National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

NSF 16-139

Dear Colleague Letter: EFRI Research Experience and Mentoring (REM) Program

September 20, 2016

Dear Colleague:

The National Science Foundation Directorate for Engineering (NSF/ENG) Emerging Frontiers in Research and Innovation (EFRI) program continually seeks to advance scientific progress in EFRI topic areas while broadening participation of underrepresented groups in science, technology, engineering, and mathematics (STEM) fields. This letter seeks to inform the community about an opportunity to pursue both of these goals through supplements to active EFRI research awards from the Research Experience and Mentoring (REM) program.

Awardees with active EFRI research grants may apply for supplemental funding from the REM program via FastLane. REM funding will support costs associated with bringing Research Participants (RPs) into the laboratory over the summer to participate in mentoring activities and research aligned with the EFRI-supported research goals. REM funds may also be used to extend structured mentoring into the academic year.

INTRODUCTION

NSF encourages EFRI-supported researchers to create carefully mentored research opportunities for people who may not otherwise become engaged in a research project, and to utilize the contributions and talents of these participants to make further progress toward research goals. Ideally the experience would be mutually beneficial. Research experiences and mentorship have been positively correlated with STEM success. For example:

- Effective mentorship in STEM has been shown to be impactful for all learners and can often strengthen persistence in STEM [1].
- “Co-curricular” activities, which provide both authentic disciplinary experiences and mentoring support, influence retention and engagement in STEM [2,3,4].
- Mentoring and training reinforce and strengthen the persistence of underrepresented students in STEM courses and majors [4].
- Mentoring and experiential opportunities are valuable for engaging K-12 students and teachers [5].

The REM program seeks to pursue this mutual process of research exploration and interaction by offering the Principal Investigators (PIs) flexibility to design the research experience and mentoring plan for the RPs. The REM Program also encourages PIs to leverage local STEM-related expertise and infrastructure already supported by NSF.

PROGRAM DESCRIPTION

The REM program supports the active involvement of research participants: high school students, STEM teachers, undergraduate STEM students, faculty, and veterans, in hands-on research in order to bring this rich research experience and contact with suitable STEM mentors into participants' lives.
The main goals of the REM program are to provide research experiences and mentoring opportunities to STEM students and/or educators that may ultimately enhance their career and academic trajectories while enhancing EFRI-supported research. The REM program may also enable the building of long-term collaborative partnerships among EFRI-supported researchers, the NSF university research community, and local school districts.

EFRI seeks to *encourage activities that are innovative and site-specific*. Effective summer research programs typically have many of the following characteristics, which are provided here as general guidelines:

- Mentorship training for researchers and affiliated graduate students or postdocs;
- Well-designed, introductory training for RPs;
- Six to ten weeks of summer research;
- Continued mentorship of RPs throughout the academic year;
- Participation of RPs in research team meetings and topic-related conferences or workshops; and
- Guidance for RPs in co-authoring publications and/or posters.

Each REM supplemental funding request *should be specific to the local setting, resources, and skills of the PI/Research Team*. The REM Program especially encourages partnerships with one or more of the following types of institutions:

- Inner-city schools or other high-needs K-12 schools;
- Community colleges that serve underrepresented populations; and
- Four-year colleges that serve underrepresented populations.

Requests for supplemental funding *must include a Recruitment Plan*, describing how at least six members of one or more of the following groups will be recruited as RPs in each EFRI topic area:

- Underrepresented minorities (African-Americans, Hispanics, Native Americans, Alaska Natives, Native Hawaiians, and other Pacific Islanders);
- Women and girls;
- Veterans enrolled in post-secondary education; or
- Persons with disabilities.

PIs requesting a REM supplement *must provide a Research Participant Mentoring Plan* describing the mentoring activities that will be provided to the RPs supported by this supplement. Mentoring activities may include, but are not limited to:

- Establishing a mutually agreed-upon list of expectations and goals;
- Meeting in advance of the research experience in order to orient RPs, learn their research interests/preferences, and arrange placements;
- Providing or arranging for didactic training in advance of the laboratory experience;
- Providing or arranging for mentorship training for those working closely with RPs;
- Providing timely evaluations of progress towards expected goals;
- Providing professional development activities such as career/educational counseling, workshop participation, networking and internships;
- Providing guidance in effective scientific writing and oral communications training for publications and presentations at conferences/meetings;
- Accompanying RPs at professional conferences and/or funding their participation;
- Providing opportunities for RPs' interaction in seminars or symposiums;
- Encouraging networking among RPs, mentors, and PIs at periodic working lunches or occasional

outings (offsite research team meetings or retreats);
- Providing guidance on ways to improve teaching, leadership, communication, and mentoring skills;
- Providing guidance on how to collaborate effectively with researchers from diverse backgrounds and inter-disciplinary areas; and
- Providing field trips to related facilities and/or local facilities of engineering interest.

REM Supplemental funding requests *must also include an evaluation component*, including but not limited to a pre-and-post survey of RPs (and possibly mentors, especially if graduate students serve as mentors). Attitudinal changes and/or changes to career trajectory, effectiveness of mentoring, understanding of scientific underpinning, added skill sets should be measured; an initial Logic Model describing expected outcomes of the activities undertaken, and the mechanism(s) to measure and evaluate those outcomes should be provided. Longitudinal data will be expected where appropriate for renewals. Evaluation data must be provided in the final report, to enable NSF to gauge the value of providing these experiences.

RPs and mentors are expected to present posters at the annual EFRI-REM grantee meeting, held in conjunction with the Emerging Researchers National Conference in STEM (ERN) in Washington, DC. Conference details can be found at http://www.emerging-researchers.org/.

ANTICIPATED TYPE OF AWARD

The Awardee may request REM supplements for up to 12 months (summer plus the academic year).

