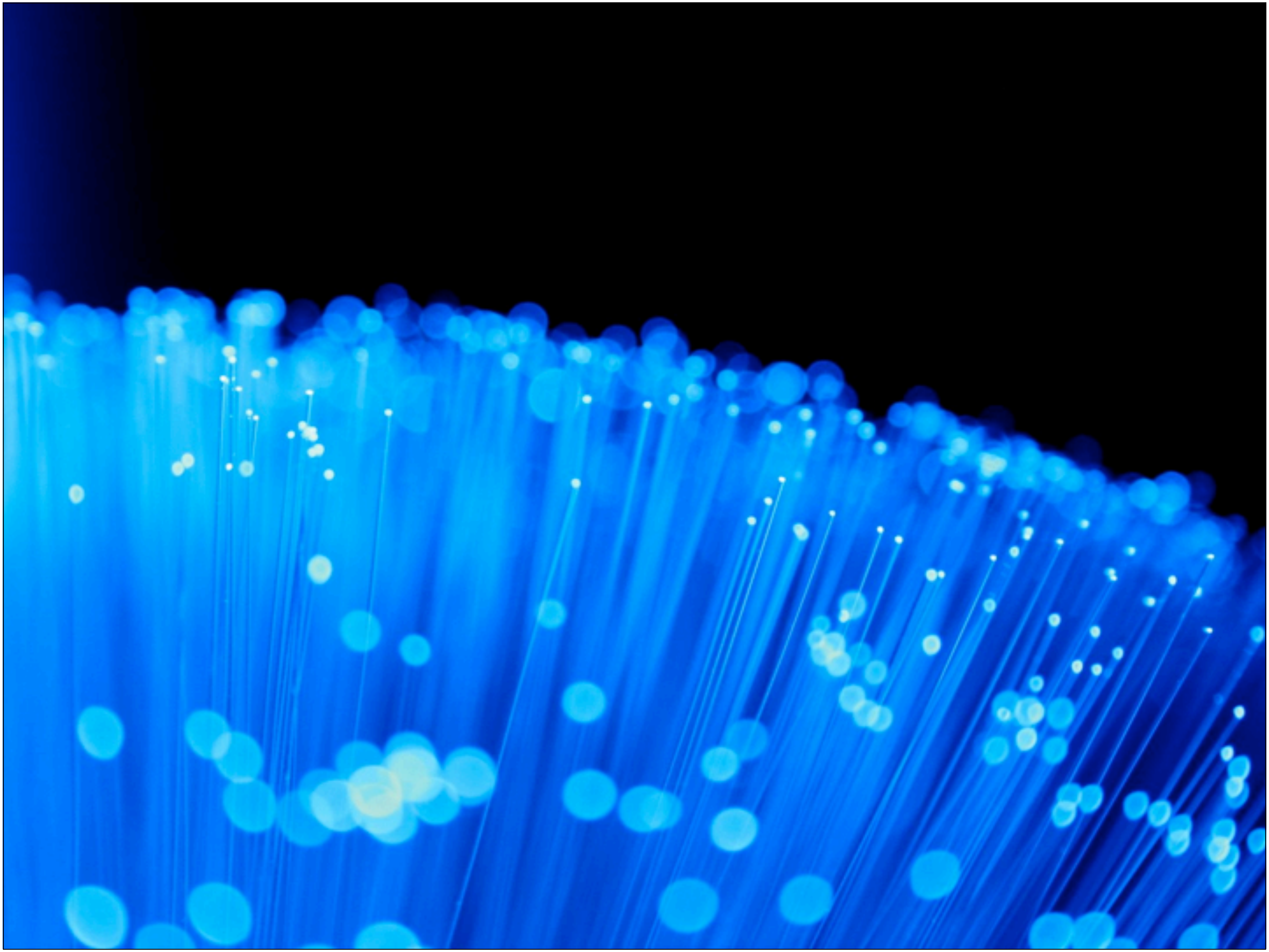
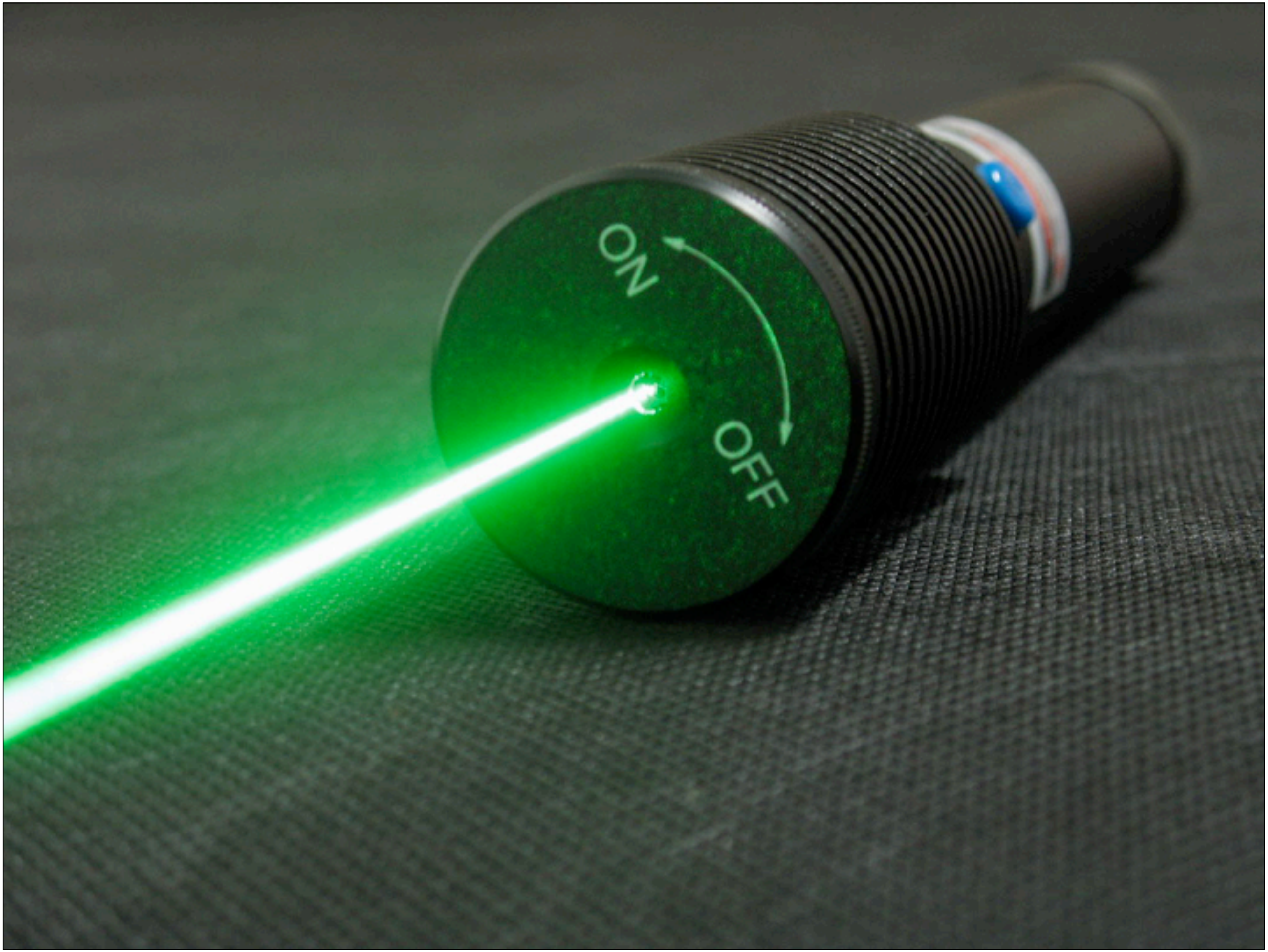
White House Office of Science and Technology Policy

