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Civil & Environmental Engineering

CIFE

CALL FOR SEED RESEARCH PROPOSALS BY

THE CENTER FOR INTEGRATED FACILITY ENGINEERING (CIFE)

SUBMISSION DEADLINE: APRIL 18, 2017, 9:00 AM PDT

The sustainable urban systems vision of the CEE department highlights the need to better understand the performance of buildings and infrastructure – individually and in concert with each other – and underscores the importance of integration to create the synergies that lead to higher performing urban systems that support a higher quality of life. New knowledge is needed on how to integrate the many technical systems in buildings and infrastructure. Research is also needed on how to integrate the organizations that carry out the engineering and management processes that conceive, design, build, and operate these physical assets. CIFE is seeking seed proposals to address these broad areas of research. Proposals must be led by a Stanford academic council member and should last one year with an expected budget in the range of $60k to $100k. The goal of these seed grants is to enable a research team to explore the feasibility of a larger research effort. The following topics illustrate focus areas that have been identified by the CIFE community as particularly critical. However, proposals can cut across these topics or address other topics in the broad research area outlined above.

Metrics: The CIFE community has defined building performance according to the following perspectives: owners (sustainability), users (usability), operators (operability), and designers and builders (buildability). Operational and validated metrics are needed for all these categories so that project teams, companies, and the whole industry can

- compare buildings, systems, and projects,
- prioritize performance targets, and
- demonstrate the impact of practices that integrate systems, organizations, and processes.

Integrated systems: "What should a smart building say to a smart city and vice versa" is a key question that needs to be answered. Answering this question will require an improved understanding of the information, money, material, and other flows supported by the technical systems[1] in buildings and infrastructure, including the synergies that can be created through connecting or integrating these flows.

Performance prediction: Most buildings (and the cities they are part of) do not perform according to the predictions for energy costs, durability, operating costs, etc. made during the design phase. However, these predictions are used during the design process to shape buildings for their entire lifecycle. More accurate prediction methods are needed to give design teams a better decision basis to improve the design of buildings, infrastructure, and cities.

Design management: The knowledge from many disciplines and the concerns of many stakeholders shape the design of buildings and cities. Better management methods are needed to bring these concerns together in a constructive manner. These methods should also leverage technologies, such as multi-dimensional modeling and optimization, virtual and augmented reality, sensing, data analytics, etc.

Feedback loops: Well-working feedback loops are still rare in the construction industry. Such feedback loops are needed for the day-to-day work of project teams, for entire projects, for buildings and urban systems from year to year, etc. They must be rapid, consistent, and reliable. They are the essential basis for the continuous improvement of design and operation of buildings and infrastructure systems.

[1] Technical systems include the energy distribution systems, structural systems, wastewater and clean water systems, information systems, etc.

Corporate strategy and learning: The current culture of giving project managers control over projects makes it difficult to rapidly scale the deployment of innovations across many projects because project managers tend to deploy methods that are familiar to them. The plethora of emerging technologies and the requirements for dramatically higher performance of buildings requires the use of innovative practices. To bring innovative practices to projects quickly, companies need to learn how to test new methods on projects and bring the insights to other projects in support of the company's strategy.

Timetable and requirements for projects for funding during AY 2017-18

March 13	Call for proposals available to the Stanford and CIFE communities.
April 11	Request the budget for your proposal from Engineering Research Administration for departments in the School of Engineering or your local research administration staff for other Stanford departments. Note that the majority of the requested funding should normally be allocated to research students. Request a proposal number from Teddie Guenzer at CIFE (cife-email@stanford.edu).
April 18 9:00 AM PDT	Submit your proposal in .doc, .docx, or .pdf format including the budget to cife-email@stanford.edu. Use the proposal template; also available at: http://cife.stanford.edu/CIFEProposalTemplate2017.docx.
April 20 9:00 AM PDT	Submit the slides you plan to use for the presentation at the Technical Advisory Committee (TAC) meeting in .ppt or .pptx format to cife-email@stanford.edu. Use the template; also available at: http://cife.stanford.edu/TACPresentationTemplate2017.pptx.
April 25	Present your proposal to CIFE's industrial members at the TAC meeting. The proposals will be evaluated with this review form; also available at: http://cife.stanford.edu/SeedProposals2017.
May 9	CIFE award decisions announced.
July 1	Earliest start date for the proposed research.
Oct. 1	Typical start date.
Jan. 1, 2017	Latest research start date.
Note:	At the requested funding time, CIFE will establish a skeleton project website which should then be completed by the research team[2]. Continued funding for the second half of the project is contingent on updates to the website in accordance with the milestones listed in the proposal.
Note:	Throughout AY 2017/18, PI(s) and RA(s) on funded seed projects are expected to be available occasionally to present the research at CIFE seminars and workshops or to visiting academics or industry professionals.
Sept. 30, 2018	Latest date for research completion unless a no-cost extension is requested.
Oct. 31, 2018	Submit final project report to CIFE for publication as a Technical Report, Working Paper, video, or website. Follow the guidelines for authors available on the CIFE website.

Intellectual Property Rights
The research carried out through the CIFE Seed Research program is governed by the research and intellectual property guidelines and rules in effect at Stanford University.

[2] The website should provide access to at least the following information: (1) A practical scenario illustrating the engineering or business problem addressed by the research and highlighting the potential impact of the research on practice, (2) the original proposal (except the budget), (3) explanations of test cases used for the project, and (4) presentations developed for this project.