NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 23-156

Dear Colleague Letter: Exploring Task-based Interactions between Human and Synthetic Actors

September 25, 2023

Dear Colleagues:

With this Dear Colleague letter (DCL), the Division of Civil, Mechanical and Manufacturing Innovation (CMMI) of the Directorate for Engineering (ENG) invites the submission of EArly-concept Grants for Exploratory Research (EAGER) proposals, as well as supplemental funding requests to existing NSF awards, in support of research on the performance of novel and important tasks that require sensorimotor interaction between human and synthetic actors: that is, physical interaction that also involves sensing through one or more modalities.

The overarching goal of this effort is to diversify research in this area through the exploration of new ways in which humans can interact with synthetic agents to achieve important societal aims. EAGER proposals are expected to involve radically different approaches, to apply new expertise, or to engage novel disciplinary or interdisciplinary perspectives. Supplemental funding requests may be related to current awards associated with any of the CMMI programs listed below.

For the purposes of this DCL, a task is considered to be a collection of goals, constraints, and methods. Task performance refers to the use of the methods to satisfy one or more of the goals without violating any of the constraints. The precise definition of these terms is left intentionally open-ended but should be explicated in any submission under this DCL.

For the purpose of this DCL, synthetic actors may be physical or virtual agents. Sensorimotor interactions may unfold within a real or virtual physical environment, and include responses to perceived forces, movements, or other evocative sensory stimuli.

A responsive submission will define the task of interest and analyze and explore the implications for task performance by human and synthetic actors linked by sensorimotor interactions.

Example topics include but are not limited to the following:

- Tasks that require competition rather than collaboration in the interaction between human and synthetic actors;
- Tasks that require production of creative or novel outcomes of such interactions;
- Tasks that require human-machine co-learning or co-adaptation;
- Formal mathematical frameworks to inform task performance during sensorimotor interaction;
- Physical or virtual task environments that can accommodate sensorimotor interaction between human and synthetic actors;
- Tasks focusing on the validation of task design and the assessment of task performance; and
- Tasks that can support the development of unified theories of perceptual-motor co-adaptation, tailored to different cognitive ability profiles.

Successful proposals and supplemental funding requests will establish how subsequent research on interaction between human and synthetic actors in the performance of the designed task(s) will yield advances not otherwise likely or possible with existing tasks.

Submission of more than one request in response to this DCL by an individual, in any capacity (PI, co-PI, Senior Personnel or Consultant) is strongly discouraged.

Submission of EAGER proposals or of requests for supplemental funding is by invitation only. The process is initiated by the submission to M3X@nsf.gov **of a Concept Outline (CO) describing the proposed idea**. Information on COs is provided in Chapter I.D of the NSF Proposal and Award Policies and Procedures Guide. The CO must describe the research idea with a clear explanation of why it is innovative, potentially transformative, or otherwise potentially high impact. In addition, if targeting submission of an EAGER proposal, the CO must also include a separate paragraph that describes why this project is appropriate for EAGER funding (i.e., it involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives). For this DCL, COs are strictly limited in length to four pages, including an estimated budget, budget justification, and a list of references. The subject line of the CO submission email must begin with "TaskDCL: M3X:".

EAGER proposals or supplemental funding requests submitted without prior submission of a corresponding CO and subsequent Program Officer Concurrence Email will be returned without review. The Program Officer Concurrence Email serves as documentation and must be uploaded in the Program Officer Concurrence Email section of an EAGER proposal or in the Other Supplementary Documents section of a request for supplemental funding. Invited EAGER proposals or requests for supplemental funding that fail to address the concepts described in this DCL will be returned without review. The title of any EAGER submission in response to this DCL must begin with

"EAGER:TaskDCL:". Instead, supplemental funding requests should highlight the title of this DCL at the beginning of the Summary of Proposed Work section.

Any correspondence or inquiries regarding this DCL must be submitted via email to M3X@nsf.gov. Complete guidance on preparing and submitting an EAGER proposal is contained in PAPPG Chapter II.F.3. and guidance on supplemental funding requests may be found in PAPPG Chapter VI.E.5.

EAGER proposals and supplemental funding requests will be accepted at any time, but they should be submitted by May 1, 2024, for full consideration for FY 2024 funding. Supplemental funding requests are not expected to exceed $150,000 or 20% of the total value of the original award, whichever is less.

PARTICIPATING PROGRAMS

EAGER proposals must be submitted through the Mind, Machine and Motor Nexus program.

Requests for supplemental funding can be made for current, active awards in any of the following CMMI programs, following the procedure described in this DCL and provided that at least twelve (12) months are remaining in the award:

Civil Infrastructure Systems (ENG/CMMI/CIS)
Dynamics, Control and Systems Diagnostics (ENG/CMMI/DCSD)
Engineering Design and Systems Engineering (ENG/CMMI/EDSE)
Humans, Disasters, and the Built Environment (ENG/CMMI/HDBE)
Manufacturing Systems Integration (ENG/CMMI/MSI)
Mind, Machine and Motor Nexus (ENG/CMMI/M3X)

KEY CONTACTS

Alexander Leonessa, CMMI/M3X, M3X@nsf.gov
David Mendonça, CMMI/M3X, M3X@nsf.gov

Sincerely,

Susan S. Margulies
Assistant Director
Directorate for Engineering