PEER Request for Proposal:
Solicitation TSRP-PEER 21-01

Introduction

The Pacific Earthquake Engineering Research (PEER) is a multi-campus center that has continuing funding from the State of California related to the seismic performance of transportation and related systems. This funding supports the Transportation Systems Research Program (TSRP), the purpose of which is to lessen the impacts of earthquakes and other natural hazards on the transportation systems of California, including highways and bridges, port facilities, high-speed rail, airports, and other related systems.

Funding from the TSRP supports transportation-related research that uses and extends PEER's performance-based engineering (PBE) methodologies, and integrates fundamental knowledge, enabling technologies and systems. The program also aims to integrate seismological, geotechnical, structural, hydrodynamic and socio-economical aspects of earthquake engineering, and involve theoretical, computational, experimental and field investigations. The program encourages vigorous interactions between practitioners and researchers.

The PEER TSRP is coordinated by PEER Research Committee (PEER-RC). Proposals will be reviewed by external reviewers, who will be determined by this committee, among experts who have not submitted proposals to this solicitation and have no conflict of interest.

Requested Proposals

The PEER-RC is soliciting proposals for one-year projects related to the following topic:

> Regional-scale simulations are becoming an important necessity to explore the effects of earthquakes on the existing and newly constructed components of the built environment and communities in general. The advances in computation power, efficient numerical methods and cost-effective sensors now make regional-scale simulations possible in many applications. We are seeking projects focused on development, expansion, application and validation of regional-scale simulations on the transportation network. Other infrastructure networks and their interdependencies with the transportation systems may be considered. This domain of regional scale simulations is expected to cover specific elements of physics-based ground motion modeling, development of detailed and/or surrogate models of the transportation network components, use of artificial intelligence methods for evaluating network performance, structural health monitoring, sensor development for validation/modeling purposes and forward & backward uncertainty quantification for improved designs considering the performance of the network. The scale of the region could be medium (SF Bay Area, LA county, Seattle) or large (California, Pacific Northwest, Western US States), and could cover transportation networks (road, heavy rail, light rail, seaports or airports) and/or utility networks (gas, water, electricity or communication).

All proposals must meet the following requirements:

1. Be led by investigators from the PEER core institutions[1]. *PEER Business and Industry Partners* (*BIPs*) interested in this solicitation are strongly encouraged to collaborate with the researchers at PEER's core institutions and submit a joint proposal.
2. Each investigator is limited to be the PI or the co-PI on **one** proposal only.
3. Contribute substantially to the PBE of transportation systems.
4. Enable substantial progress for a reasonable investment (e.g., based on previous research or matching opportunities).
5. Have significant broader impacts and potential to be expanded as bigger projects.

Investigators must commit to:

1. Working as part of the overall TSRP team, sharing information, data, models, outcomes and ideas needed for other projects,
2. Attending at least two meetings per each year of funding: the PEER Annual Meeting, the PEER Researchers' Workshop (usually held in summer), and any TSRP coordination meeting organized by the Research Committee,
3. Submitting a proposed research description at the beginning of the project for distribution to the PEER community,
4. Agreeing to review a PEER report in the field of their expertise, and
5. Writing a PEER report at the end of the project, documenting the project contributions.

Where possible, the projects should:

1. Leverage the investments of other programs within or outside of PEER,
2. Engage the practitioners' community,
3. Use OpenSees as the primary computational platform, and if applicable, contribute (or improve) and document new elements, material models or numerical solution strategies and share any developed analytical models with the PEER community,
4. Incorporate NHERI SimCenter computational tools as appropriate in the proposed research. Details of SimCenter computational tools can be found at https://simcenter.designsafe-ci.org/research-tools/overview/, and
5. If experimental in nature, use the PEER core institution testing facilities and organize blind prediction contests from the test outcomes, if possible, with additional available in-kind support from the PEER headquarters staff and researchers.

Proposals will be evaluated based on the primary criteria of technical merit and broader impact. Further, proposals that collaborate with other on-going PEER projects and proposals with matching funding will be viewed favorably. In addition to the above considerations, projects will be selected to result in a diversity of specialization.

Proposals are expected to have annual budget **not to exceed $100,000**. The review process for the proposals will involve external reviewers selected by the PEER-RC. As an outcome of this RFP, funding is expected for 2 to 3 projects. All proposed research projects will be subject to final approval by the PEER Director. A list of the current and past TSRP projects is posted on the PEER website at:
https://peer.berkeley.edu/research/transportation-systems/projects.

[1]PEER core institutions are UC Berkeley, Caltech, OSU, Stanford, UC Davis, UCI, UCLA, UCSD, UNR, USC, and UW.

Proposal Submission Instructions

Format
Submit proposals online at https://peer.berkeley.edu/research/transportation-systems/request-proposals. Proposals should be submitted using the form found in the above site. Uploaded attachment may be a Word document or PDF (.doc or .docx or .pdf) and shall include the following:

- a three-page project description,
- a two-page biographical sketch of the PI(s), and
- a one-page draft budget.

Filename of the attachment should follow the format:
"<R1>_<Last name>_RFP2021_<optional title less than 50 characters>"

For example,
"R1_Lastname_RFP2021_Optional_Title.pdf"
or
"R1_Lastname_RFP2021.docx"

Budget
All proposed work should be completed within a period less than or equal to one year. Budgets should be limited to:

1. one month of summer support (or its equivalent) for the PI or Co-PI,
2. one graduate student researcher,
3. experimental expenses,
4. computing expenses,
5. travel to two PEER coordination meetings (including the PEER annual meeting),
6. project-related supplies, and
7. other reasonable expenses, as approved by the PEER-Headquarters (HQ).

It is expected that proposing institutions will waive indirect costs, as is the practice for the University of California institutions. Final budgets with campus Sponsored Project Office (SPO) approval can be prepared after the initial selection of successful proposals, and any negotiated agreement on the scope and budget.

To meet the needs of the TSRP program, PEER-HQ may approach proposers to negotiate possible revisions to the scope and budget to better fit the program goals.

Important Dates
The **key dates** for responding to Solicitation PEER 21-01 are:
15 October 2021: submitting questions to peer_center@berkeley.edu
01 November 2021: proposal submission deadline
17 December 2021: completion of the review process of all proposals
17 January 2022: project start date