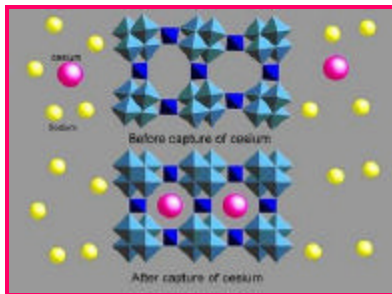
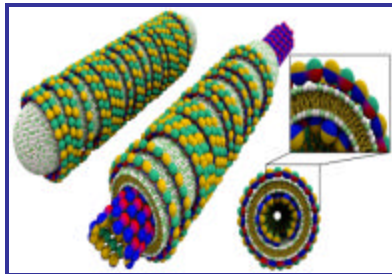


Materials Research & Education in DMR: Looking Back, Racing Forward

Zakya H. Kafafi

Director, Division of Materials Research (DMR)



FY 2009 Budget Request by Division

Mathematical and Physical Sciences Funding

(Dollars in Millions)

	FY 2007 Actual	FY 2008 Estimated	FY 2009 Request	Change over FY 2008 Estimated	
				Amount	Percent
Astronomical Sciences	\$215.39	\$217.86	\$250.01	\$32.15	14.8%
Chemistry	191.22	194.22	244.67	50.45	26.0%
Materials Research	257.27	260.22	324.59	64.37	24.7%
Mathematical Sciences	205.74	211.79	245.70	33.91	16.0%
Physics	248.47	250.52	297.70	47.18	18.8%
Multidisciplinary Activities	32.64	32.70	40.00	7.30	22.3%
Total, MPS	\$1,150.73	\$1,167.31	\$1,402.67	\$235.36	20.2%

Totals may not add due to rounding.

