Funding Opportunity Announcement

Perception and Cognition Research to Inform Cancer Image Interpretation

PAR-17-125 (R01) and PAR-17-124 (R21)

Webinar Questions & Answers

Q. Does NCI have a database of different cancer images available? Are there existing resources available to NIH researchers and cancer image databases for their use?

A. Yes. The NCI cancer imaging program maintains a cancer imaging archive that has a wealth of images with various cancers. It is under the auspices of Dr. Lalitha Shankar, Chief, Clinical Trials Branch, Division of Cancer Treatment and Diagnosis, Also, the National Lung Screening Trial has 75,000 CT images and 1,200 pathology images available, including both normal and abnormal images.

NCI Cancer Imaging Program Archives
http://www.cancerimagingarchive.net/

National Lung Screening Trial
https://www.cancer.gov/types/lung/research/nlst

Q. Is there an organized place or venue for testing experts, like a mobile lab at a radiology conference?

A. Yes. In conjunction with this FOA, NCI sponsored a mobile lab at last year's Radiological Society of North America conference (RSNA), at which 172 radiologists participated as research subjects in experiments from nine different labs. We are hoping to expand the program in the coming year and possibly bring it to other conferences. Look for email announcements for the perception lab at next year's RSNA. In addition, the American College of Radiology has a variety of programs primarily meant to educate residents and fellows, but it also potentially has an opportunity to do some of the testing that may be relevant for this sort of grant portfolio.

Q. Examining methods of teaching radiology necessitates many trainees and access for longer than we can have at RSNA. Any advice on how to get around that problem?

A. This might be an ideal case for developing your research program on non-radiologists to determine the perceptual principles before moving to radiology trainees. Please contact Dr. Todd Horowitz (NCI) or Dr. Vinay Pai (NIBIB) to discuss this issue further.

Q. Do you offer a tutorial for scientists who don't have a lot of expertise in cancer image interpretation to learn more about medical images or how to diagnose different types of medical conditions using images?

A. We will try to arrange a tutorial in a webinar format soon.

Q. How important is the research in non-experts? If we have an interesting and potential technique for improving experts, can we use only experts in our grant?

A. Yes, you can use only experts in your grant. What we are looking for is research that is motivated by a strong perceptual hypothesis. While we think that it may be easier to do a lot of the work in non-experts, we will certainly not penalize you for only studying experts.

Q. Is it allowable/encouraged to propose neuroimaging (say, fMRI or EEG)? Or would you rather the proposal focus primarily on psychophysical experiments?

A. It is allowable and you can propose to include neuroimaging in your research study.

Q. What about studying how people interpret neuroimaging, as opposed to using neuroimaging as a method?

A. Yes, neuroimaging is of very high interest in cancer diagnosis and management. This is a very perplexing area because of the issues of trying to distinguish between radiation necrosis, steroid effect, and recurring tumors.

Q. How basic might the research be to get funded? Must medical images be included in the grant proposal, per se?

A. Not necessarily. You should make the case that the perceptual cognitive problem you are studying is relevant for medical image interpretation, but the proposal does not need to include medical images.

Q. In addition to research on visual perception cognition, will you also consider research on other sensory modalities involving cancer detection such as haptic perception, palpation for soft-tissue screening, or multimodal approaches?

A. Yes, if you can make a strong case that there is a perceptual issue. We also are interested in multimodal approaches and multi-sensory perception.

Q. If we wish to do a different kind of deep machine learning rather than the standard CAD images, should we apply and talk with BRP or NIBIB?

A. If you are developing new approaches in machine learning techniques, you should talk with NIBIB. NIBIB encourages development of new and novel mathematical approaches that are broadly applicable to this problem space. Application of conventional machine learning approaches in this problem space are not a high priority at NIBIB. Regarding multidimensional, NIBIB is interested in dimensions greater than three (i.e. 3D spatial plus time, or additional dimensions) (e.g. digital tomosynthesis data in a longitudinal study). We are interested in novel analytics related to such complex multidimensional data. We are also interested in research to study performance vis-a-vis image perception for low signal-to-noise and/or contrast-to-noise systems (such as low-dose CT imaging acquisitions).

Q. How much does your funding agency work on neuromorphic hardware and neural networks?

A. If this is an area of interest, please send Dr. Vinay Pai (paiv@mail.nih.gov) an email with a draft of your abstract and/or specific aims to further discuss your ideas.

Q. Will NIBIB be interested in multi-dimensional signals collected from pathology data in the context of machine learning? Does it have to include perception as a driving hypothesis?

A. For this PAR, the driving hypothesis should be perceptual or cognitive in nature. There may be proposals that are of interest to NCI and NIBIB but would be a better fit under a different mechanism. If you're interested in applying machine learning to pathology data independent of any perceptual or cognitive question, your project may be appropriate for a different regular initiative. Please contact Dr. Todd Horowitz (todd.horowitz@nih.gov), Dr. Lalitha Shankar (shankarl@mail.nih.gov) or Dr. Vinay Pai (paiv@mail.nih.gov).

