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WHERE DISCOVERIES BEGIN



News Release 15-098

## Investing in diversity

Material science partnership awards broaden participation, strengthen research



PREM partnerships involve outreach to excite budding scientists.

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With an eye toward improving material science through increased diverse perspectives, the National Science Foundation (NSF) awarded six Partnerships for Research and Education in Materials (PREM) awards this year, in its fifth such competition since 2004.

Whether they focus on new laser treatments that may better target cancer cells, or on exploring new materials that could lead to sustainable energy alternatives, PREM awards couple the expertise of NSF Materials Research Science and Engineering Centers (MRSEC) with minority-serving colleges and universities to involve those students in some of the nation's preeminent materials research.

PREM aims to broaden participation and enhance diversity in materials research and education by stimulating formal, long-term, multi-investigator, collaborative research and education partnerships.

"The PREM program is first and foremost a competitive research award that also has elements of a mentoring venture, a capacity-building program and a fairly clever support network all wrapped up together," said Linda Sapochak, acting director for NSF's Division of Materials Research. "Since we started making these awards formally in 2004, we've seen groups make important discoveries, apply for patents--even start up a company."

While there is an increasing emphasis <<https://www.whitehouse.gov/issues/education/k-12/educate-innovate>> on STEM education, it still remains a challenge to involve many underrepresented groups of students in these fields. The most recent edition of the *Women, Minorities and Persons with Disabilities Science and Engineering* biannual report <<http://www.nsf.gov/statistics/2015/nsf15311/digest/>> from NSF's National Center for Science and Engineering Statistics shows that less than 10 percent of material scientists are Hispanic. For African Americans, the numbers are even lower, at approximately 4-6 percent.

"This isn't a one-way learning street in these collaborations," said Dan Finotello, NSF's lead program director for the MRSEC and PREM program. "As much as a MRSEC may already seem to have the very best tools and talent, time and time again we have seen how new and different perspectives can improve research approaches and outcomes."

These awards were made possible through partnership between NSF's Division for Materials Research and the Historically Black Colleges and Universities Undergraduate Program in NSF's Education and Human Resources directorate.

"This is truly a win-win situation. The collaborations offer unique research and educational opportunities for students who most likely wouldn't get this exposure otherwise," said Sean Jones, NSF PREM program director. "And what's really exciting is how the partnership complements the discovery process. You want all the talent you can get. An inclusive investigator pool minimizes research 'blind spots.'"

This year's awards include two renewals and four new awards:

**University of Puerto Rico Humacao/University of Pennsylvania** <<http://www.nsf.gov/cgi-bin/good-bye?http://www.lrsm.upenn.edu/>> --Initiated more than a decade ago in a predecessor to the PREM program, this partnership has a renewed award. Already, the collaboration has involved more than 100 students in research with PREM faculty, and additional outreach aimed at K-16 has touched thousands. Of the 25 PREM students who graduated with undergraduate degrees between 2009 and 2014, 17 continued onto STEM-related graduate studies. High school students and undergraduates participate in multidisciplinary research that leads to publishable results. In fact, 55 percent of the publications from researchers associated with the program over that same time frame included these students as co-authors. This partnership's PREM research and education activities focus on nanofibers for nano-electronic devices and sensors, and with a special outreach focus on women in physics, partnering with the American Physical Society at times to enhance efforts.

**University of Texas Rio Grande Valley (formerly UT Pan American)/University of Minnesota** <<http://www.nsf.gov/cgi-bin/good-bye?http://www.mrsec.umn.edu/>> --With a strong focus on nanofibers, this partnership (which began with UT Pan American) has provided research opportunities for 135 students that included incorporating them as scientific presenters and paper collaborators--and also as partners in submitting 12 patent applications (some licensed). While a high percentage of students come to the partnership without the advantage of strong scientific backgrounds, the program has seen a 100 percent retention and graduation rate among its undergraduates. The partnership's research has important applications for areas of study such as sensor development, novel lithium-ion batteries and spintronics.

**Hampton University/Brandeis University** <<http://www.nsf.gov/cgi-bin/good-bye?http://www.brandeis.edu/mrsec/>> --Part of a new partnership, Hampton University will tap into Brandeis' existing research experience with respect to bioinspired soft materials, focusing on developing more targeted drug delivery systems. This PREM will increase the number of African-American women students in

materials science and the proposed research will directly engage trainees, from high school students to postdoctoral fellows, in cutting-edge research that leads them to co-author publications and present research findings at conferences.

**North Carolina Central University/Penn State Center for Nanoscale Science** <<http://www.nsf.gov/cgi-bin/good-bye?http://www.mrsec.psu.edu/>> --Another new partnership, NCCU plans to increase low participation of underrepresented minorities in material science with a peer-to-peer "PENNpal" mentoring program. Tapping into Penn State's work and expertise in developing a new class of materials for energy conversion and conservation, NCCU will focus on precise magnetic properties for graphene and similar 2-D materials.

**New Mexico Highlands University/Ohio State University** <<http://www.nsf.gov/cgi-bin/good-bye?http://cem.osu.edu/>> --In an area where minority groups make up the majority of the population, NMHU plans to continue its reputation for pioneering new opportunities for its students and researchers. This collaboration will allow NMHU researchers and students to start new research in 2-D graphene as it is modified by absorbed metal nanoparticles and possible applications in photonic devices. This new approach to materials design and crystal engineering will allow for the combination of two or more components in one crystalline material which will significantly alter electronic, magnetic and optical properties and may help develop new sensors. Master's-level students will spend a semester at OSU to improve opportunities for PhD program entrance there or elsewhere.

**California State University, Los Angeles/Penn State University** <<http://www.nsf.gov/cgi-bin/good-bye?http://www.mrsec.psu.edu/>> --Key goals of this partnership are to establish a master's of science degree program in materials science at CSULA and also a bridge structure for its students to continue on to PhD studies at Penn State (or other leading institutions) or to help them seek employment in the field after graduation. Scientific emphasis will be on developing, discovering and applying new materials and material properties that are important to solving current societal problems. Additionally, mindful of the early portion of this academic pipeline, this PREM will also manage a summer research experience for academically talented high school students with four local minority high schools with more than 95 percent Hispanic enrollment.

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## Related Websites

PREM website: <http://prem-mrsec.org/> ([/cgi-bin/good-bye?http://prem-mrsec.org/](http://prem-mrsec.org/))

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