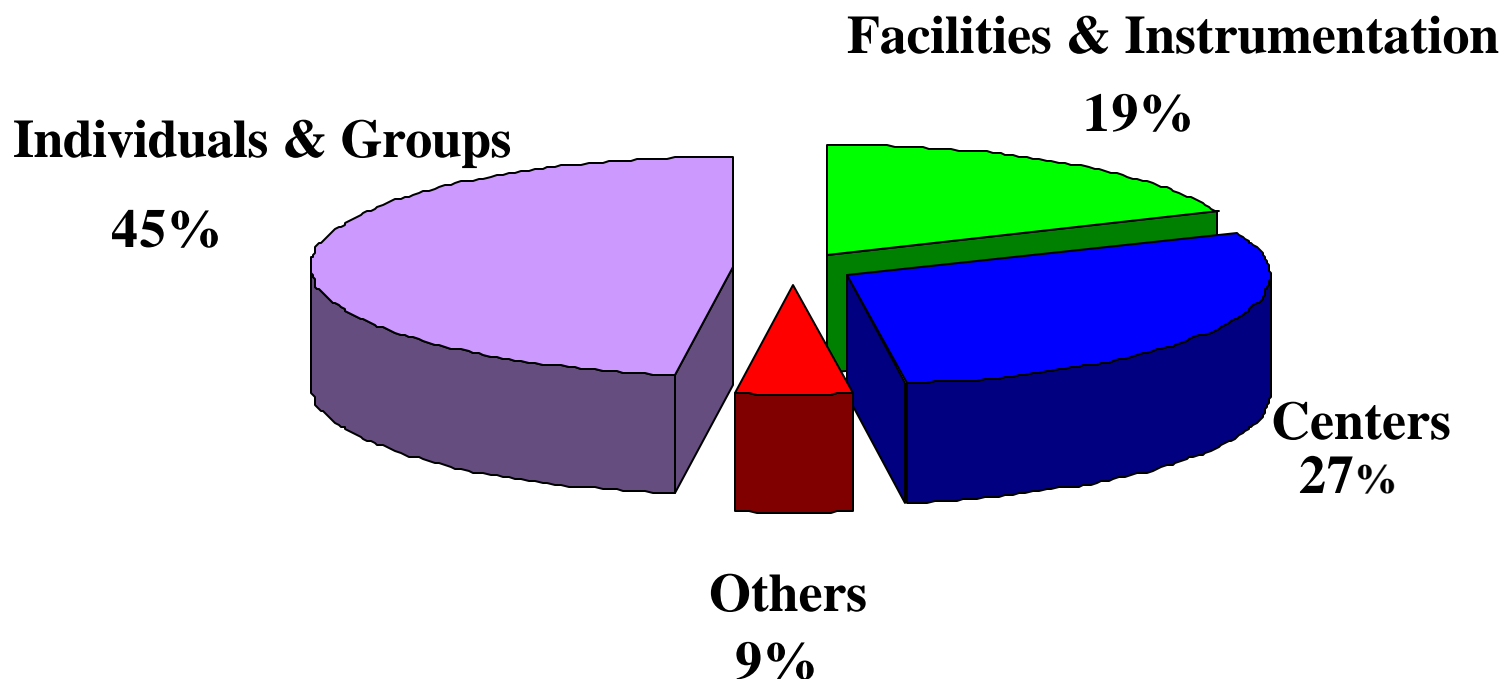
**NSF:
\$6.854 B,
+13.0%**

Racing Forward

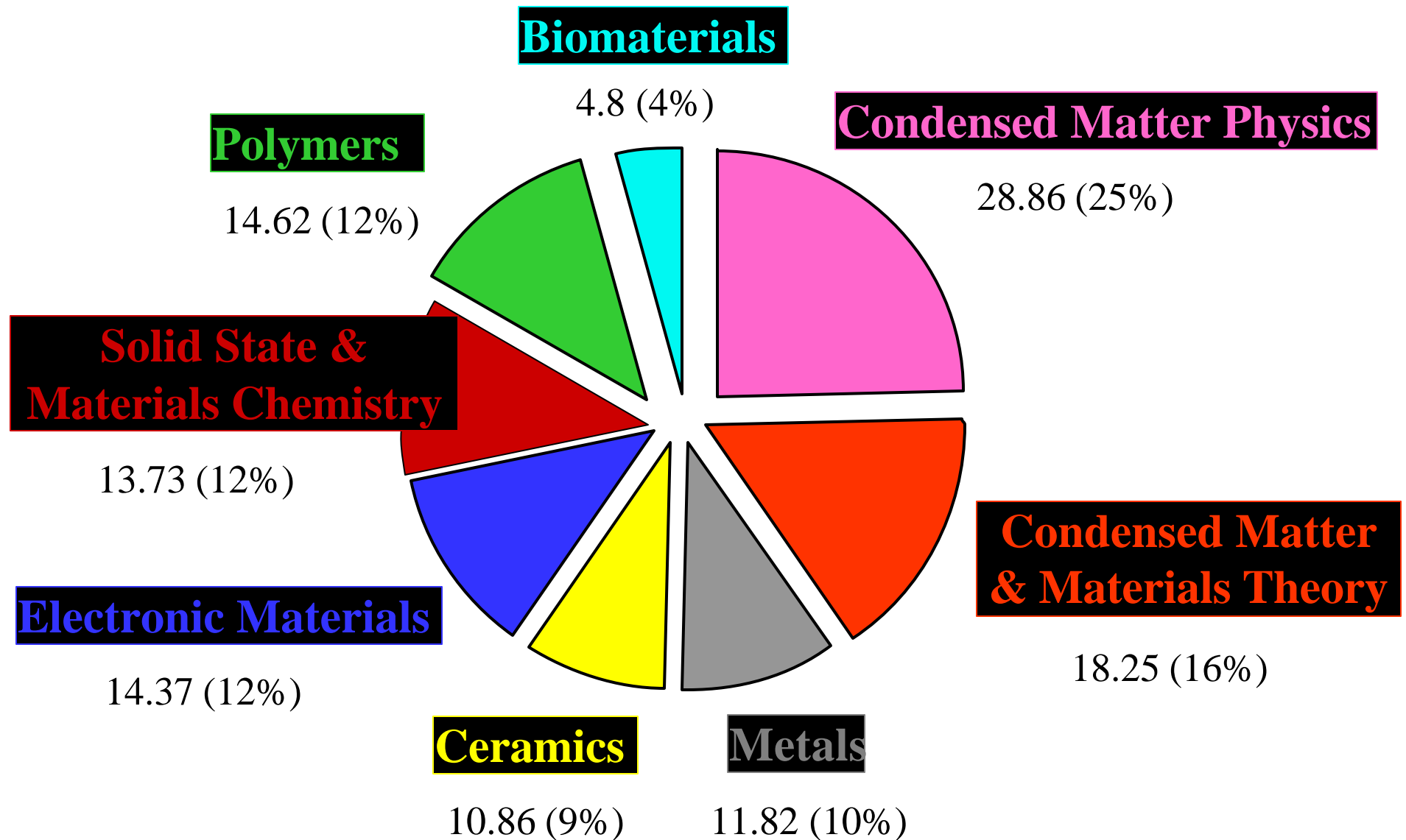
Substantial increase in budget will allow DMR to:

