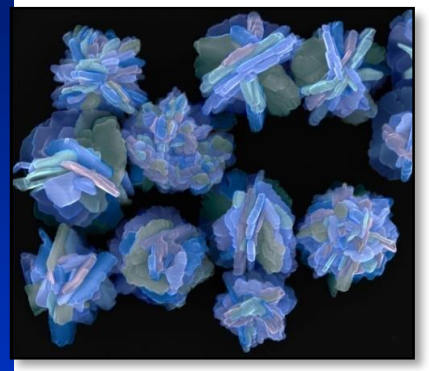
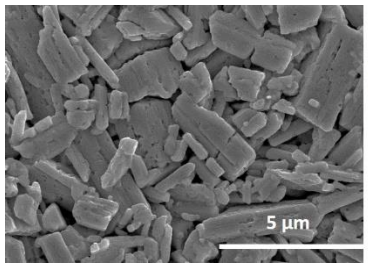
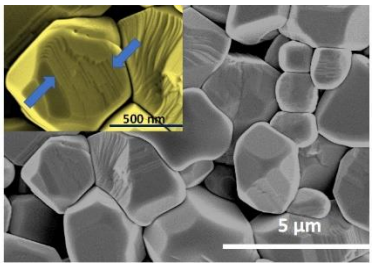
National Science Foundation

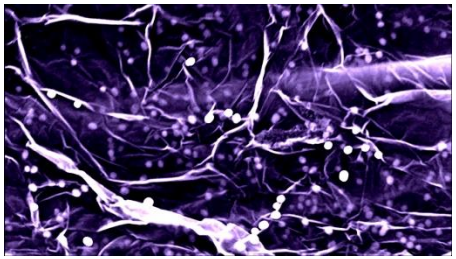


Partnership for Research and Education in Materials (PREM)

Debasis Majumdar
Division of Materials Research
Directorate for Mathematical and Physical Sciences
National Science Foundation







National Science Foundation

PREM Program

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

National Science Foundation

Eligible PREM Institutions

STEM Baccalaureate granting institutions that serve primarily underrepresented 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%
- Native American-serving non-Tribal Institutions and Tribal Colleges and Universities (TCU)
- Native Hawaiian Serving Institutions (NHSI) >10%

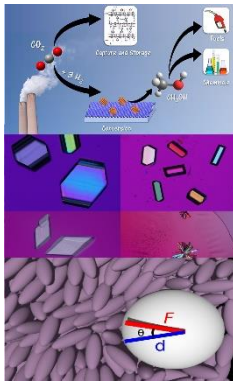
Eligible PREM Partners

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

- Materials Research Science and Engineering Centers (MRSECs)
- DMR supported Science and Technology Centers (STCs)
- DMR supported Materials Innovation Platforms (MIP)
- National High Magnetic Field Laboratory (NHMFL)
- Cornell High Energy Synchrotron Source (CHESS)
- Center for High Resolution Neutron Scattering (CHRNS)

Overarching Goals

- Broaden participation in materials research
- Create new opportunities for students at minority-serving institutions
    - Build student confidence, access to mentors, access to instrumentation
- Enhance research productivity and infrastructure
- Impact both institutions: research and culture
- Develop integrated research and education programs
- Pursue close interactions with partner institution and NSF
    - Annual Meetings
    - Site Visits and Reverse Site Visits
    - PREM Workshops



National Science Foundation

Essential Components of PREM

PREM

Expected Outcome and Metrics

- Science
  - Cutting-edge research and educational excellence
    - *High-impact publications, patents, curriculum development, mentoring,….*

- People
  - Measurable Δ in demographics: faculty, post-docs and students: G, UG, K-12
  - Robust pipeline development utilizing PREM pathway elements
    - *Recruitment, retention & graduation stats, % URM, post-graduation trajectory,…*

- Partnership
  - Impactful reciprocal collaboration
    - *Research experience, student exchange, partner's engagement in research and mentoring, joint publications, Δ in partner's demographics,….*

PREM Program Summary

- Started in 2003 - 6 Competitions - 38 awards
- 2018 snapshot:12 active PREM + 8 new awards + 2 seeds*
- New awards: average size ~ $4 million; six-year duration
- 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; Annual report; Site Visits (yr 2), Reverse Site Visits (yr 4)