"To help businesses discover, develop, and deploy new materials twice as fast, we're launching what we call **the Materials Genome Initiative**.

The invention of silicon circuits and lithium ion batteries made computers and iPods and iPads possible, but it took years to get those technologies from the drawing board to the market place. **We can do it faster.**"

-President Obama (6/11)

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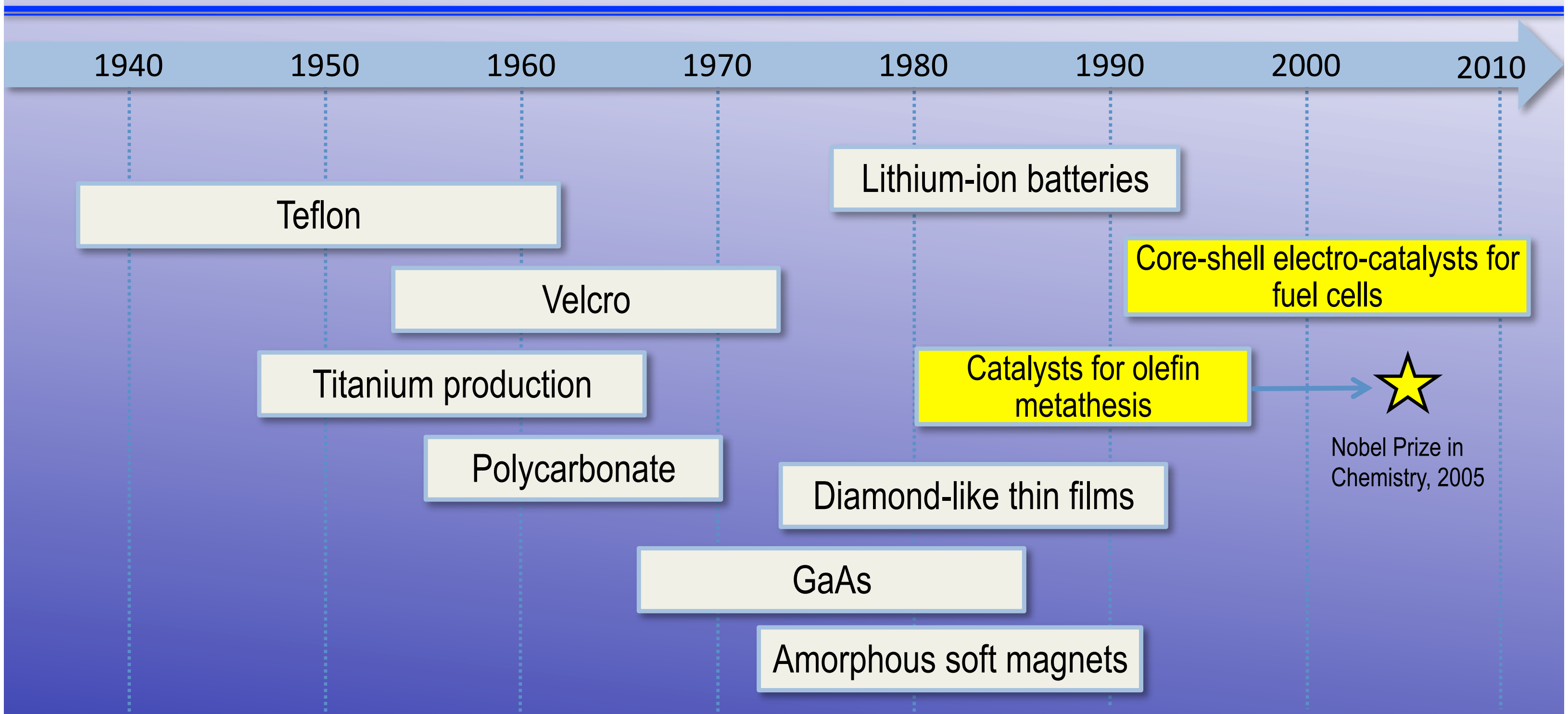
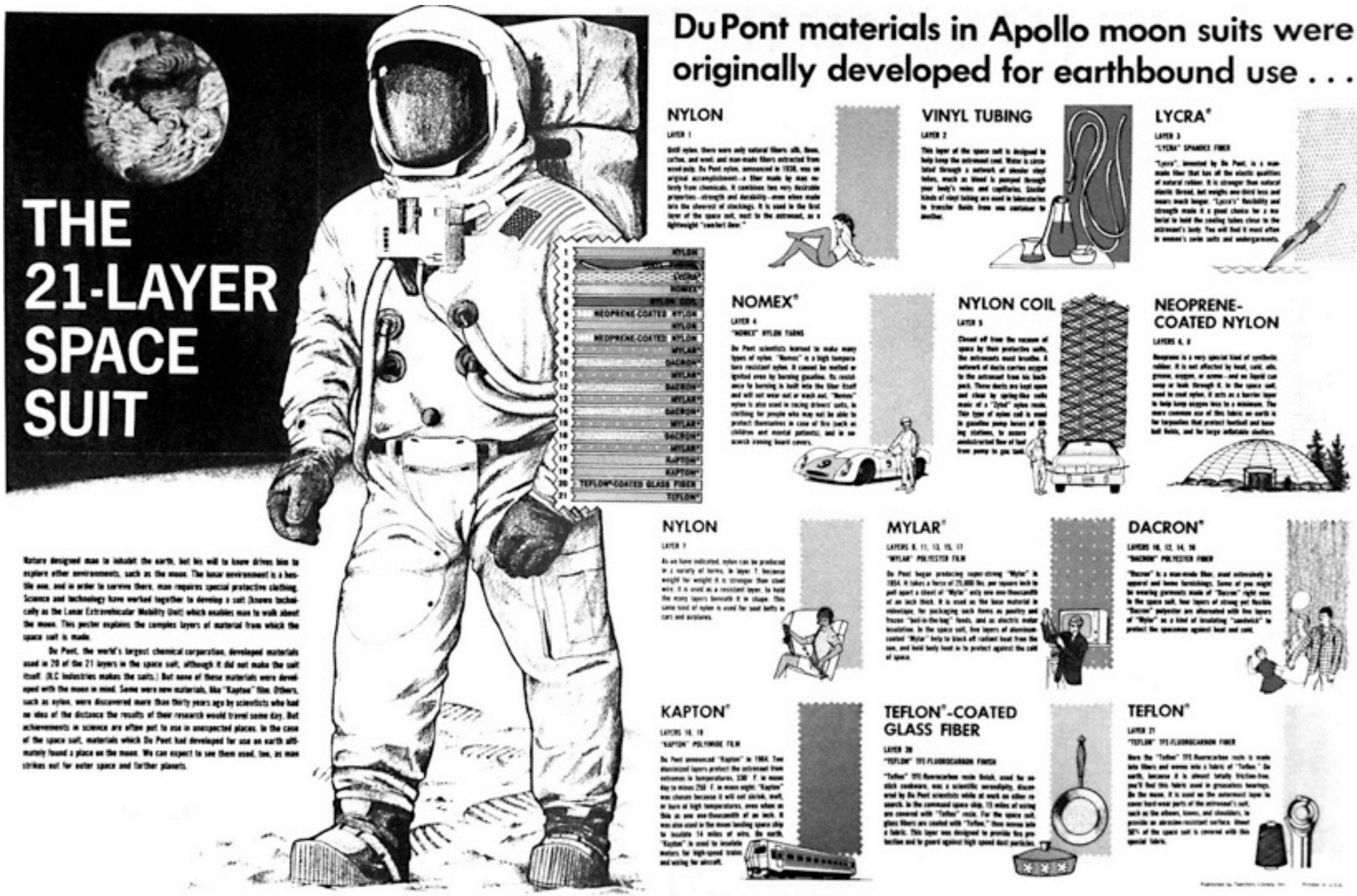
Discovery to Application in the 20th Century

