REQUEST FOR STATEMENTS OF INTEREST
W912HZ-19-SOI-0009

Project Title: USCRP Research Topic 2: Coastal Structure Design and Rehabilitation incorporating Stochastic Risk and Uncertainty

Responses to this Request for Statements of Interest will be used to identify potential investigators for studies to be sponsored by the U.S. Army of Engineer (USACE) Engineer Research and Development Center (ERDC) Coastal and Hydraulics Laboratory (CHL). The intent of this request is seek researchers interested in performing applied research to develop and implement stochastic methods into the design and rehabilitation of coastal structures with emphasis on the risk and uncertainty in coastal forcing and structural stability. In applying their research findings to develop and implement stochastic methods into coastal structural design, the researcher should examine and quantify aspects of coastal structure performance, such as 1) structural capacity, that is, can the structure sustain significant damage and still perform reasonably well, 2) the transition from minor damage to catastrophic structural failure, which can be gradual or abrupt and 3) the risk in not repairing a minimally-damaged structure because the cost differential between repairing one with minor damage and waiting until it is a catastrophically-damaged structure can often be orders of magnitude. Estimated award amounts for individual proposals of $50,000 to $400,000 may be accepted. Multiple awards may be funded. Possibly no awards will be made if the submitted proposals do not meet the objectives outlined in this RSOI.

Background:
The U.S. Coastal Research Program (USCRP) is a partnership of the coastal research community to coordinate Federal activities, strengthen academic programs, and build a strong workforce. Three primary research needs identified by the USCRP's nearshore coastal community are to improve understanding of: 1) long-term coastal evolution due to natural and anthropogenic processes; 2) extreme events, including flooding, erosion, and the subsequent recovery; and 3) the physical, biological and chemical processes impacting human and ecosystem health. As identified by the USCRPs plan, the USCRP addresses societal needs along the coast through a coordinated effort backed by researchers from Federal agencies, academia, industry, and non-governmental organizations. Awards will be made with the intent of assisting academic institutions in funding coastal and nearshore processes graduate students to address critical research needs within the coastal community, advancing the state of knowledge, and building the future U.S. workforce.

Public Purpose and Benefit:
These results will benefit the public through improved prediction of storm processes and impacts, reduced uncertainty in those predictions, development and application of improved statistical methods to design and rehabilitate structures, and ultimately reducing risk to coastal communities.

Brief Description of Anticipated Work:
This research is envisioned as a 2-year study.

Objective 1: In order to achieve the main objective of this study of incorporating stochastic risk and uncertainty into costal structure design and rehabilitation, the researcher should first summarize the present state-of-knowledge concerning methods for implementing stochastic methods into the design and rehabilitation of coastal structures while considering the risk and uncertainty in coastal forcing and structural stability. Researchers will analyze field and laboratory data with the goal of determining improved methods for incorporating uncertainty into coastal structure design. The basic and applied methods researchers may use to reach this research goal include analyzing existing field data to validate numerical models and determine the level of model uncertainty, collecting new field or laboratory data to improve model physics and reduce model uncertainty, using field and laboratory data to develop methods for quantifying risk, then determining new methods to better incorporate the stochastic risk into structural design and rehabilitation. Products from this objective will include: a Shore & Beach article that documents the state-of-knowledge; and a Fact Sheet that succinctly synthesizes these findings (2-4 pages).

Objective 2: Based on the present state-of-knowledge, develop a plan for improving our capabilities regarding the implementation of stochastic methods into the design and rehabilitation of coastal structures and quantifying the risk and uncertainty in coastal forcing and structural stability. Recommend numerical modeling, analytical (e.g., analysis of historical data), and/or field data collection to address gaps in knowledge. Document gaps, recommended actions, and areas that have been improved from this study in a Shore & Beach article.

Objective 3: Implement recommendations outlined in Objective 2 through field data collection to reduce model uncertainty and incorporation of essential information into numerical models. Models may include but are not limited to phase-resolving models, time-averaged equations of motion for fluid flow models, and turbulence models. Essential information that may be included in numerical models may include (but is not limited to) bottom friction, wind forcing, wave transmission, prediction of forces on structures, and structure overtopping.

Annual products from this work will include Community Fact Sheets (2-4 pages each) that summarize advancements each year; and an annual contribution to the USCRP Quarterly Bulletin (1/2- 1 page for each article). Shore & Beach articles that are co-authored with a practitioner are anticipated at the end of Objectives 1 and 2, and at the conclusion of the study. If numerical models are utilized in the study, open-source modeling systems are preferred so that all coastal researchers can benefit from advancements

Base Period Tasks:
Objectives 1-3 will be addressed in the base period work effort and summarized in the summary report for this period.

Government Participation:
The university researcher(s) will work in close coordination with the USACE and USCRP staff who will provide technical assistance on accessing data available on USACE and other federal agency data portals, coordinating with community leaders, and notifying the researchers of potential field data collection opportunities. The USACE and USCRP will also facilitate and participate in researcher coordination efforts and meetings either in person or by webinar during the study. The USACE and USCRP team will ultimately incorporate the research and documentation completed by the researcher(s) into a technical report.

Materials Requested for Statement of Interest/Qualifications:
Please provide the following via e-mail attachment to: Stacy.D.Thurman@usace.army.mil

(Maximum length: 2 pages, single-spaced 12 pt. font).
1. Name, Organization and Contact Information
2. Brief Statement of Qualifications (including):
    a. Biographical Sketch,
    b. Relevant past projects and clients with brief descriptions of these projects,
    c. Staff, faculty or students available to work on this project and their areas of expertise,
    d. Any brief description of capabilities to successfully complete the project you may wish to add (e.g. equipment, laboratory facilities, greenhouse facilities, field facilities, etc.).

Note: A proposed budget is NOT requested at this time.

Review of Statements Received: Based on a review of the Statements of Interest (SOI) received, an investigator or investigators will be invited to prepare a full study proposal. Statements will be evaluated based on the specific experience and capabilities of the investigator(s) in areas related to the study requirements. Additionally, the evaluation method and selection criteria for research and development awards must be: (1) the technical merits of the proposed research and development; and (2) potential relationship of the proposed research and development to the Department of Defense missions.
Please send responses or direct questions to:

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Timeline for Review of Statements of Interest: Review of Statements of Interest will begin after the SOI has been posted to all units on the CESU website for 10 working days.