



Call for Collaborative Research Proposals in Stimulating Collaborative Advances Leveraging Expertise in the Mathematical and Scientific Foundations of Deep Learning as part of the NSF-BSF Program

As part of the NSF-BSF program, the U.S.-Israel Binational Science Foundation (BSF) invites collaborative research proposals in Stimulating Collaborative Advances Leveraging Expertise in the **Mathematical and Scientific Foundations of Deep Learning (MoDL+)**, in the Mathematical and Physical Sciences Divisions; the Computer and Information Science and Engineering (CISE); Engineering (ENG) and Social, Behavioral and Economic Sciences Directorates at the U.S. National Science Foundation (NSF).

Synopsis of Program:

Deep learning has met with impressive empirical success that has fueled fundamental scientific discoveries and transformed numerous application domains of artificial intelligence. Our incomplete theoretical understanding of the field, however, impedes accessibility to deep learning technology by a wider range of participants. Confronting our incomplete understanding of the mechanisms underlying the success of deep learning should serve to overcome its limitations and expand its applicability. The National Science Foundation Directorates for Mathematical and Physical Sciences (MPS), Computer and Information Science and Engineering (CISE), Engineering (ENG), and Social, Behavioral and Economic Sciences (SBE) will jointly sponsor new research collaborations consisting of mathematicians, statisticians, electrical engineers, and computer scientists. Research activities should be focused on explicit topics involving some of the most challenging theoretical questions in the general area of Mathematical and Scientific Foundations of Deep Learning. Each collaboration should conduct training through research involvement of recent doctoral degree recipients, graduate students, and/or undergraduate students from across this multi-disciplinary spectrum. This program



complements NSF's National Artificial Intelligence Research Institutes and Harnessing the Data Revolution programs by supporting collaborative research focused on the mathematical and scientific foundations of Deep Learning through a different modality and at a different scale.

Proposals in response to this call should be submitted to appropriate existing NSF programs in one of the participating divisions. A proposal must meet the requirements and deadlines of the program to which it is submitted, but should include the prefix "MoDL: " in the proposal title after any program specific title requirements. Primary and secondary units of consideration on the cover sheet should indicate which programs from the participating divisions are most relevant.

PI teams must bring together appropriate expertise in two or more disciplines: computer science; electrical engineering; mathematics/statistics; and social, behavioral, and economic sciences. Each project must clearly demonstrate substantial collaborative contributions of interest to the respective communities.

For more details please follow the link: [Dear Colleague Letter: Mathematical and Scientific Foundations of Deep Learning and Related Areas \(MoDL+\) \(nsf22023\) | NSF - National Science Foundation](#)

General:

1. BSF administers the NSF-BSF program on behalf of the Israel Council for Higher Education (CHE). For fiscal year 2022 CHE has budgeted 38.3M NIS for US-Israel collaborative research under this program.
2. The NSF-BSF program is not a “special” program and NSF does not set aside money for potential grants. Rather, NSF-BSF proposals are evaluated together with standard NSF proposals in a review process managed by the regular NSF core programs in the participating disciplines. It is essential that the U.S. PI has a clear understanding of the NSF-BSF framework before embarking on proposal preparation.



3. Applications must be developed and written jointly by a team of Israeli and U.S. scientists that hold academic appointments in their respective countries and are eligible to apply for external funding at organizations such as NSF and BSF.
4. Israeli applicants are advised that they should pay particular attention to the NSF evaluation criteria, http://nsf.gov/bfa/dias/policy/merit_review/, which may include requirements such as broader impacts, data management plan etc. These requirements may either be missing in BSF/ISF applications, or have a greatly different meaning (particularly the term ‘broader impacts’) and thus require special attention. **Failure to appropriately address these requirements may be detrimental to the proposal and in the worst case may lead to rejection without review.** Discussion of these requirements with the US PI(s) and jointly addressing these is recommended.
5. The NSF accepts applications only from U.S. scientists and submission to the NSF-BSF program should be made only by the U.S. applicant. The proposal is recognized as an NSF-BSF application by adding the prefixed “NSF-BSF:” to the proposal title. The role of the Israeli applicant(s) and the nature of the collaboration must be described in the different sections of the proposal, e.g. sections with details of work plan, time line etc. **Furthermore, it should be clearly explained why the contribution of the Israeli PI is critical to the success of the proposed study.**
6. For technical reasons only, the Israeli applicant cannot appear on the cover page of an NSF proposal. However, by using the prefix “NSF-BSF:” in the title and including the Israeli applicant as “Senior Personnel” the NSF system immediately identifies the Israeli applicant as Co-PI on the project. The Israeli applicant will provide a CV, a budget and budget justification and these will be added as supplementary documentation to the proposal.
7. BSF will adhere to the NSF decision regarding the duration of the project.
8. The program is expected to accept research proposals on an annual basis.
9. A presentation with tips for Israeli scientists who wish to participate in collaborative proposal submission under the NSF-BSF program can be found [here](#)



