NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

NSF 16-142

Dear Colleague Letter: Advanced Measurement Systems for Experimental Determination of Complex Biomaterial Properties

September 28, 2016

Dear Colleague:

Through this Dear Colleague Letter (DCL), the Division of Civil, Mechanical and Manufacturing Innovation (CMMI), Directorate for Engineering (ENG), announces its intention to support research on advanced measurement systems for experimental determination of complex biomaterial properties through its Biomechanics and Mechanobiology (BMMB) and Mechanics of Materials and Structures (MoMS) core programs.

Rapid advances in photonic, acoustic, imaging, electronic and manipulative technologies have recently created an unprecedented potential to study biomaterials at multiple scales and high resolution. Combined with computation methods, it is now possible to identify the material property distributions of perturbed living organisms. These technological advances have the potential to revolutionize our understanding of the mechanics of biological materials from the molecular scale to in vivo measurement.

The BMMB and MoMS Programs of CMMI welcome proposals as part of their existing programs (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13523&org=CMMI, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13355&org=CMMI) that advance developments at all levels for the experimental determination of complex biomaterial properties tested in situ. Proposals for these advances include (but are not limited to) research that specifically addresses determination of dynamic elastic and failure mechanical properties of the brain, bone, individual cells, tissue, and other biological material systems. Development and validation of mathematical and/or computational techniques for inverse identification of complex and/or novel material model property distributions are included in this call.

This DCL calls attention to the inclusion of these topics within the scope of the existing CMMI BMMB and MoMS programs. Proposals submitted in response to this DCL will be jointly reviewed by these programs in competition with other proposals; this is neither a special competition nor a new program, and proposals will be funded as part of the core programs' budgets. For joint consideration by both programs proposals submitted in response to this DCL should be synergistic with both BMMB and MoMS approaches and must contain research components as described by the two (BMMB and MoMS) program solicitations. Proposal ideas that do not fit within the BMMB and MoMS program descriptions but appear to address topics related to this DCL should be submitted to other relevant NSF programs.

Proposals relevant to this DCL must be submitted during the regular CMMI proposal submission windows, following the Proposal and Award Policies and Procedures Guide (PAPPG) proposal

preparation guidelines (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp). For further information, interested PIs may contact Kara Peters (Program Director, MoMS, telephone (703) 292-7060, email kpeters@nsf.gov) and David Fyhrie (Program Director, BMMB, telephone (703) 292-7088, email dfyhrie@nsf.gov).

Sincerely,

Grace Wang

Acting Assistant Director, ENG