- Increase # and size of PI grants
- Start new centers & institutes to enable focus on transformative, interdisciplinary, global research & education effort
- Expand investments in workforce development, especially at the junior rank while broadening participation for women, minorities and scientists with disabilities
- Develop new educational & outreach activities

DMR Support in Materials Research & Education **(\$257 M in Fiscal Year 2007)**



Funding (\$M) Distribution for Individual Investigators' Programs in Fiscal Year 2007



MPS by Division

(Dollars in Millions)

FY 2005 - FY 2008

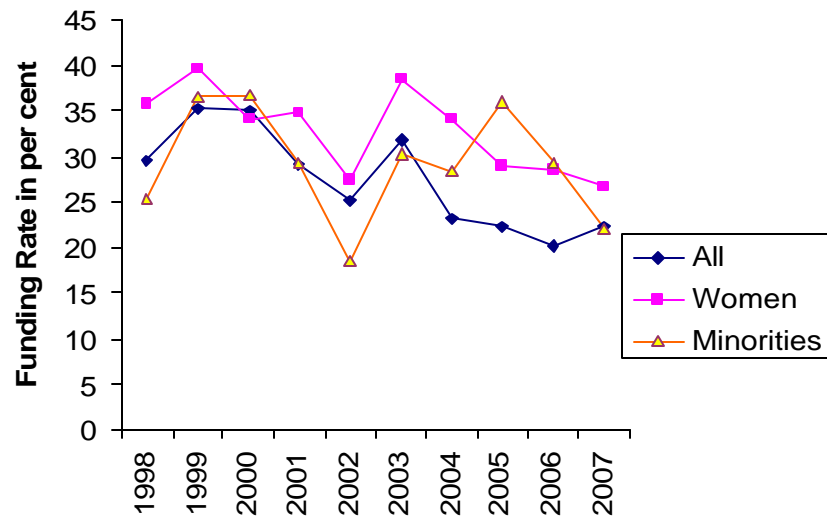
	FY 2005 Actuals	FY 2006 Actuals	FY 2007 Actuals	Change from 06 to 07	FY 2008 Request	Change from 07 to 08	FY 2008 Estimate	Change from 07 to 08
AST	195.11	\$199.75	\$215.39	7.8%	\$232.97	8.2%	\$217.86	1.1%
CHE	179.26	180.70	191.22	5.8%	210.54	10.1%	194.22	1.6%
DMR	240.09	242.59	257.26	6.0%	282.59	9.8%	260.22	1.2%
DMS	200.24	199.52	205.74	3.1%	223.47	8.6%	211.79	2.9%
PHY	224.86	234.15	248.47	6.1%	269.06	8.3%	250.52	0.8%
OMA	29.80	29.90	32.64	9.2%	34.37	5.3%	32.70	0.2%
MPS	1,069.36	1,086.61	1,150.72	5.9%	1,253.00	8.9%	\$1,167.31	1.4%