ELIGIBILITY

A request for supplemental funding may be submitted by the PI or co-PI of any currently active EFRI research award. Supplemental funding requests may include collaboration with and/or placement of RPs in other EFRI-supported laboratories. REM RP candidates must be United States citizens, nationals, or permanent residents. It is the responsibility of the submitting institution to verify eligibility of the REM RP candidate.

PREPARATION OF AN EFRI-REM SUPPLEMENTAL FUNDING REQUEST

Information about requesting supplemental support is contained in Part II: Award and Administration Guide (AAG) of the NSF *Proposal and Award Policies and Procedures Guide* (PAPPG), available online at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp .

In addition to AAG requirements for supplemental support, the following materials must be submitted to apply for REM supplemental funding:

- *Recruitment Plan* (1-3 pages). See additional details in the Program Description section above.
- *Research Participant Mentoring Plan* (2-3 pages). See additional details in the Program Description section above.
- *Evaluation Plan* (2-3 pages). See additional details in the Program Description section above.
- *Budget*, *including* a budget justification for the funds requested and their proposed use. The maximum annual amount (including any associated indirect costs) is $100,000. The budget must include travel/registration expenses for RPs and mentors to participate in the EFRI grantee meeting. It must not include tuition at the EFRI-supported institution(s). Costs related to hosting RPs may vary from laboratory to laboratory; the budget should include expenses related to providing RPs with appropriate mentoring, materials, and laboratory access.

REM RPs must be provided with a stipend for their participation. Details are left to the PI, but EFRI offers the following guidelines based on figures from similar NSF programs:

- High School student: not less than $2800

- University/College/Community College (CC) student: not less than $4000
- K-12 Teacher or CC Faculty: not less than $6000
- College/University faculty: about one tenth of their average annual salary
- Veteran: approximately 2 months of the Post-9/11 GI-Bill Housing Basic Allowance for Housing (calculator at https://www.defensetravel.dod.mil/site/bahCalc.cfm, setting pay grade to E-5.)
- Housing stipends may be provided for out-of-town RPs, 18 years of age or older. Local high-school students or recent graduates (under 18 years of age) should be lodging with a parent or guardian, or may be housed in on-campus housing facilities if the university has a record of successfully housing minors (documentation should be provided).
- Travel stipends may be provided for the RPs. RPs (under 18 years of age) may travel with the research team to the annual EFRI-REM Grantee conference. Appropriate safety waivers and transportation waivers should be obtained from all participants, but are mandatory for those under 18 years of age. Out-of-town RPs may be offered an allowance for occasional home visits.

The request for supplemental funding should be submitted to NSF by your organization's Sponsored Projects Office via FastLane. For questions related to the use of FastLane, contact the FastLane Help Desk: email fastlane@nsf.gov or telephone 1-800-673-6188.

CONTACTS FOR ADDITIONAL INFORMATION

For questions or information on submission of an REM supplemental funding request, contact the managing Program Officer for the current EFRI award, or one of the following REM Coordinators:

Kerstin Mukerji, kmukerji@nsf.gov
Mary Poats, mpoats@nsf.gov

REVIEW PROCESS

Award decisions will be based on internal review and/or review by a panel of external experts from academia and industry, and upon availability of funds. We anticipate notifying successful PIs by the end of January 2017 so that the recruitment plan can be implemented at that time.

AWARD SIZE AND DURATION

The maximum amount of a REM supplement is $100,000. The Awardee may request REM supplements for up to 12 months (summer plus academic year). REM supplements are nontransferable.

AWARD INFORMATION

Anticipated FY 2017 budget for the REM program is $1,000,000, subject to the availability of funds and the merit of proposals received.

SUBMISSION DEADLINE

The deadline for submission of a REM request is 5:00 p.m., submitter's local time, on ***November 16, 2016.***

SPECIAL REPORTING REQUIREMENTS

The annual and final project reports must discuss the impact of the supplemental funding on increasing the participation of underrepresented groups in engineering. Accumulated quantitative data on race, gender, and disability are expected. EFRI anticipates that REM will open and promote new avenues for increasing the participation of underrepresented populations in engineering disciplines, and in turn, enhance the development of the U.S. engineering workforce in accordance with the America COMPETES Act (https://www.govtrack.us/congress/bills/110/hr2272/text), thereby addressing the

continuing underrepresentation of women and minorities through 2020 anticipated in the Engineer of 2020 report of the National Academy of Engineering (http://www.nap.edu/catalog.php?record_id=10999).

We hope that you are inspired by this opportunity to design and implement a program that serves your research needs while simultaneously working to develop engineers of the future; we look forward to reading your innovative proposals.

Sincerely,

Grace Wang
Acting Assistant Director
Directorate for Engineering (ENG)
National Science Foundation

Citation References

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2. Thiry, H., Laursen, S.L., and Hunter, A.B. (2011). What experiences help students become scientists? A comparative study of research and other sources of personal and professional gains for STEM undergraduates. *Journal of Higher Education, 82*(4), 357-388.
3. Chang, M.J., Eagan, M.K., Lin, M.H., and Hurtado, S. (2011). Considering the impact of racial stigmas and science identity: Persistence among biomedical and behavioral science aspirants. *Journal of Higher Education, 82*(5), 564-596.
4. National Academies of Sciences, Engineering, and Medicine (2016). *Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways*. Washington, DC: The National Academies Press. http://www.nap.edu/catalog/21739/barriers-and-opportunities-for-2-year-and-4-year-stem-degrees
5. National Science Board (2010). *Preparing the Next Generation of STEM Innovators: Identifying and Developing Our Nation's Human Capital (2010)*. NSB-10-33. https://www.nsf.gov/nsb/publications/2010/nsb1033.pdf