Eligibility:

1. All inquiries regarding the suitability of the research topic must be made by the U.S. applicant(s) to the relevant program directors at NSF. BSF will not respond to any query regarding topic eligibility.
2. All BSF regulations regarding eligibility of the Israeli applicant(s) and NSF regulations regarding the U.S. applicant(s) will apply to this program.
3. **An Israeli scientist is allowed to submit one NSF-BSF proposal per year (1 Oct – 30 Sept).**
4. Israeli scientists with an active NSF-BSF grant are allowed to submit an additional application to any of the participating **NSF programs only during** the last year of their current NSF-BSF grant.
5. Israeli and US applicants are allowed to simultaneously submit proposals that have various degrees of similarity, to both a participating NSF program and to the regular BSF program. In the event that significantly similar applications are recommended for an award, only the one recommended for an NSF-BSF award will be funded.

Evaluation:

1. Proposals will be evaluated by the relevant NSF program, using their criteria and adhering to a Lead Agency Model that underpins several other Israeli binational and multinational research collaborations. BSF watches over compliance by Israeli applicants, but does not evaluate the scientific merit of the applications.
2. NSF uses a conventional peer review system with ad-hoc (external) reviews for full proposals and subsequent evaluation by expert panels. However, unlike the practice in Israel, panel members serve in an advisory capacity, and final decisions lie with the program officers and NSF management. These post-panel officials may introduce



additional considerations such as whether the research topic already has support from the U.S. government, whether support from other NSF programs was sought, etc.

3. NSF program officers inform reviewers and panelists of the special nature of the NSF-BSF partnership and ensure that the Israeli applicant(s) are recognized as Co-PIs and are evaluated alongside their US counterparts. For more detail, please, we refer to the NSF Dear Colleague letter that covers the NSF-BSF program in great detail (<https://www.nsf.gov/pubs/2020/nsf20094/nsf20094.jsp>).
4. If the collaborative research proposal is recommended for an award, then, pending formal approval, the Israeli applicant(s) will receive a grant from the BSF, while the U.S. applicant(s) will receive a grant from the NSF.
5. The award amount for the Israeli applicant is capped at a maximum of \$80,000 per year for experimental programs and up to \$55,000 per year for theoretical or computer-based research, **subject to the availability of funds**. If more than a single Israeli group is involved in the research, then the budget may be increased by up to 50%.
6. In case of similar NSF-BSF and regular BSF applications, in which the NSF evaluation was not completed by the time the regular BSF awards are made, we will defer the decision regarding a possible grant for the BSF application, until NSF had made its funding decision regarding the NSF-BSF proposal.
7. Israeli researchers may take part in the NSF evaluation process as panel members and/or external reviewers.

Submission:

The full proposals will be submitted to the program twice.

Step 1. The U.S. applicant will submit the NSF-BSF proposal following the NSF regulations (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg) and submission procedures (<https://www.fastlane.nsf.gov/>). **The US applicant's submission to**



the NSF MUST include the BIOGRAPHY (in NSF format) and BUDGET + BUDGET JUSTIFICATION (in BSF format) of the Israeli applicant under supplementary materials.

Step 2. The Israeli applicant will submit the identical proposal as a pdf document to the BSF, including all information regarding the U.S. applicant(s), and adhere to relevant BSF regulations regarding proposal submission: see [here](#).

Timetable:

Full proposals should be submitted to the BSF according to the following deadlines: BSF applications should be submitted 7 days after the US PI submitted to the NSF.

In order to be considered, a proposal must meet the requirements and deadlines of the NSF program to which it is submitted

Applicants are requested to acquaint themselves with the BSF regulation for this NSF-BSF program before they submit applications. The forms and regulations can be downloaded from the BSF website (<https://www.bsf.org.il/funding-opportunities/nsf-bsf-joint-research-grants/the-programs/>).

Questions regarding the suitability of the proposed research for this program should be directed by the U.S. applicant(s) to program officer in the relevant programs at the NSF.

Other questions regarding this call for proposals can be discussed with the BSF staff by mail or by phone (972-2-5828239): Dr. Rachel (Heni) Haring (heni@bsf.org.il ext. 110) or Ms. Yael Dressler (yael@bsf.org.il ext. 103). Questions regarding the online application system should be directed to Ms. Orli Rozenchwajg (orli@bsf.org.il ext. 109).