** PREM seed funding*

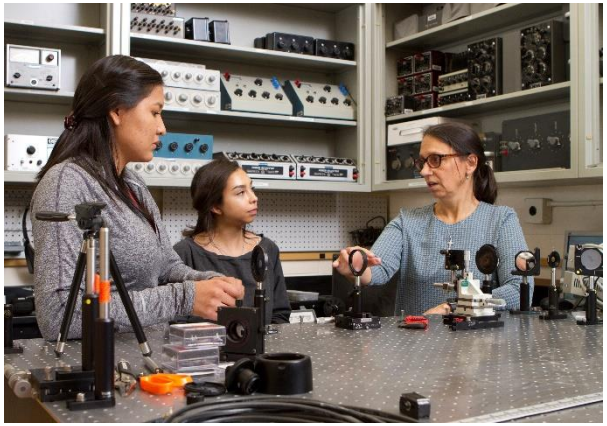
PREM solicitation: 2018 competition

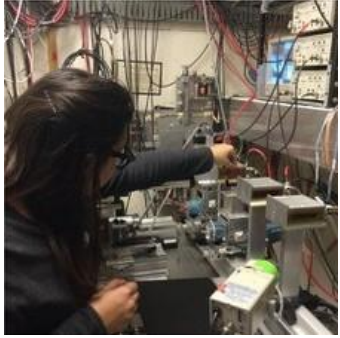
Eva Campo, Alfredo Caro, Linda Sapochak

- 6-year award (vs. 5-year previously)
- Eligibility includes Native American-serving non-Tribal Institutions; co-PI is the Director of DMR-supported center or facility
- Project description limited to 28 pages (vs. 20 previously)
  - Partnership Context:
    - *starting point in PREM pathway*
  - Partnership Impact:
    - *strategy for attaining a final point in PREM pathway using PREM elements*
- Updated review criteria
  - Research and Education Partnership:
    - *quantity and quality of research and education*
  - Reciprocity in Partnership
    - *student/faculty exchange and mentoring*

National Science Foundation

2018 New PREMS



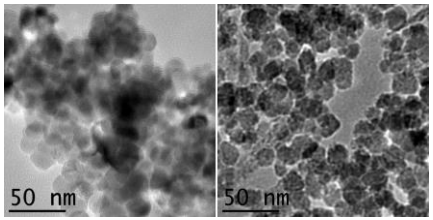


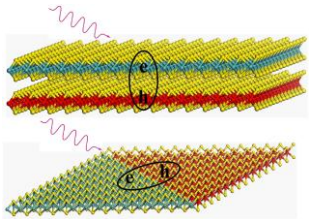
Class of 2018:

California State University Northridge	Princeton	MRSEC
Jackson State University	UC Santa Barbara	MRSEC
Fort Lewis College	STROBE	STC
University of Puerto Rico Mayaguez	U Wisconsin Madison	MRSEC
The University of Texas at El Paso	UC Santa Barbara	MRSEC
Hampton University	Brandeis U	MRSEC
University of Puerto Rico Rio Piedras	CHESS	Facility
Tuskegee University	U Nebraska Lincoln	MRSEC

PREM Seed:

Fayetteville State University	CHRNS	Facility
Navajo Technical University	Harvard	MRSEC





NATIONAL SCIENCE FOUNDATION PREM Partnership for Research and Education in Materials

National Science Foundation

PREM Output YTD

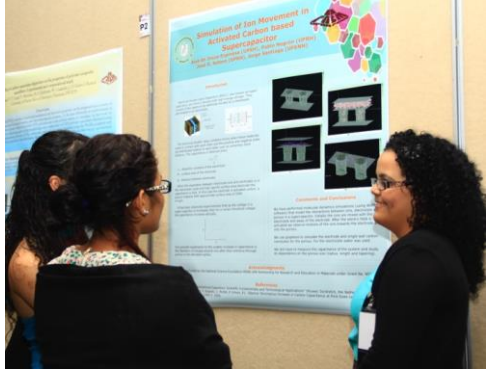
	Class of 2004	Class of 2006	Class of 2009	Class of 2012	Class of 2015**	Total
Post-docs	9	28	36	28	8	**109**
Graduate students	61	103	98	122	43	**427**
Undergraduate students	115	143	230	209	100	**797**
Publications	282	357	449	610	147	**1845**
Presentations	862	766	1064	1321	496	**4509**
Patents awarded		0	3	3	0	**6**
Patents pending		7	10	6	5	**28**

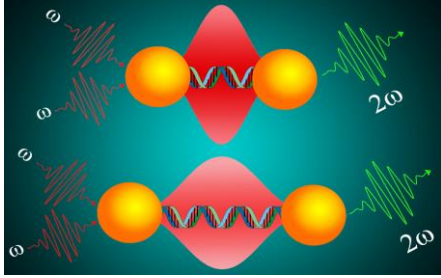
2015** at the end of 3 years

NATIONAL SCIENCE FOUNDATION PREM

National Science Foundation

2018 Active PREMS





Class of 2012:

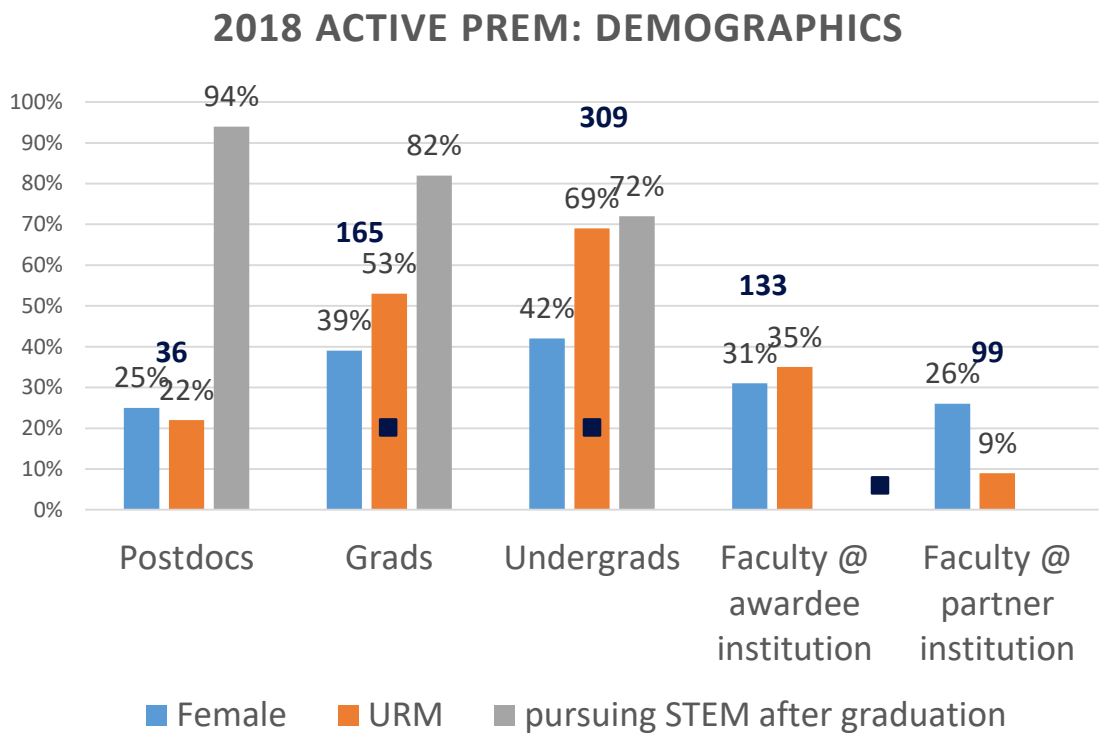
California State University Northridge	Princeton	MRSEC
Howard University	Cornell	MRSEC
Jackson State University	UC Santa Barbara	MRSEC
Norfolk State University	Purdue-Cornell University	MRSEC
Texas State University - San Marcos	Duke & N Carolina	MRSEC
The University of Texas at El Paso	UC Santa Barbara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

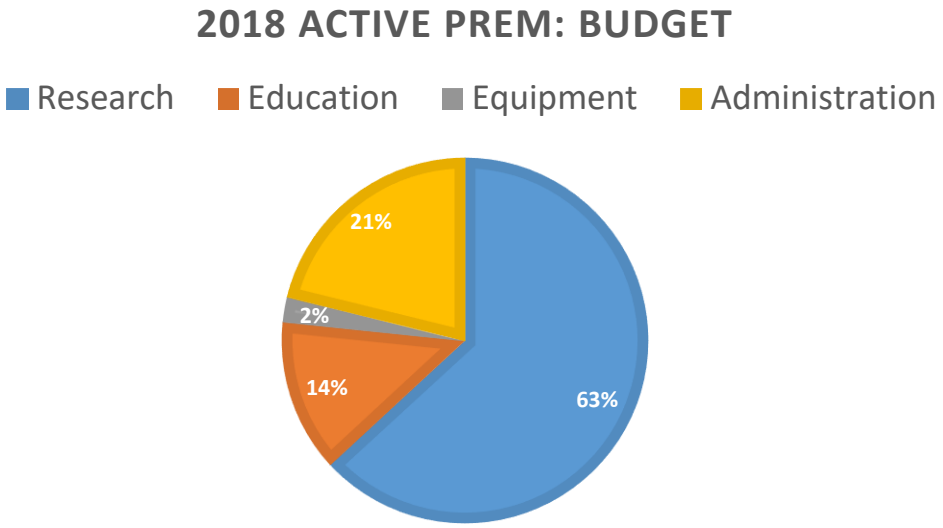
Class of 2015:

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

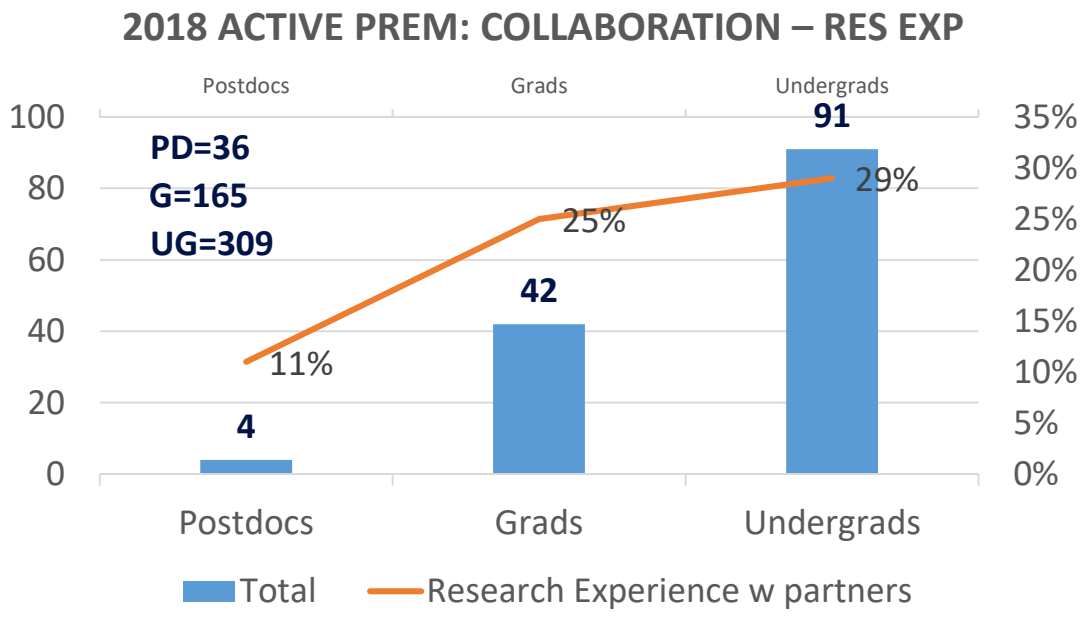
NATIONAL SCIENCE FOUNDATION PREM

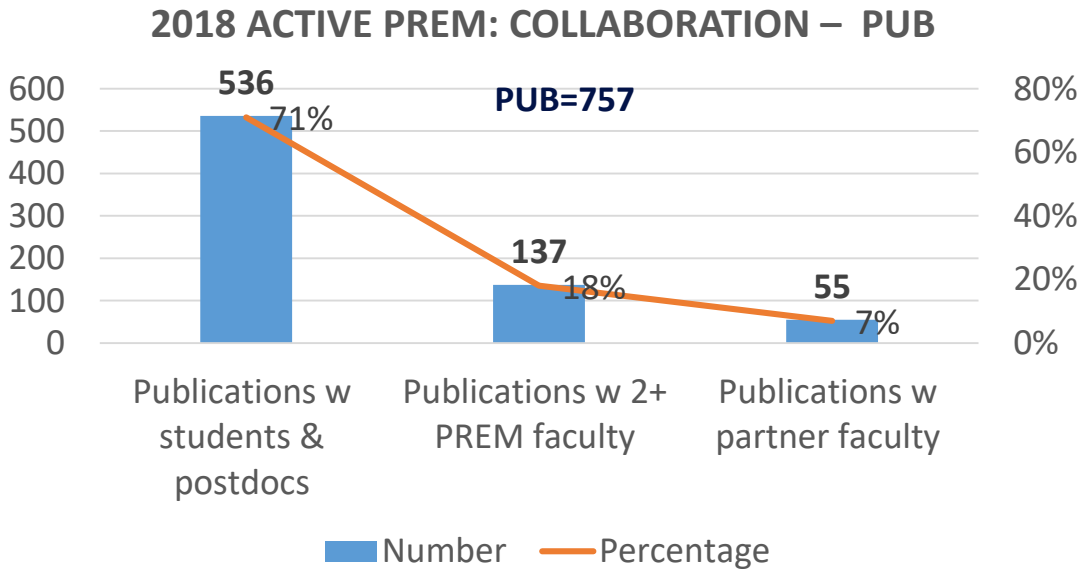
Stats: 2018 Active PREM





Stats: 2018 Active PREM





National Science Foundation

Summary

- Dynamic and growing program.
- Positive impact on students and the institutions.
- Strong proposals in competition.
- Reciprocity model with strong research synergy is key!
- PREMs developing additional partnerships that further build research capacity as well as helps broadening participation.
- PREM graduates staying in STEM.
- DMR and MPS are very committed to this program.