Impact of FY2008 Budget on DMR Programs

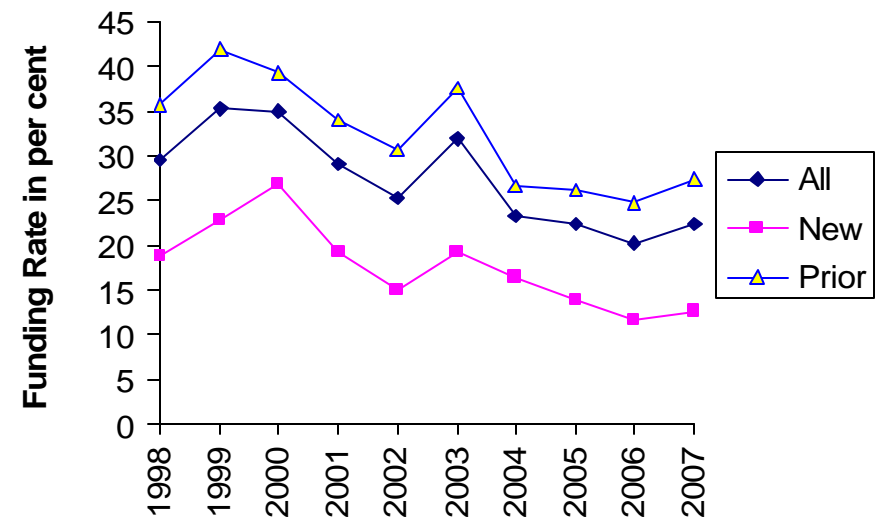
- DMR will be **unable** to increase research and education support
- Success rates for individual investigators will remain at historically low levels
- DMR will be **unable** to increase support for centers
- DMR will be **unable** to enhance research, user programs, instrument upgrades or education activities at the National High Magnetic Field Laboratory