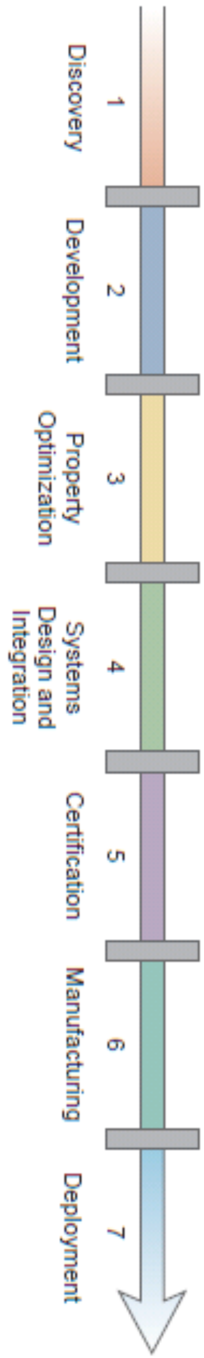


We need to do better!

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.


THE 21-LAYER SPACE SUIT
Du Pont materials in Apollo moon suits were originally developed for earthbound use . . .
NYLON
VINYL TUBING
LYCRA®
NOMEX®
NYLON COIL
NEOPRENE-COATED NYLON
NYLON
MYLAR®
DACRON®
KAPTON®
TEFLON®-COATED GLASS FIBER
TEFLON®
Nature designed man to inhabit the earth, but his will to know drives him to explore other environments, such as the moon. The lunar environment is a hostile one, and in order to survive there, man requires special protective clothing. Science and technology have worked together to develop a suit (known technically as the Lunar Extravehicular Mobility Unit) which enables man to walk about the moon. This poster explains the complex layers of material from which the space suit is made.
Du Pont, the world's largest chemical corporation, developed materials used in 20 of the 21 layers in the space suit, although it did not make the suit itself. (ILC Industries makes the suits.) But none of these materials were developed with the moon in mind. Some were new materials, like "Kapton" film. Others, such as nylon, were discovered more than thirty years ago by scientists who had no idea of the distance the results of their research would travel some day. But achievements in science are often put to use in unexpected places. In the case of the space suit, materials which Du Pont had developed for use on earth ultimately found a place on the moon. We can expect to see them used, too, as man strikes out for outer space and farther planets.

… 2X faster & 2X cheaper



1. **Discovery**
2. **Development**
3. **Property Optimization**
4. **Systems Design/ Integration**
5. **Certification**
6. **Manufacturing**
7. **Deployment**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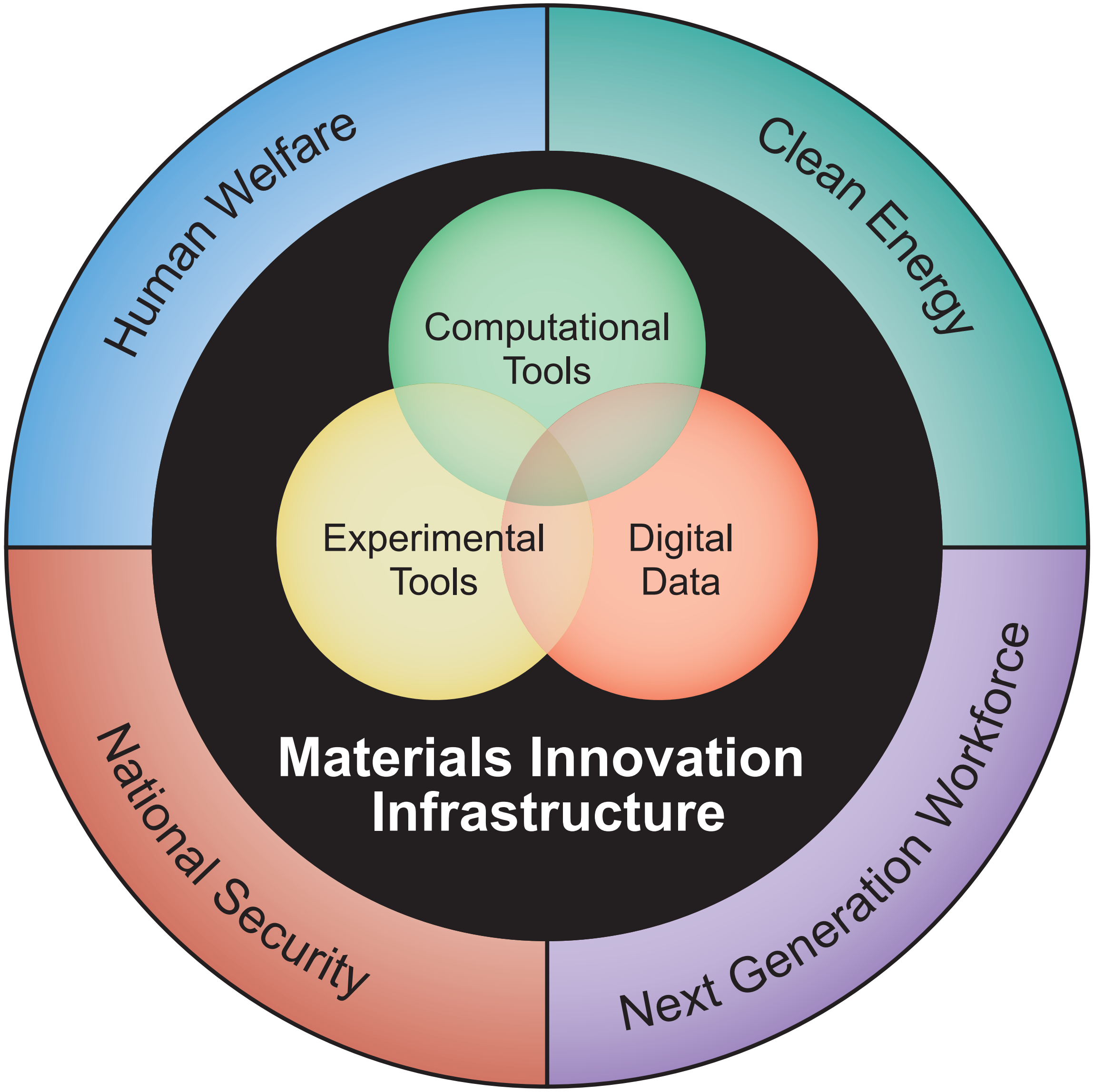
DREAMLINER

