NATIONAL SCIENCE FOUNDATION
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ARLINGTON, VIRGINIA 22230

NSF 16-092

Dear Colleague Letter: NSF/NSFC Joint Research on Environmental Sustainability Challenges

Replaces NSF 15-091.

June 13, 2016

Dear Colleagues:

The NSF Engineering Directorate (ENG) and the National Natural Science Foundation of China (NSFC) Department of Engineering and Material Sciences (DEMS) are partnering to encourage joint research by U.S. - China teams collaborating on fundamental research that addresses critical environmental sustainability challenges.

The U.S. and China have the two largest economies on Earth and also have important engineering, technology, business and trade relationships with each other. Both nations face significant environmental sustainability challenges, for example in water and energy, urban sustainability, and manufacturing. Fundamental research is needed to provide the foundational knowledge for addressing these challenges.

This call is for research proposals from joint U.S. - China teams in two environmental sustainability topic areas:

Topic 1. Combustion Related to Sustainable Energy
Topic 2. Urban Water Sustainability

Every proposal must include the participation of researchers from at least one U.S. institution and at least one institution in China. Proposals that do not comply with this requirement will be returned without review. The proposal submitted to NSF must conform to NSF proposal requirements as specified in NSF's posted Grant Proposal Guide, and the matching proposal submitted to NSFC must conform to requirements posted by NSFC. NSF will fund the U.S. researchers of winning teams (up to a total of $500K for 4 years for each winning proposal), while NSFC will fund the China researchers of winning teams (up to a total of 3 million yuan for 4 years for each winning proposal). In total, no more than 3 joint NSF-NSFC project grants are expected to be funded. Each proposal must include a management plan that clearly specifies the role of team researchers from both the U.S. and China, and the mechanisms through which close collaboration will be assured. The management plan is not to exceed 3 pages and is to be included in the supplementary document file of the electronic submission.

Cyberinfrastructure proposals are outside the scope of this call.

Topic 1. Combustion Related to Sustainable Energy

In both the U.S. and China, over 80 percent of energy usage is derived through combustion. Combustion

processes provide the energy for electricity generation (e.g., from coal and natural gas), transportation (e.g., internal combustion engines in cars and trucks), building space and hot water heating, and industrial processes. Combustion results not only in useful energy conversion, but also pollution. One example of pollution from combustion is soot, in particular particulates of size 2.5 microns or smaller that cause smog that not only obscures vision, but also can result in respiratory distress and serious health problems. Combustion also generates greenhouse gases (e.g., CO2) that drive global warming and climate change. Fundamental research is needed to decrease the adverse environmental impacts of combustion processes.

Examples of fundamental research needs in the area of Topic 1 include but are not limited to:

- Increased knowledge of fundamental mechanisms related to combustion carbon (CO2) capture technologies, such as oxy-fuel combustion processes and chemical looping
- Increased knowledge of fundamental mechanisms for gasification (coal, biomass, coal/biomass mixtures)
- Increased understanding of fundamental combustion reaction mechanisms for pollutant emissions (e.g., particulates, NOx), with efforts focused on reduction of such emissions from combustion systems (e.g., coal, internal combustion engines)

Note that increasing combustion efficiency is outside the scope of this call for proposals. Also, separation proposals related to combustion (e.g., for gases, such as CO2 and O2, and for removal of particulates by such separation processes as filtration) are not within the scope of this call. For U.S. researchers, such separations proposals should be redirected to the Chemical and Biological Separations program (CBS) of the CBET Division of NSF.

For Topic 1 proposals, on the Cover Sheet of the proposal submission to NSF in FastLane, the title of the proposal must begin with "SusChEM," making the proposal fall under the NSF SEES umbrella of Sustainable Chemistry, Engineering, and Materials. The proposal title on the FastLane Cover Sheet would then read "SusChEM: rest of proposal title."

Topic 2. Urban Water Sustainability

Provision of water with sufficient quality and in adequate quantity is vital for urban areas, and is becoming increasingly challenging. Examples of fundamental research needs in the area of Topic 2 include but are not limited to:

- Means to enable urban wastewater re-use, including as potable water
- Routes for efficient and cost-effective capture, storage, and use of storm water
- Pathways to minimizing water consumption for all purposes
- Creation of advantageous synergies in the Food-Energy-Water (FEW) nexus
- Drinking water safety and security

PROPOSAL SUBMISSION

US-based researchers, through their U.S. institutions, may submit unsolicited proposals to collaborate with China-based researchers on either of the two topics listed and described above to the ENG/CBET Environmental Sustainability (7643) program during the window October 1 - October 20, 2016. The window closes at 5:00 pm submitter's local time on October 20, 2016. More information on the ENG/CBET Environmental Sustainability program and submittal procedures is posted at: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027.

Each U.S. - China team is responsible for ensuring that their counterpart submits a matching proposal by the required deadline. Each submitted proposal must include a letter from the collaborator. For NSF proposals, the collaborator letter is to be included in the supplementary documents file of the electronic

submission.

REVIEW AND AWARD PROCESS

The review and award process will follow NSF and NSFC guidelines specified in their respective policy documents. NSF and NSFC will conduct separate reviews of eligible submitted proposals in accordance with their review policies and regulations. NSF and NSFC will reach consensus, through discussion, on which projects are high enough priority to both sides to warrant joint funding. NSF and NSFC will make awards to the U.S. and Chinese institutions respectively.

Questions concerning this opportunity may be emailed to the CBET Environmental Sustainability program director, Bruce Hamilton (bhamilto@nsf.gov) or the CBET Environmental Engineering program director, William J. Cooper (wjcooper@nsf.gov).

Sincerely,

Pramod P. Khargonekar
Assistant Director for Engineering