



Materials Research Science and Engineering Centers

NSF Division of Materials Research MRSEC

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MRSEC Program Directors



MRSEC Program Goals

- Stimulate and support **outstanding** interdisciplinary **research and education** in materials of a scope that **requires a center**
- Address **fundamental**, complex materials problems that are intellectually challenging and important to society
- Foster **partnerships** between academia and industry as well as other sectors
- **Broaden participation** of groups under-represented in the sciences

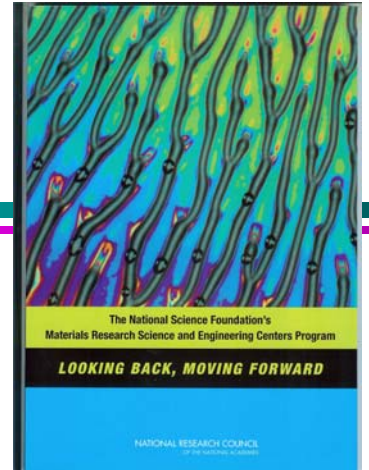


A Little History

- Late 1950s National Materials Program
- 1960-61 First IDLs (ARPA etc)
- 1968 Mansfield Amendment
- 1971 Proposal to transfer IDLs to NSF
- 1972 NSF establishes DMR, MRL program
- 1986 DMR establishes MRG program
- 1994 DMR establishes MRSEC program
- 2007 National Academies MRSEC Report
- 2010 DMR splits MRSEC program into Centers and Teams



National Academies Study of the MRSEC Program



The community perceives great value.

Two primary concerns:

- Increasing requirements without a commensurate increase in **resources**
- An **imbalance** in center aspects, in particular with education outreach arising from the varied sizes of MRSECs
- **Recommendation:** To respond to changes in the budgetary landscape and changes in the nature of materials research in the coming decade, NSF should restructure the MRSEC program to allow more efficient use and leveraging of resources. The new program should fully invest in **centers of excellence** as well as in **stand-alone teams of researchers**.

http://sites.nationalacademies.org/BPA/BPA_048201



Interdisciplinary Research Groups: Core Unit

- One or more IRG(s) in each MRSEC
- Each IRG:
 - Addresses a major materials topic or area.
 - Involves several researchers with complementary backgrounds, skills, knowledge
 - Provides sustained support for interactive effort
 - Is more than a ‘collection of individual investigators’
- Interaction **within** an IRG is critical
- Interaction **between** IRGs not required, but may strengthen the Center



Other Elements of a MRSEC

- Flexibility to develop new areas, support for 'Seeds'
 - Potentially Transformative
 - Important to review mechanism and effectiveness of Seed Program
- **Education** (precollege to postdoctoral) and development of human resources
 - REU only requirement
 - Other education outreach activities **scale with the size** of the MRSEC
- **Diversity** Strategic Plan
- Active **collaboration with industry** and other sectors
- **Shared experimental facilities**



MRSEC Class of 2008

Institution	IRGs	Institution	IRGs
Brandeis – new	1	MIT	3+2
Chicago	4	Minnesota	4
Colorado	1	Nebraska	2
Colorado School of Mines – new	2	New York University - new	1
Harvard	3	Ohio State University - new	2
Georgia Tech – new	1	Penn State University	4
U. Mass - Amherst	2+2	Princeton	4

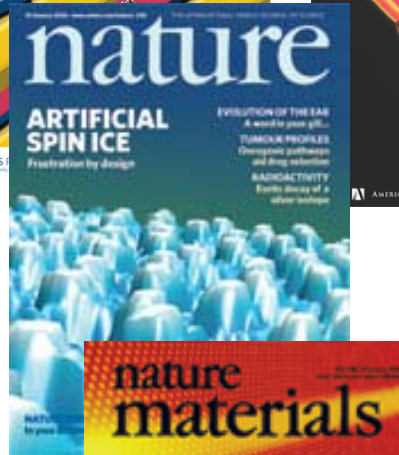
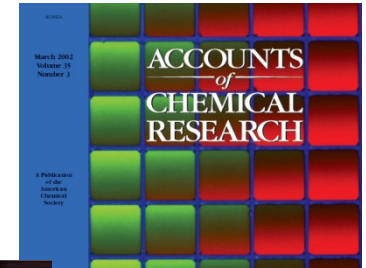
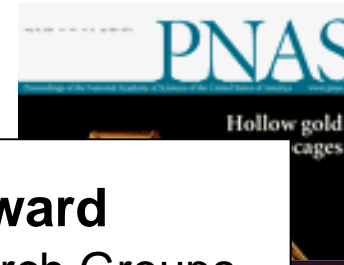
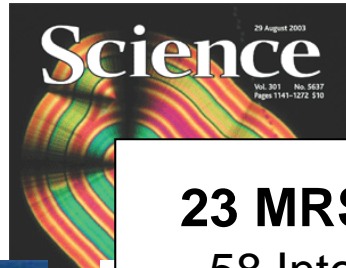
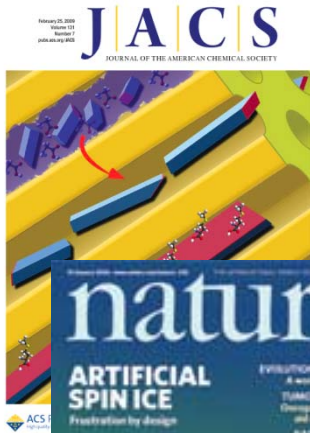