Q. I'm interested in how dermatologists diagnose cancers effectively from tele-dermatology images. Is this part of the scope of the FOA? Would a project on skin cancer be acceptable? This involves the direct observation of cancer with the naked eye --- not "images" per se.

A. Yes, perceptual and cognitive questions related to visual diagnosis in dermatology and tele-dermatology would fall under the scope of the FOA.

Q. Because this is a program announcement with special receipt review, where will you find reviewers with the capacity to review applications that come in? With this being a small research community, it seems that many potential reviewers will be submitting applications themselves.

A. Review falls under the purview of the Center for Scientific Review (CSR) at NIH. Their goal will be to convene a panel with all the relevant expertise necessary for the review panel. We will certainly advise them to cast a wide net with respect to the disciplines, including medical image perception specialists, but also people who are perception or cognition researchers who might not be specialists in medical image perception per se, as well as radiologists, pathologists, cytologists, nuclear medicine physicians, potentially dermatologists, or any professional who interprets a visual image to detect or diagnose cancer. Investigators can help CSR, and us, by submitting letters of intent, and by writing cover letters that specify the expertise you think necessary to evaluate your proposal.

Q. Are there limits on available funds, or is there a set number of grants that can be funded under this opportunity?

There are no specific limits set for this funding opportunity. The limitations will be based on how well the applications score in the review process.

Q. Are there any special conditions for international applicants? I am a U.K. researcher in observer performance. The application I am proposing is not specific to U.K. practice. Is it worth applying?

A. In general, at NIH, unless the funding opportunity says otherwise, foreign applicants are welcome to apply, but there's an additional level of justification. You will need to justify why the research must be carried out at the foreign laboratory, not at a domestic laboratory. In the specific case of this funding announcement, we welcome contributions from international researchers. Your proposal would have to justify why your expertise or your

U.K. institution is essential or best suited to this line of research. For example, studying international differences in image interpretation should be sufficient justification. Please contact Dr. Todd Horowitz (todd.horowitz@nih.gov) or Dr. Vinay Pai (paiv@mail.nih.gov) specifically to discuss your proposal in more detail. For more information, see https://grants.nih.gov/grants/policy/nihgps_2013/nihgps_ch16.htm and https://grants.nih.gov/grants/foreign/index.htm

Q. Being an international applicant, how does the new government affect the international applications for research grants?

A. At this time, nothing in terms of how NIH or NCI is funded or is operating has changed since the beginning of the new administration. We will continue to fund high-priority research.

Q. How do you ensure that scientific reviewers will not penalize R21s that do not have preliminary information?

A. We have written specifically into the funding opportunity announcements that we discourage preliminary data.

Q. If we have some pilot data, is it best if we talk to you before deciding if it is R01 or R21, or does pilot data showing proof-of-concept exclude the R21 mechanism, and if it is only one study and six radiologists, is that enough data for applying for R01?

A. In cases like this, send an email to Dr. Todd Horowitz (todd.horowitz@nih.gov) or Dr. Vinay Pai (paiv@mail.nih.gov) to discuss in more detail. The general approach is that if you have proof-of-concept, then you are probably ready to move on to an R01. But there might be some proposals where pilot data exist but might not be sufficient for an R01.

Q. Will proposals sent to NIBIB or NCI be reviewed separately by two different review panels?

A. No, all proposals coming in under the FOA will have the same special emphasis panel, whether they are assigned to NCI or NIBIB.

Q. Is the research funding available for student researchers as well?

A. This funding opportunity announcement is limited to research project grant (R01) and exploratory/developmental research project grant (R21) applications. Applications for research training, career development, or fellowship support are not eligible for this funding opportunity announcement. However, a faculty researcher may propose a research project grant that will fund student researchers as part of the research team. Diversity supplements also are a possibility. If you have a fellowship proposal that fits in this area, please contact Dr. Todd Horowitz (todd.horowitz@nih.gov) or Dr. Vinay Pai (paiv@mail.nih.gov) to discuss it separately.

For more information about funding for cancer training and diversity supplements:
https://www.cancer.gov/grants-training/training/funding
https://grants.nih.gov/grants/guide/pa-files/PA-15-322.html
https://grants.nih.gov/grants/guide/contacts/PA-15-322_contacts.html

Q. Can the proposals be made three years in advance? What is the best time to start the application so as to continue right after the PhD?

A. It takes a minimum of nine months between the time a proposal is submitted and when it gets funded. It is difficult to guarantee that a proposal will be funded at a particular time because it is possible that it must go through a few rounds to get funded. If you are a graduate student or postdoc and planning to move on to a faculty position, you can apply for training grants, called K awards, and K99/R00 awards where you propose a project that will bridge you from being dependent on an adviser to getting your first faculty position. Those don't come under this FOA, but please contact Dr. Todd Horowitz (todd.horowitz@nih.gov) if you are in that situation so he can direct you to training resources. For further information, see https://www.cancer.gov/grants-training/training/funding.

Q. Will my proposal be kept confidential as it will be coming from a small for-profit business?

A. All applications are kept confidential.

Contacts

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