DMR Funding Rate for Research Proposals

Total Number of Proposals & Awards in FY 2002- FY 2007

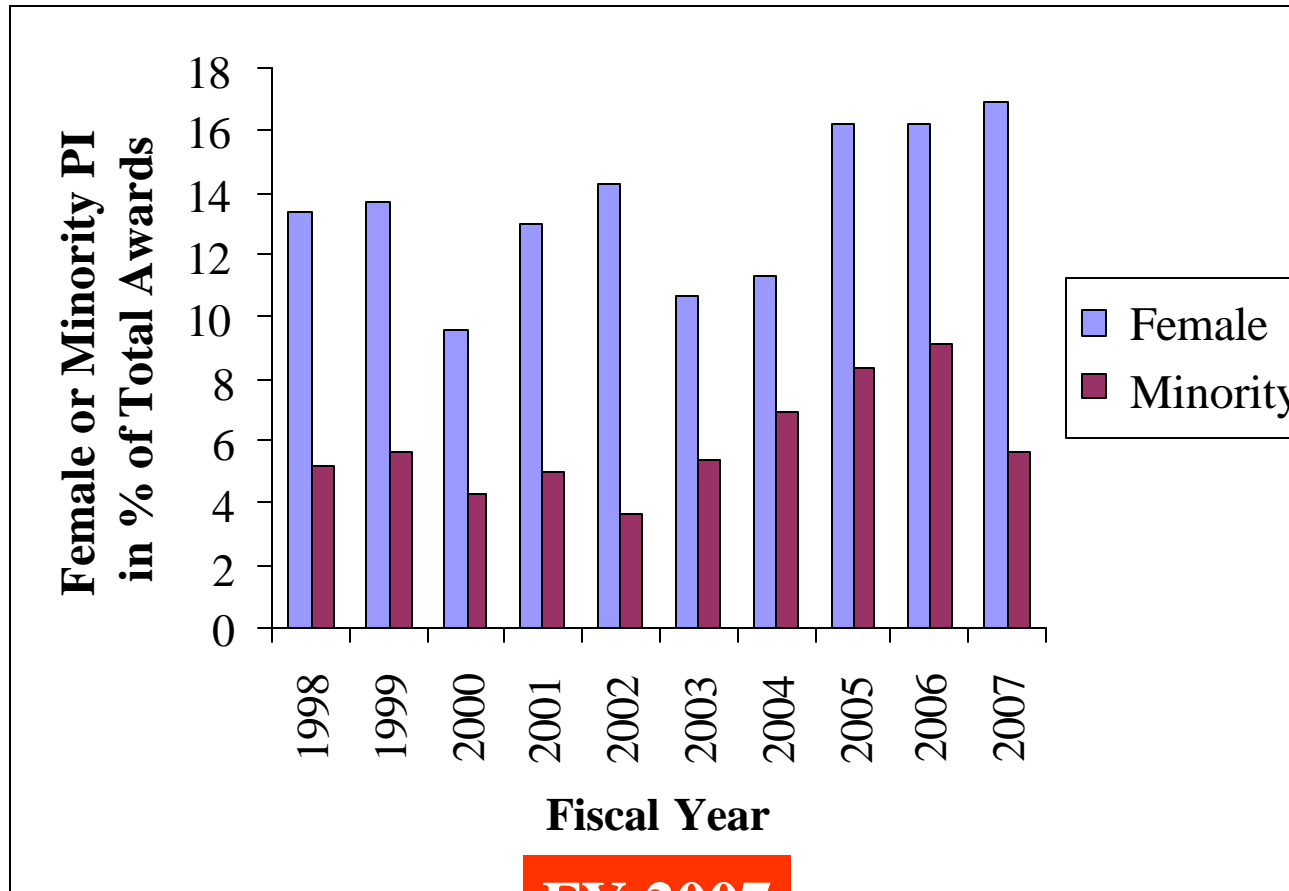


Women or Minority Principal Investigators



New versus Prior Principal Investigators

DMR Awards Demographics in FY 1998 – FY 2007



FY 2007

Total number : 1,352 proposals / 301 awards

Women PIs : 191 proposals / 51 awards

Minority PIs : 77 proposals / 17 awards



NAS Studies & NSF Workshops

National Academy of Sciences (NAS)

- Condensed-Matter and Materials Physics (2007)
- Materials Research, Science & Engineering Centers (2007)

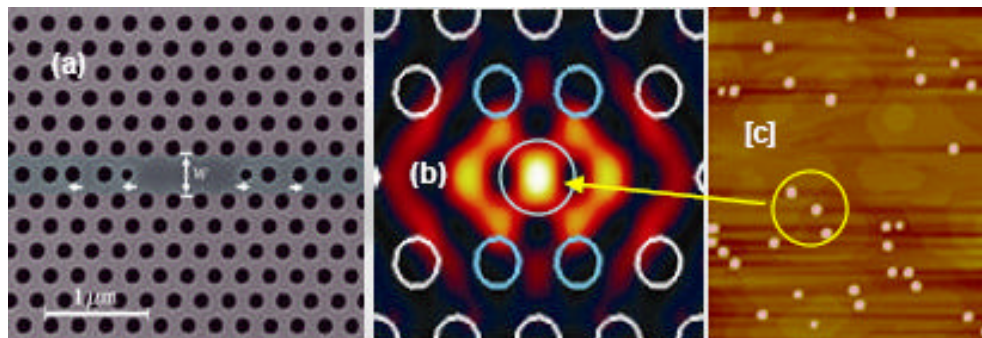
National Science Foundation (NSF)

- Future Directions in Solid-State Chemistry (2008)
- Interdisciplinary, Globally Leading, Polymer Science & Engineering (2008)



Physics 2010 – Big Questions

- How do complex phenomena emerge from simple ingredients?
- How will the energy demands of future generations be met?
- What is the physics of life?
- What happens far from equilibrium and why?
- What new discoveries await us in the nanoworld?
- How will the information technology revolution be extended?
- How do we extend the frontiers of measurement & prediction?
- How can we inspire and teach others?



