Request for Information (RFI) on Advancing Research in Fundamental Neuroscience
Notice Number: NOT-NS-22-073

Submitted to webform on September 1, 2022

- Issues that present obstacles or opportunities for the advancement of new areas of FN.

First and foremost, advancing FN requires strong behavioral paradigms. See article:
Neuroscience Needs Behavior: Correcting a Reductionist Bias
John W Krakauer, Asif A Ghazanfar, Alex Gomez-Marin, Malcolm A MacIver, David Poeppel. Neuron. 2017 Feb 8;93(3):480-490. doi: 10.1016/j.neuron.2016.12.041

Additional obstacles include:

  - Cross-species analysis offers tremendous opportunities for the advancement of FN. However, unintended consequences of animal facilities regulations and IACUC rules that tend to favor only using a few species present obstacles to cross-species analysis. Addressing these challenges would most likely require a major NIH-led initiative.
  - Well-prepared trainees, especially ones who have the interest in human neuro, a good understanding of psychological processes, and also the skills in coding, programming, computational methods. FABBS encourages NINDS to consider the importance of multifaceted training and skill development for investigators or possibly cultivating connections across skill sets.
  - The need for a greater understanding of differences across developmental stages. Additional investment and knowledge may provide an opportunity to predict future outcomes and eventually help tailor early interventions and future therapeutics to improve health outcomes of a given individual.

- The value of team science approaches to advance FN research.
  - Team science has the potential to bring together a unique combination of knowledge in human neuro, psychological processes, skills in coding, programming, and computational methods to best support the advancement of FN.
  - Team science might be critical to advancing the resource intensive questions in developmental cognitive neuroscience. In his comments listed below, Dr. Fair suggested that current funding mechanisms are not well suited for optimizing study design, and encouraged considering collaborative or linked RO1s. See:
    - NIMH Director's Innovation Speaker Series: Developmental Cognitive Neuroscience in the Era of Big Data, Damien Fair (https://www.youtube.com/watch?v=A7hWg8Pl8Z8)
    - Fair, D. A., Dosenbach, N. U. F., Moore, A. H., Satterthwaite, T. D., & Milham, M. P. (2021). Developmental Cognitive Neuroscience in the Era of Networks and Big Data: Strengths, Weaknesses, Opportunities, and Threats. *Annual Review of Developmental Psychology, Vol. 3*:249-275. https://doi.org/10.1146/annurev-devpsych-121318-085124.

- Topic ideas for an NINDS FN workshop.
    - Using cross-species paradigms to advance research. How might researchers broaden the number of species we study and use as model organisms? How to better match the species to the problem and compare species, while considering natural ecologies of adaptation?

- Noteworthy cases in which FN research programs were exceptionally successful and the unique aspects in their design. The following examples are taken from 'If Neuroscience Needs Behavior, What Does Behavioral Science Need?' by Nora Newcombe, December 29, 2017.
    - Eunice Kennedy Shriver National Institute of Child Health and Human Development's (NICHD) Study of Early Childcare and Youth Development, which definitively answered a central question, showing that there is little need to worry about nonmaternal care if that concern is based simply on the fact that it is nonmaternal.
    - A small-scale longitudinal study of language development in typically developing children and children with brain damage, led by Susan Goldin-Meadow at the University of Chicago. This study yielded rich information on the role of parental speech and gesture in development of both kinds of children, leading to recommendations regarding new diagnostic tools and interventions for children at risk.
    - The National Institute on Drug Abuse's (NIDA) Longitudinal Study of Adolescent Brain and Cognitive Development holds immense promise to elucidate the developmental pathways leading to substance-use disorders.

- The need for a strategic planning process (e.g. BRAIN) for any aspect of FN research.

FN would benefit from increased attention to behavioral paradigms. The recommendation is consistent with two reports recently approved by the NIH Council of Council:

1. Trans-NIH Research Opportunities in the Basic Behavioral and Social Sciences (https://dpcpsi.nih.gov/sites/default/files/Day-1-130PM-bBSSR-WG-Report_508.pdf)

2. Integration of the Behavioral and Social Sciences Research at the National Institutes of Health (NIH) (https://obssr.od.nih.gov/sites/obssr/files/inline-files/BSSR_IntegrationWorkingGroupReport_508.pdf)