HR0011SB20254-15
Unbiased Behavioral Discovery Platforms
Frequently Asked Questions (FAQs)

1. Is it allowable for the system to use local wireless communication, such as a private mesh network of bluetooth- or WiFi-connected devices?
   A: Yes, a private network of wireless-connected devices would be an allowable component of a system.

2. Does the behavior have to be categorized (e.g. licking, grooming, etc.) or is it sufficient to identify anomalous behavior?
   A: Although it is ideal to have a categorized behavior for comparative purposes minimally, the detectable behaviors in an automated system could be anomalous, provided that they enable accurate identification and satisfy the objectives for a given Phase.

3. Does the behavioral identification need to be able to identify which agent/contagion/etc. is infecting the subject(s).
   A: Strictly, no. The goal of the SBIR is to develop unguided behavioral discovery technologies for unappreciated or novel behaviors.

4. Dose sensitivity (Phase I objectives) is more clear for chemical exposure, but what would be meant for diseases? e.g. disease load, disease progression, initial dose, etc.?
   A: For disease behavior detection, all of those listed in the question could be options, depending on the condition. The behaviors simply need to be detectable singularly and/or in aggregate, and ideally disease onset, severity, and/or progression would provide a spectrum of behavioral responses to delineate disease stages or progression reliably.

5. For dose estimation is the chemical exposure/disease known?
   A: This question presumably refers to the Phase 1 demonstration. In that case yes, the chemical exposure and/or disease could represent a known.

6. Will behavioral profiling systems for non-rodent animal models be considered under this announcement?
   A: This solicitation is inclusive of any potential animal model provided its implementation and behaviors are well justified and relevant to human health.

7. Is one species okay for Phase I?
   A: One species is acceptable for phase I.

8. Physiology: do you prioritize according to the list order? Or is one highly recommended
   A: The listed examples are not provided in a ranked order and are not meant to be exclusive.

9. AI tools suggested in the text - are they illustrative or meant to be used?

A: The machine learning tools referenced in the text are illustrative and do not represent a restricted list of techniques to propose.

10. By "novel behavior detection" - do you mean detecting and identifying specific new behaviors (supervised learning) or any new behaviors that are deviations from the healthy state (i.e. unsupervised clustering or never-before validated in the lab)?
    A: Either supervised learning or non-supervised clustering are viable strategies for this announcement, as long as the identified behavior is a sensitive indicator of the physiological state in question.

11. For Phase II - do you have specific species that you prefer from larger animals or do rats or NHPs suffice?
    A: If phase 2 work is focused on the adaptation of a behavioral profiling technique in a new animal model, the model is ultimately up to the proposer but should be well justified given the physiology of interest. Further, translation of the behavioral platform to the new model must be achievable under 24 months of performance and budget as outlined in the solicitation.

12. Algorithm Robustness (TRL): The solicitation mentions a projected TRL of 3 for the end of Phase I. Is the expectation that we demonstrate robustness on par with a fully deployable commercial product, or is the focus primarily on proving the feasibility of the [Health Score] concept using retrospective/open-source datasets?
    A: Phase 1 prototypes do not need to be commercially deployable. TRL 3 demonstrates analytical and experimental critical function and/or characteristic proof-of-concept. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. The focus of this solicitation is on the detection of behaviors, which could include a [Health Score], and the quantification of robustness to errors should quantify behavior detection errors.

13. Data Acquisition vs. Simulation: In Phase I, is there a strict requirement for us to acquire *new* experimental data using our own hardware setup, or is it acceptable to validate our [software] primarily using high-quality open-source datasets (e.g., CalMS21) to demonstrate proof-of-concept?
    A: The Month 8 milestone requires a demonstration using naïve animals that the performer perturbs based on their selected physiologies of interest. Therefore, using only open-source datasets to train or test your model is not sufficient for meeting all Phase 1 milestones.

14. Hardware Documentation: Since our core innovation is software-centric, how detailed should our hardware documentation be? We plan to be camera-agnostic, but should we include specific specifications for the reference hardware we intend to use for validation?
    A: The report should include drafted instructions/manual for prototype users and therefore should specify at least the minimum requirements for assembly and use by a new user. If the prototype is camera-agnostic, include both information about the

camera used for the demonstration and provide minimum specifications required for alternative compatible cameras.

15. Definition of "Instrument": The solicitation calls for a "prototype instrument." Does a software-only solution that processes data from standard Commercial Off-The-Shelf (COTS) cameras satisfy this requirement, or is the delivery of a proprietary physical sensing device required?
    A: A software-only solution that processes data from standard Commercial Off-The-Shelf (COTS) cameras could satisfy this requirement.

16. Fidelity of "Discovery": Regarding "unguided behavioral discovery," is the primary objective for the Phase I system to flag *deviations* from a healthy baseline (anomaly detection), or must the system explicitly categorize and name specific novel behaviors (unsupervised clustering/classification)?
    A: The proposed solution must meet or exceed existing state-of-the-art behavioral assays in your physiological area(s) of interest; many existing behavioral analyses include anomaly detection. There is no specific requirement to classify novel behaviors if the proposed solution exceeds state-of-the-art.