Quantum-dot photonic crystal cavity
Evelyn Hu et al., UCSB



DMR Vision for 2010 and Beyond

- **Sustainability**
- **Matter by Design**
- **Diversity**
- **International Activities**
- **Cyber-Enabled Discovery**
- **Quantum Science & Engineering**
- **Emergent Behavior**
- **Observation & Imaging**
- **MPS Life Science Interface**
- **Plasma Science & Engineering**
- **Education**

Pilot ACI-Fellows Program in 2008

- **Creativity extension awards for young investigators and under-represented groups**
- **High-risk, transformative research & education with emphasis on broadening participation**

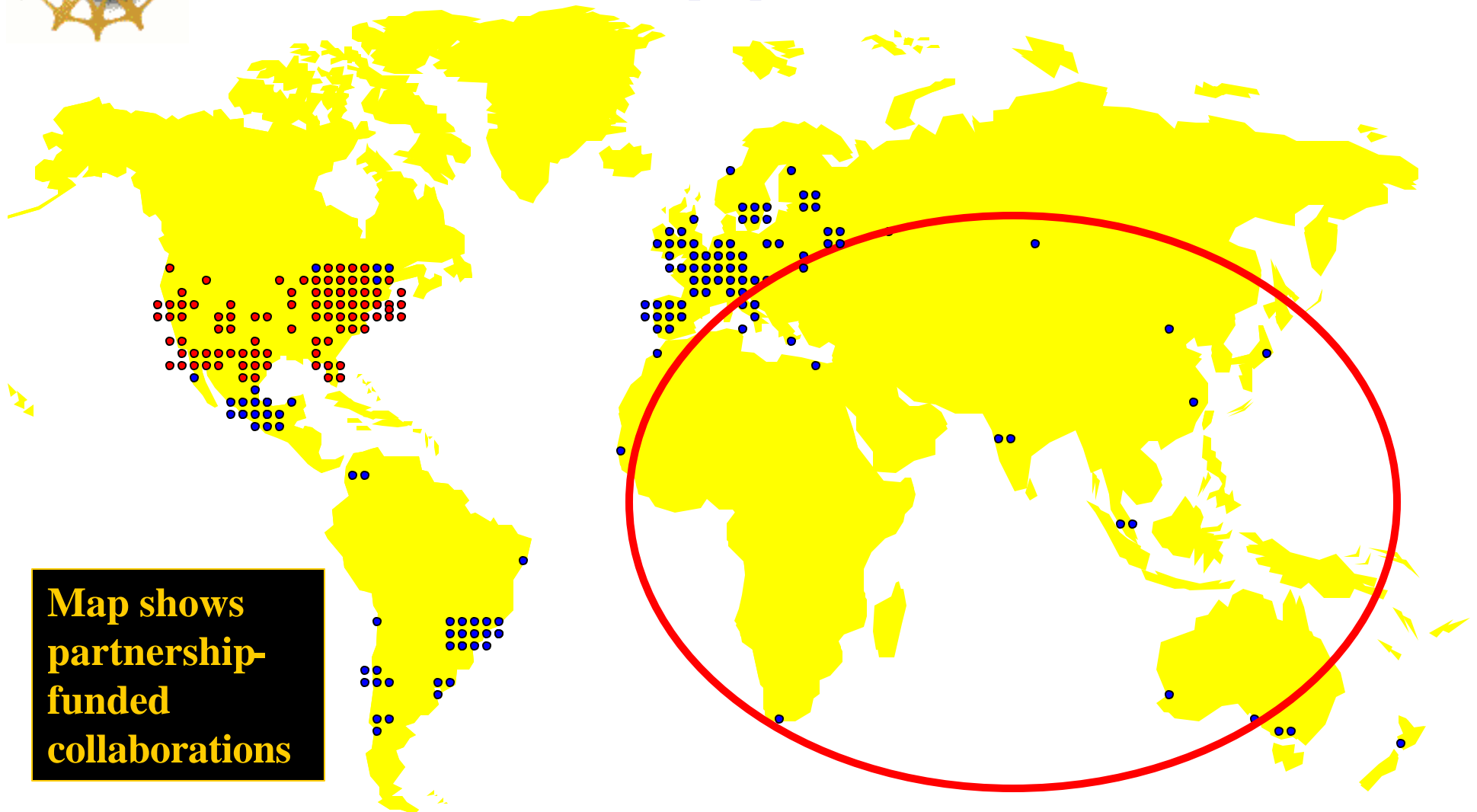
Diversity & Education Workshops in 2008

- **Gender Equity Workshop (May 18-20, U. of Maryland)**
- **Education Workshop (August 4-5, NSF)**
- **Workshop for Scientists with Disabilities**