MRSEC Class of 2011

Institution	IRGs	Institution	IRGs
UC Santa Barbara	3	U Pennsylvania	4
Cornell U	3	U Wisconsin	3
Duke U - new	2	U. Utah - new	2
U. Michigan - new	2	Yale U.	2
Northwestern U	3		



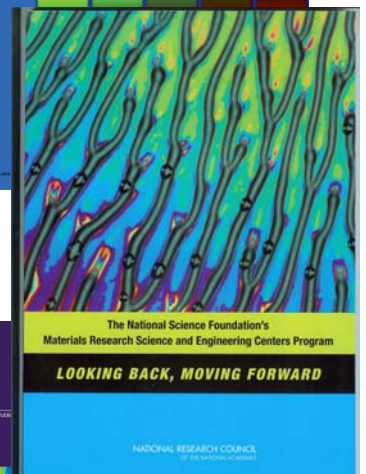
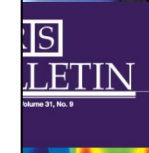
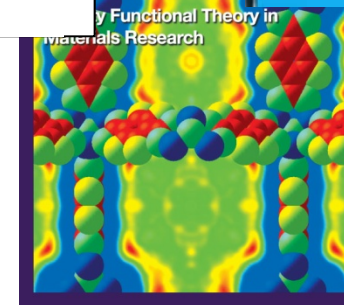
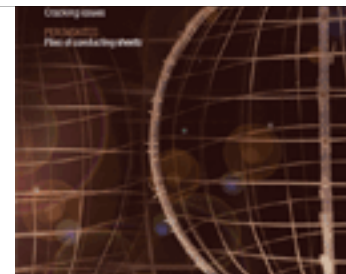
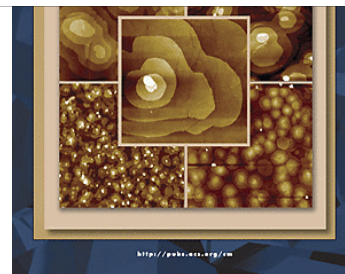
MRSEC: High Impact - High Visibility



23 MRSECs Going Forward
- 58 Interdisciplinary Research Groups (IRGs)

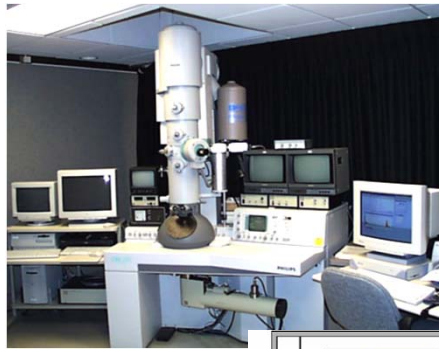
2010-2011 Data for 27 Centers

- 901 Faculty participants
- 224 Ph.D.s awarded
- 129 Post-docs completed
- 1500 publications
- 76 patents issued





Infrastructure



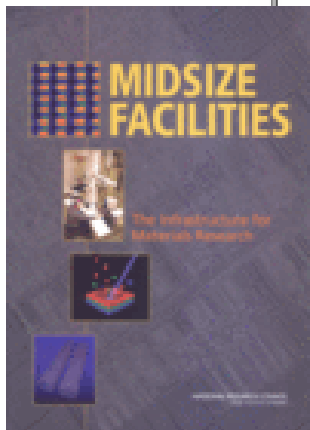
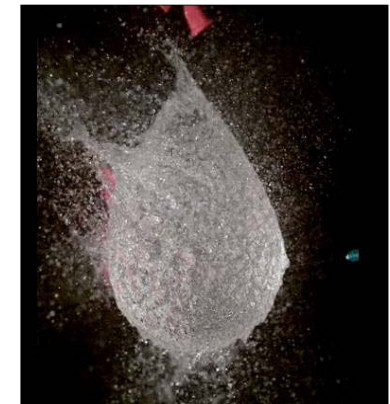
Users of MRSEC Facilities

- > 2000/yr Academic
- > 550/yr Industry
- > 100/yr National Labs

Over 500 Publications annually

Shared Facilities Workshop in 2011

- 77 Technical Staff in SEFs
- 31 Other Technicians
- 70 Administrative Staff
- 28 Education Staff



Materials Research Facilities Network



MRSEC Awards

- Six year awards, ~ \$54M annually (2011)
- Annual PI meetings
- Program Director Site Visit in year two
- Site visit review with a panel during year four
- Existing Centers compete with new proposals in open competition in the sixth year of the award

- Continuum from small to large Centers
- Current support ranges from ~\$1.2M to ~\$3.6M
- Non-research activities scale with the size of the Center



Questions?