

PARTNERSHIP FOR RESEARCH AND EDUCATION IN MATERIALS (PREM)

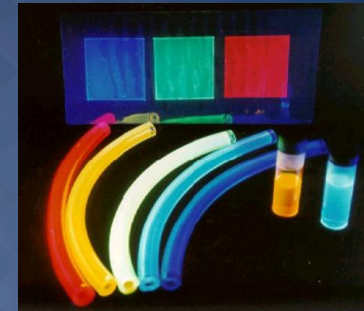
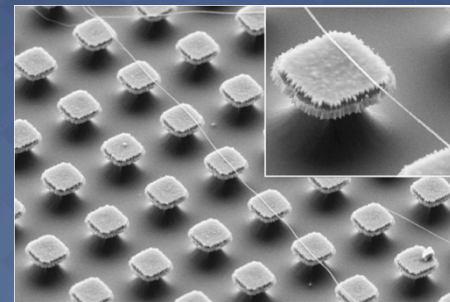
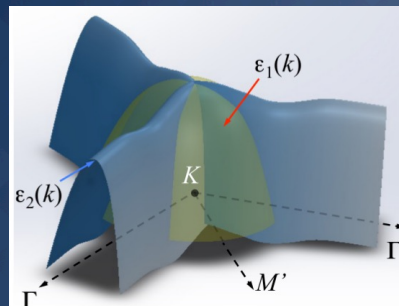
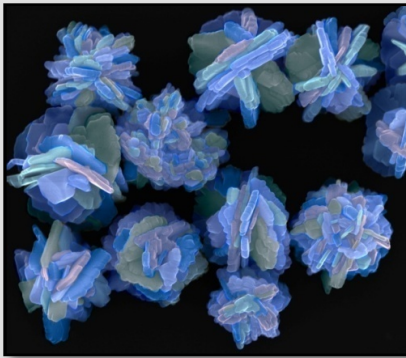
MRSEC Directors Meeting

October 18, 2015

J. Alfredo Caro, PREM PD

Sean L. Jones, Dan Finotello, Former PDs

Division of Materials Research



Context

From 'NSF_big_ideas'

The U.S. is experiencing a period of significant demographic shifts; the Census Bureau projects that by 2050, minorities will comprise 53 percent of the population.

To maintain U.S. leadership in science, the nation must address the challenge of broadening participation in STEM within a single generation.



PREM Program Overview

The goal of Partnerships for Research and Education in Materials (PREM) is to enhance diversity in materials research and education

by stimulating the development of formal, long-term, collaborative research and education partnerships between minority-serving institutions

and the NSF Division of Materials Research (DMR)-supported centers and facilities



PREM Program Overview

- Started in 2004 - 4 Competitions since inception
- 12 active; five year awards, ~ \$6M annually
- Average size ~ \$600k annually
- Competitive research award
 - ❖ Interdisciplinary materials research teams at both institutions.
 - ❖ Partnership based on intellectual connections.
 - ❖ Multi-level education and outreach programs to build a pipeline of students interested in materials science
- Re-competition model
- Program Mgt: Annual PI meetings; Site Visits (yr 2), Reverse Site Visits (yr 4)



Eligible PREM Institutions

STEM Baccalaureate granting institutions that serve primarily under-represented minority groups as classified by the Department of Education:

- Hispanic Serving/High Hispanic Enrollment Institutions (HSI/HHE) >25%
- Historically Black Colleges and Universities (HBCUs)
- Minority Serving Institutions (MSI) >50% aggregate
- Alaska Native Serving Institutions (ANSI) >20%
- Tribal Colleges and Universities (TCU)
- Native Hawaiian Serving Institutions (NHSI) >10%

Eligible PREM Partners

DMR supported group awards with critical mass of collaborators, breadth of research topics, and within the oversight purview of DMR program directors.