The Materials World Network - 2007

Since 2001 ~950 NSF proposals, 182 awards, \$67M



**Map shows
partnership-
funded
collaborations**

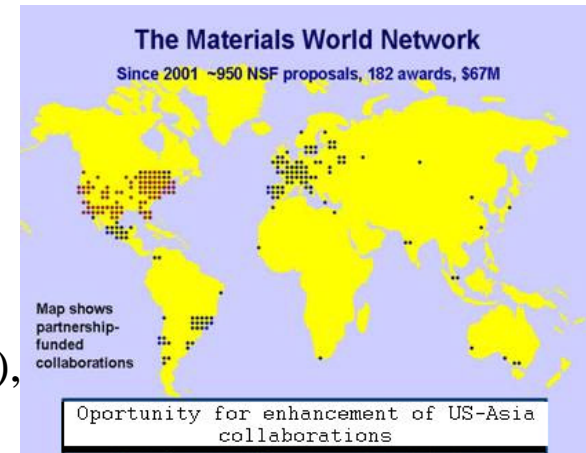
**The International Materials Institutes are developing
collaborations within Asia and Africa...**



Asia Participation in the Materials World Network

Current Participation

Natural Sciences Foundation-China (NSFC), China
Department of Science and Technology (DST), India
Japan Society for the Promotion of Science (JSPS), Japan
Agency for Science, Technology, and Research (A*STAR),
National Science Council, Taiwan



DMR Visit to China & Japan (10/22-11/2/2007)

- ✓ Expanded participation of NSF-China beyond 'materials science' to include condensed matter physics and polymer science
- ✓ Future yearly NSF-NSFC joint workshops alternating between USA and China
- “Nanostructured Materials for Global Energy and Environmental Challenges” jointly with CHE & DMS will be held in USA**
- ✓ Possible joint summer school with Ministry of Science and Technology (MOST), China
- ✓ Incorporated the participation the following organizations in Japan in the MWN:
 - * National Institute of Materials Science (NIMS)
 - * New Energy Development Organization (NEDO)
 - * Japan Science and Technology Agency (JST)

Emerging & Future Developments in MRSECs

MRFN: Materials Research Facilities Network is up and running: <http://mrsec.org/facilities/>

- Started with four coordinating nodes, fifth node was added last year
- Expected to grow from now on
- Remote control experiments and access to equipment

TRIM: Transformative Research in Materials

- Mid-term super-seed competition

MRSEC Directors web site <http://www.MRSEC.org>

- Redesign, new functionality, new web master hired; work closely with PDs
- Develop a true network linkage between all present & future MRSECs

Education and Outreach Network is under development

- Collaboration with Digital Library Project, NRCEN etc,
- Regular Education Coordinators meetings at MRS, APS etc
- MRSEC Education Coordinators, L. Bartolo&Co, I. Zaks

PREM: 10 awards all with MRSECs

- Clear benefits, Goals, Centralized coordination, Recent Workshop
- The program will be expanded to include women colleges, students with disabilities, etc..

MRG: Material Research Group

- Program will be launched in FY2010
- Competitions will be coordinated with the MRSEC cycles

CDI enabled: National & international centers and research groups without boundaries

