



Third Call for Seed Grant Proposals

July 22, 2016



Introduction

Cyber Physical Systems (CPS) and the Internet of Things (IoT) are examples of phrases used to describe the integration of a modern information backbone into the functioning of physical systems and critical infrastructures. What has received much less attention is the integration of techniques for the analysis of massive amounts of data (“big data”) in near real time to better operate CPS. A leading adopter of such technologies is the energy sector: the smart grid, oil and gas, and other industrial infrastructures associated with the modern energy ecosystem.

The Siebel Energy Institute was established by the Thomas and Stacey Siebel Foundation as an innovative joint program of collaborative energy research to catalyze cooperative research activities and advances in data analytics, including statistical analysis and machine learning, for the smart grid, oil and gas, and modern energy systems.

The Siebel Energy Institute is a consortium for innovative and collaborative energy research that includes the following member institutions:

- Carnegie Mellon University
- École Polytechnique
- Massachusetts Institute of Technology
- Politecnico di Torino
- Princeton University
- University of California, Berkeley
- University of Illinois at Urbana-Champaign
- The University of Tokyo
- Tsinghua University

Institute Director: Dean Shankar Sastry, University of California, Berkeley

The goal of the Institute is to accelerate the advancement of research in machine learning for smart grid analytics and foster research cooperation and synergies among the faculty, scholars, postdocs, and students at the Institute partner institutions to break new ground in energy systems and IoT analytics research.

Call for Proposals

To that end, the Institute is soliciting innovative research proposal abstracts that aim to advance the science and application of analytics and machine learning to improve the reliability, safety, security, and efficiency of the energy infrastructure.

Themes of particular interest to the Institute for this third call for proposals include:

- (1) technology enablers that improve infrastructure for next-generation, or “Smart Cities,”
- (2) machine learning analytics for enhancing Internet-of-Things (IoT)-enabled infrastructures,
- (3) analytics for enhancing the resilience of “Smart City” IoT-enabled infrastructures, including water, gas, transportation, etc.

The Institute will consider proposals that address (but are not limited exclusively to) the following areas:

- Smart Infrastructure Analytics: Analytics for infrastructures such as energy, water, transportation, gas, etc. (including from city-scale sensing, social applications, mobile platforms, and crowdsourcing)
- Next-Generation Urban Traffic Management: While data collected from mobile platforms, such as cell phones, is currently used in a number of apps to provide traffic maps, analytics needs to extend this to provide services in areas such as:
 - Predictive traffic congestion management: real-time data is merged with weather data, accident data, road closures, etc. to optimally reduce congestion and transit times – also included is variable speed limits
 - Consumer-facing parking: analytics to provide recommendations for street or off-street parking to minimize waiting time and optimize utilization of parking spots
- Energy Infrastructures: Electricity or gas in urban buildings (including energy efficiency, outage management, micro-grids for buildings – both public and private), and sharing of HVAC resources between buildings
- Human Decision-Making: Including modeling choices and actions, automation that shares control authority with humans, and risk models for human-automation systems
- Cyber-Physical Data Analytics: Including development of new services, such as predictive crime risk assessment of homes and risk mitigation, new “shared economy” services such as ride sharing, multi-modal transportation, use of autonomous vehicles, etc.
- Resilience of Urban IoT-Enabled Infrastructures: Including against cyber-attacks

Accepted research proposals will receive a US\$50,000 seed funding award for the development of completed research proposals intended for submission to supporting institutions, including but not limited to: U.S. Department of Energy; U.S. National Science Foundation; Japanese Ministry of Economy, Trade, and Industry; EURAXESS; Académie des Sciences; and other government funding institutions, universities, private foundations, and industry organizations. The proposal completion seed funding is for a period of six (6) months. Collaborative research with multiple Siebel Energy Institute member institutions is not required, but grant proposals that include such collaboration are encouraged. Please note that the Siebel Foundation requests that no indirect cost or “research overhead” be charged to the funding.

For additional information on about the Siebel Energy Institute grant program please see: www.siebelenergyinstitute.org.

Instructions for Completing Research Proposal Abstracts

Please use the format and associated instructions below to submit seed funding proposals. Proposal abstracts are not to exceed three (3) pages in length. Proposal abstracts are due **October 21, 2016** and should be submitted in PDF format only by e-mail to Carolyn Winter at cawinter@berkeley.edu.

Proposal abstracts submitted to the Siebel Energy Institute should include the details for each of the sections listed below. This information is intended to capture general information about the planned research proposal, the researcher(s) and academic institution(s) on the proposal team, and some detail on the proposed research activities, the funding agency/agencies to which the proposal will be submitted, and an estimate of the amount of resources/funding required to do the work of the full proposal. Proposal abstracts are for development of complete research grant proposals beginning December 15, 2016, and complete research grant proposals are expected to be submitted to funding institutions within six (6) months of receipt of seed funding. Alternative formats will not be considered.

Proposals should be 1-3 pages in length, not to exceed three (3) pages, text should be typed and a font size of 10 points or larger must be used, and submissions should include the following information:

PROJECT TITLE – A descriptive title of your proposed research activity or full proposal.

LEAD RESEARCHER/INSTITUTION – The name, 150-word professional biography, and high-resolution photo of the lead faculty researcher and his/her affiliated university logo or seal.

OTHER RESEARCHER(S)/INSTITUTION(S) – The names, professional biographies, and photos of other faculty researchers and their affiliated universities and university logos or seals.

PROJECT AREA – The area in which the proposed research activity or full proposal best fits. It is expected that each proposed project will align with only one of the areas listed. Please select and provide comments in the Research Details section as to your area of research focus.'

- Smart Infrastructure Analytics:
- Next-Generation Urban Traffic Management
- Energy Infrastructures
- Human Decision-Making
- Cyber-Physical Data Analytics
- Resilience of Urban IoT-Enabled Infrastructures

PROJECT ABSTRACT/OVERVIEW – A high-level summary (in layman's terms) of the proposed research activity or full proposal, including its goals, objectives, approach, and desired outcome(s).

PROJECT IMPACT – Responses to the following questions (maximum 50 word answer per question):

- 1) What would this grant mean to you and your University?
- 2) How will your proposed research activity or proposal positively impact the energy industry and/or society at large?
- 3) What problem or challenge will your research hope to solve?

RESEARCH PROPOSAL DETAILS – The planned research component of the full proposal, including Overview, Objectives, Approach, Deliverables, Research Timeline, and Milestones. This section should describe the core, long-term problem(s) being addressed, new approach(es) that will lead to solution(s) to the problem(s), and evaluation criteria to measure success (e.g., a theorem, prototype, user study, law/policy).

KNOWLEDGE TRANSFER DETAILS – The planned knowledge transfer activities of the full proposal that will support transitioning research results (e.g., to industry or the government). Please include details on known or expected partners or users outside of the Institute and their specific interests in the research and results.

REQUESTED FUNDING – An estimate of the funding to be requested to perform the work planned for the full proposal. Resource estimates should include the amount of personnel time (in either summer months or FTEs) for faculty, students, post docs, and staff and each resource's estimated cost (e.g., faculty summer month = "\$x"; full-time GSR = "\$y"). If known, please also include the name(s) and institution(s) for each person expected to support the proposed research activity. The funding estimate should also include other project-related costs such as equipment, supplies, travel, etc. Please note that this is an estimate of the funding you plan to request in the full proposal and, as such, the Siebel Energy Institute does not require that the budget be reviewed/approved by your grant or sponsored projects administration.