- Materials Research Science and Engineering Centers (MRSECs)
- Science and Technology Centers (*STC*)
- Nanoscale Science and Engineering Centers (NSEC)
- *National Facilities*
 - *National High Magnetic Field Laboratory - NHMFL,*
 - *Cornell High Energy Synchrotron Source – CHESS,*
 - *Materials Innovation Platforms – MIP,*
 - *Center for High Resolution Neutron Scattering - CHRNS*



Current PREMS

Class 2012 (-2017):

California State University Northridge	Princeton	MRSEC
Howard University	Cornell	MRSEC
Jackson State University	UC Santa Barbara	MRSEC
Norfolk State University	Purdue-Cornell University	MRSEC
Texas State University - San Marcos	Duke & N Carolina	MRSEC
The University of Texas at El Paso	UC Santa Barbara	MRSEC

Class 2015 (-2020):

California State University, Los Angeles	Penn State	MRSEC
Hampton University	Brandeis University	MRSEC
New Mexico Highlands University	Ohio State University	MRSEC
North Carolina Central University	Penn State	MRSEC
University of Puerto Rico Humacao	University of Pennsylvania	MRSEC
University of Texas Rio Grande Valley	University of Minnesota	MRSEC



PREM Expectations

- Broaden participation in materials research.
- Create new opportunities for students at minority-serving institutions.
- Enhance capacity and research infrastructure at the minority-serving institution.
- **Impact both institutions – research and culture/attitudes.**
- **Integrated Research and Education Programs.**
- **Close interactions with partner institution and NSF Program Directors.**



Impact of PREM

On PREM Students

- Building confidence and changing career goals.
 - Many 1st generation college students.
 - Many have never left their local environment.
- Value of collaborative research
 - Access to multiple mentors
 - Access to instrumentation

On PREM Institutions

- Enhanced research productivity
- Create/Enhance Multi-disciplinary environment
 - Enables a focus on materials research
 - New collaborations
 - Additional access to external funds
- Enriched curricula
- New degree programs
- Improved infrastructure: equipment, space, release time



Demographics

	Total * (affiliated)	Women %	Under-represented minorities %
Faculty at PREM	108(20)	27%	50%
Faculty at Partner Inst.	97(36)	23%	16%
Post-docs	30(12)	27%	26%
Graduate students	137(56)	35%	44%
Undergraduates	222(34)	35%	70%

* Total = NSF PREM supported + affiliated (non-PREM support)

Data from 2016 Annual Report for the Class of 2012 & 2015 PREMs



Cumulative Graduates and Output

	Class of 2004*	Class of 2006*	Class of 2009*	Class of 2012	Total
Post-docs	9	28	36	19	92
Graduate Students	61	103	98	58	320
Undergraduate Students	115	143	230	80	568
Publications	282	357	449	377	1465
Presentations	862	766	1064	847	3539
Patents Awarded		0	3	2	5
Patents Pending		7	10	3	20

Cumulative Graduates and Output

	Class of 2004*	Class of 2006*	Class of 2009**	Class of 2012	Total
Post-docs	9	28	36	19	92
<i>Research Exp. w/ partner institution</i>			12 (33%)	9 (47%)	
Graduate Students	61	103	98	60	420
<i>Research Exp. w/ partner institution</i>			14 (14%)	22 (37%)	
Undergraduate Students	115	143	230	92	1000
<i>Research Exp. w/ partner institution</i>			60 (26%)	36 (39%)	
Publications (% w/ students)	282	357	449 (82%)	377 (72%)	1465
<i>With 2 or more PREM faculty</i>			106 (24%)	60 (16%)	
<i>With 2 or more partner faculty</i>			49 (11%)	34 (9%)	
Presentations	862	766	1064	847	3539



Summary

- Program is dynamic and growing, with stronger proposals in every competition.
- Positive impact on students and the institutions.
- PREM graduates are staying in science.
- A PREM community is forming.
- DMR and MPS are very committed to this program.





Timeline

- March-May 2017 Site visits for Class 2015
- June 2017 MRSEC awards
- ~Sept 2017 PREM solicitation out
- ~Nov 2017 PREM proposals in
- ~April 2018 PREM awards, Class 2018



Thank You

Where Discoveries Begin