- Possible co-funding with other agencies: DoE, DoD, NIH, and industry



DMR Facilities – Major Challenges

Facility operating costs are borne by DMR

I. Stewardship of the NHMFL

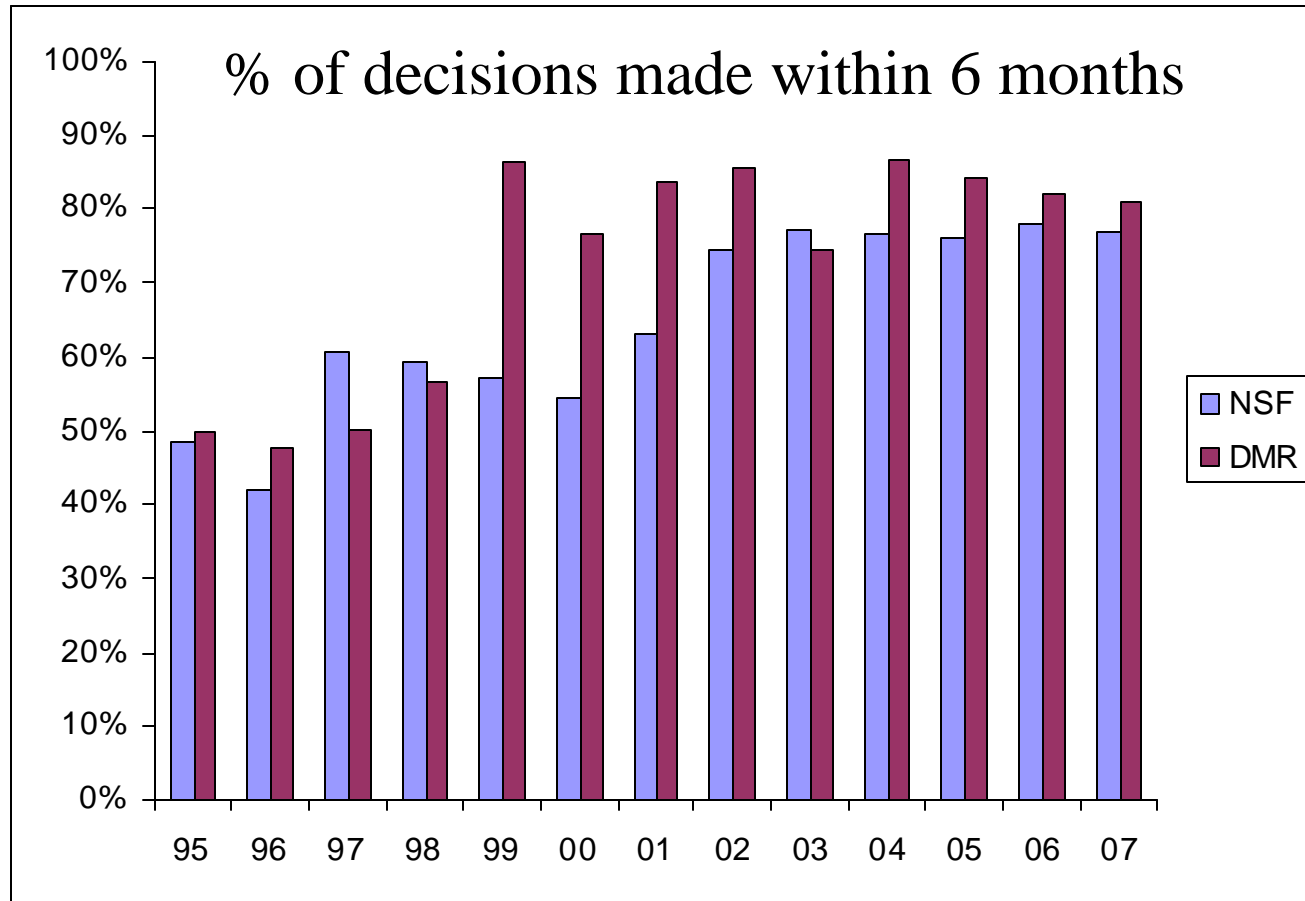
- DMR currently provides ~95% of NSF funding
- Serving an increasingly broad user community

Partnership is essential !

II. Stewardship of Future Light Source Facility? Future of University-Based Synchrotron Facility?

A major decision will be made based on the recommendations of the MPSAC panel on NSF role in future light source facilities!

Organizational Excellence



- We are doing better than NSF average
- We promise to increase it close to 90% !
- In fact some of the DMR programs have already reached this goal!