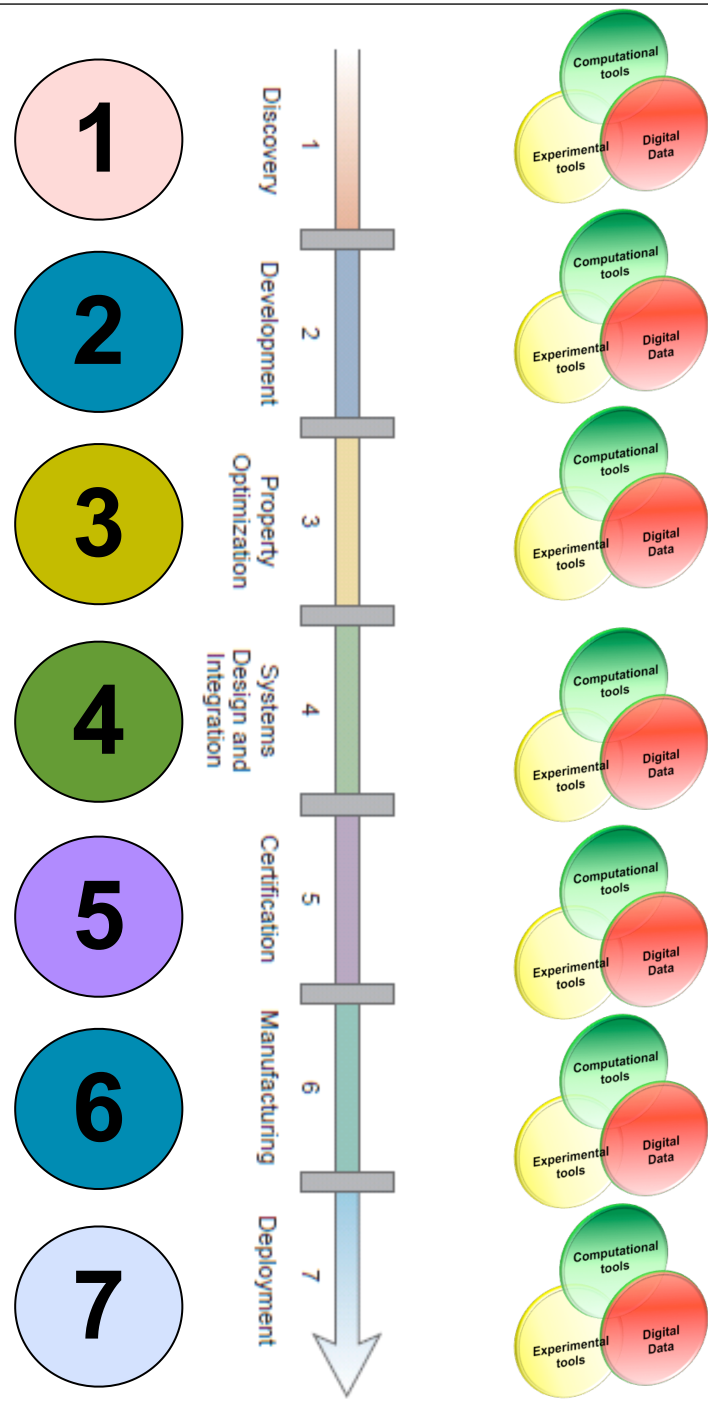
Cross-Cutting Themes – Top 4 List

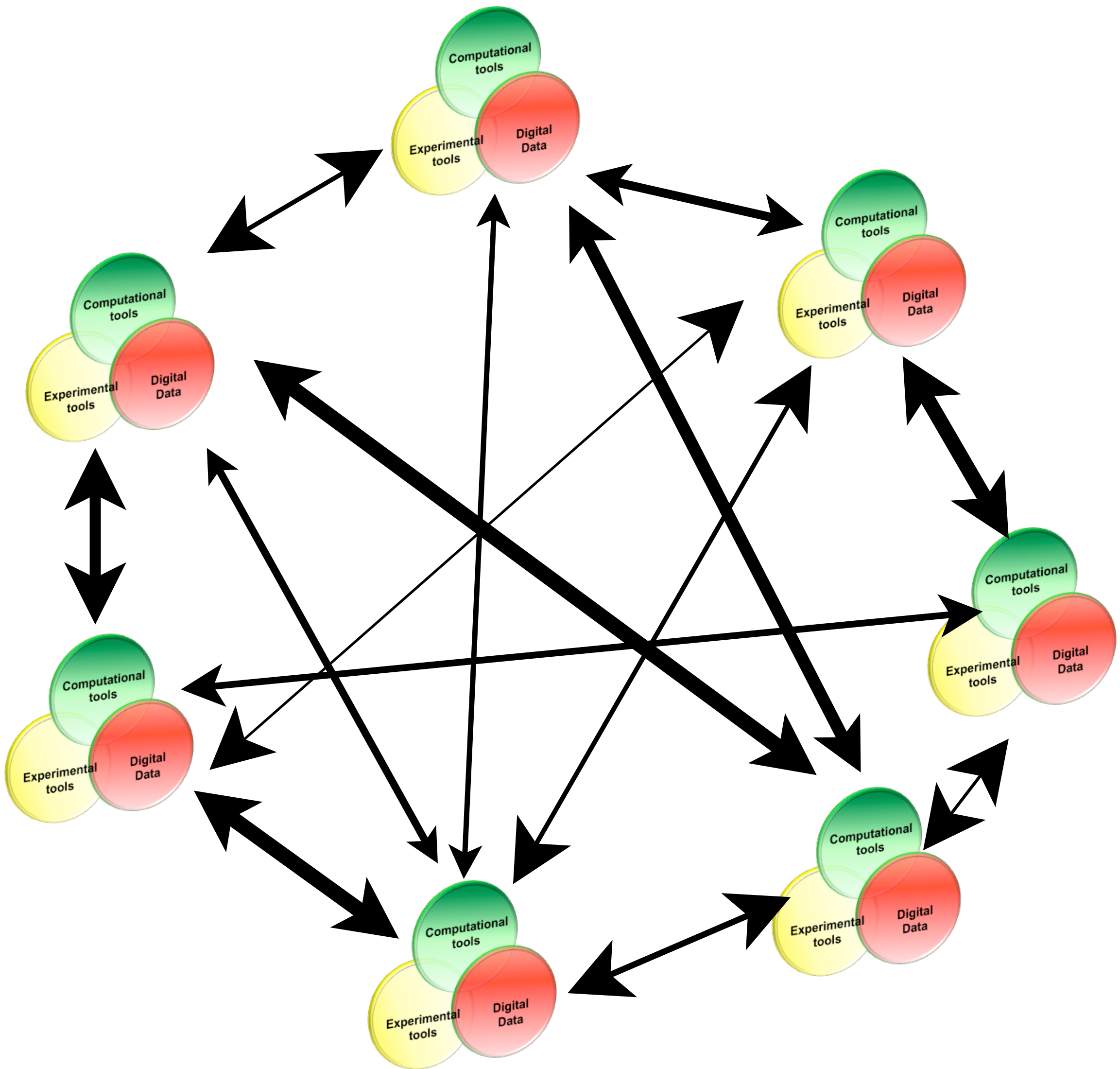
All Hands on Deck

1. Incentivizing open data and access of tools
2. Structuring public-private partnerships
3. Driving innovation across computation, data informatics and experimentation
4. Moving the community to a different cultural norm

