

**REQUEST FOR STATEMENTS OF INTEREST
NUMBER W912HZ-19-SOI-0011
PROJECT TO BE INITIATED IN 2019**

Project Title: USCRP Research Topic 8: Quantifying and Communicating Numerical Model 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 to seek researchers interested in performing applied research to identify, quantify, and potentially reduce uncertainty in numerical model predictions. Proposers will identify numerical model uncertainty and determine methods for improving the representation of physical processes in the model in order to reduce model error. Quantification of uncertainty in numerical model predictions will cover time periods from single storm events to seasonal, annual, and longer time periods. Estimated award amounts for individual proposals of \$50,000 to \$500,000 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 and non-storm coastal processes and impacts, better estimates and validation of numerical model accuracy, identification, quantification, and reduction of sources of error, improved strategies for short- and long-term coastal resilience; and development of more effective communication methods for relating numerical model predictions and uncertainty in predictions to coastal communities impacted by storms and long-term processes.

Brief Description of Anticipated Work:

Objective 1: In order to achieve the main objective of this study of incorporating quantifying and communicating numerical model uncertainty, the researcher should first summarize the present state-of-knowledge concerning methods for estimating numerical model uncertainty. 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 ability to quantify, reduce, and communicate numerical model uncertainty. Recommend numerical modeling, analytical (e.g., analysis of historical data), and/or field data collection to address gaps in knowledge, including where, when, and why to apply numerical models to specific problems. 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 and development of validation datasets. Next this objective may include the development of a community model validation forum to compare models, quantify uncertainty, determine strengths and weaknesses, and determine when and where models are best applied. Finally researchers should determine methods for improving representation of physical processes in numerical models from the knowledge gained from these comparisons in order to advance model predictions and reduce model uncertainty.

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 model validation data available on USACE and other federal agency data portals notifying the researchers of potential field data collection opportunities to further validate their models. The USACE and USCRP will also facilitate and participate in researcher coordination efforts and meetings with other researchers working in this topic area 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:
Robyn.D.Wells@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:

Robyn D. Wells

U.S. Army Engineer Research and Development Center (ERDC)

ERDC Contracting Office (ECO)

3909 Halls Ferry Road

Vicksburg, MS 39180

Robyn.D.Wells@usace.army.mil

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.