The Materials Innovation Infrastructure




1
Discovery
2
Development
3
Property Optimization
4
Systems Design and Integration
5
Certification
6
Manufacturing
7
Deployment
Computational tools
Experimental tools
Digital Data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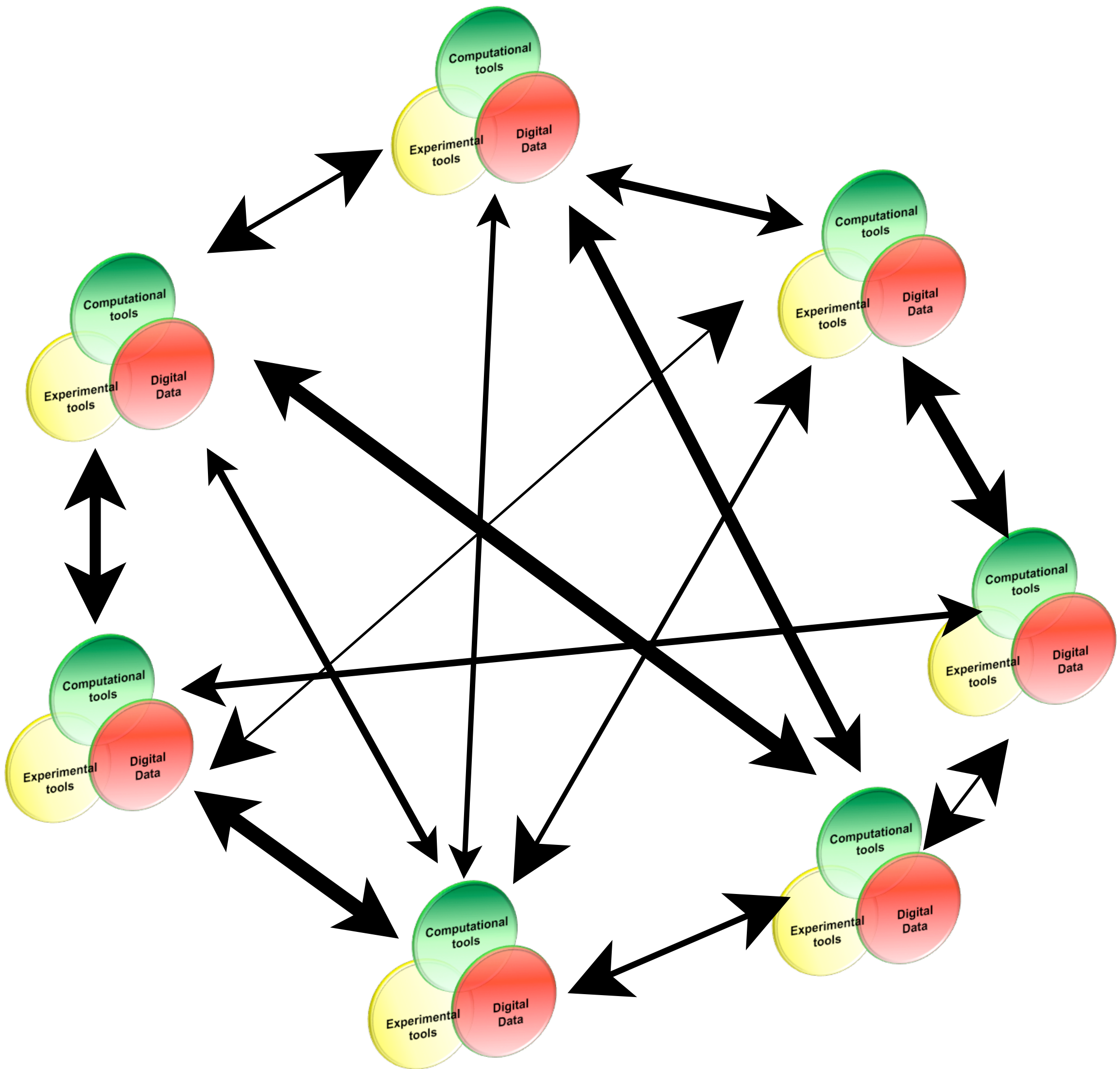
Experimental tools
Digital Data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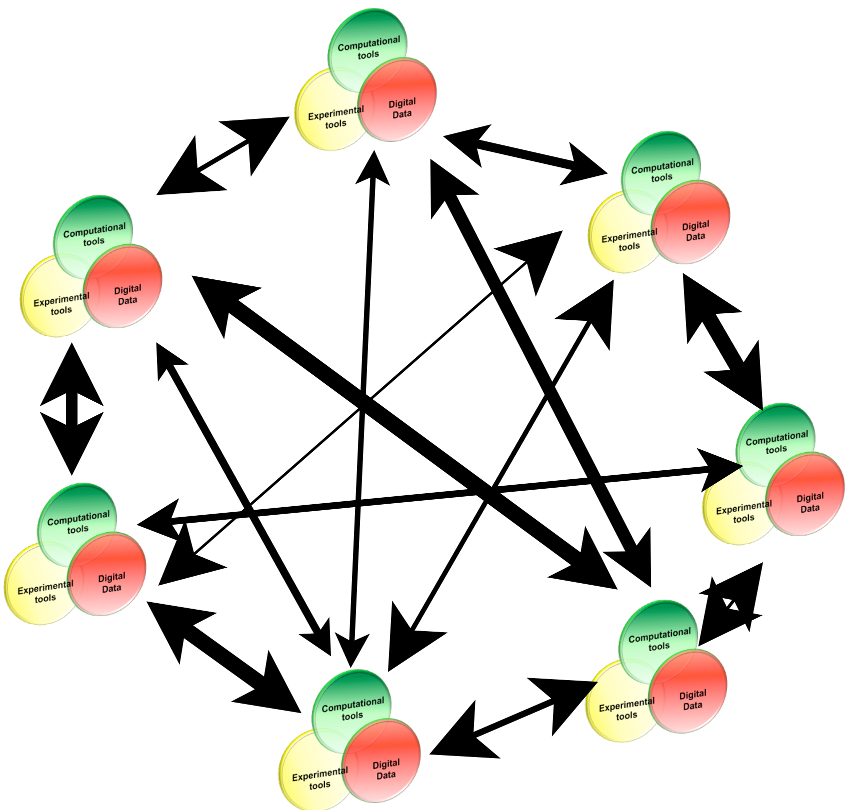
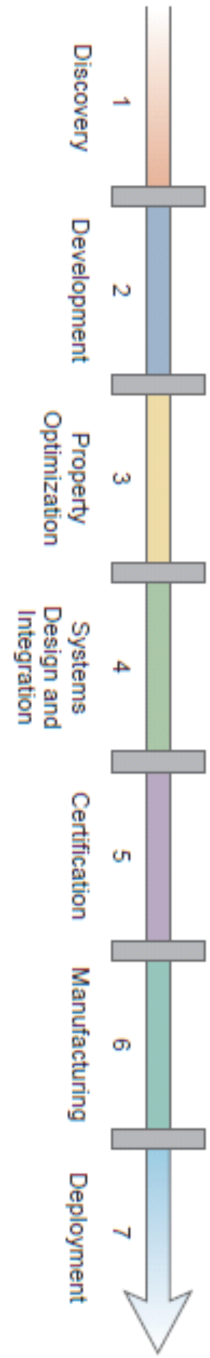
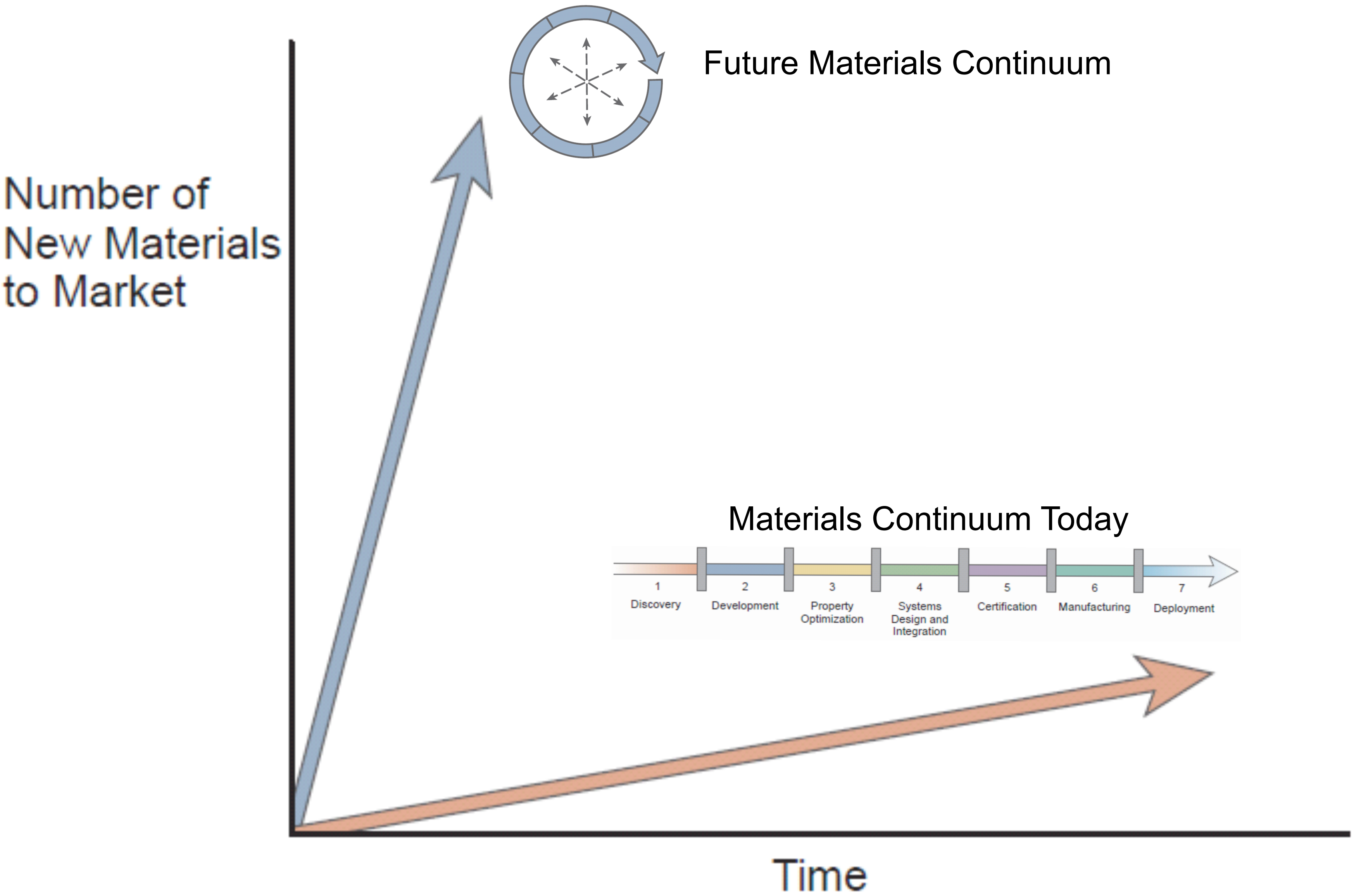
Experimental tools
Digital Data


Computational tools
Experimental tools
Digital Data


1 Discovery
2 Development
3 Property Optimization
4 Systems Design and Integration
5 Certification
6 Manufacturing
7 Deployment


Future Materials Continuum
Number of New Materials to Market
Materials Continuum Today
1 Discovery
2 Development
3 Property Optimization
4 Systems Design and Integration
5 Certification
6 Manufacturing
7 Deployment
Time

Achieving the Vision

Accomplishments to Date

- Federal MGI activity in FY12 (DOE, NSF, DOD, NIST)
- Interagency workshop and White House event
- Leverage on existing Federal programs
- Interagency coordination and standing presence
- External stakeholder commitments
- Partnering with universities, professional societies, NGO's, AMP

Achieving the Vision

Where We Are Heading

- Roadmap of milestones, policies and R&D activity for FY13/ FY14
- Convening stakeholders to guide the movement
- Industry initiated commitments and activity
- University initiated commitments and activity
- Commitments from publishing community

Call to Action

All Hands on Deck

- Identify something specific for your community to participate
- Identify shared principles that might guide collaboration
- Data - pre-competitive sharing, access, informatics
- Scaling pockets of success
- Feedback to OSTP and Federal agencies