Opportunity Title: Computer Vision Scientist or Engineer
Opportunity Reference Code: ERDC-CHL-2019-0006

Organization U.S. Department of Defense (DOD)

Reference Code ERDC-CHL-2019-0006

How to Apply Components of the online application are as follows:

- Profile Information
- Educational and Employment History
- Essay Questions (goals, experiences, and skills relevant to the opportunity)
- Resume (PDF)
- Transcripts/Academic Records -Click here for detailed information about acceptable transcripts
- References

Submitted documents must have all social security numbers, student identification numbers, and/or dates of birth removed (blanked out, blackened out, made illegible, etc.) prior to uploading into the application system.

If you have questions, send an email to usace@orise.orau.gov. Please list the reference code of this opportunity in the subject line of the email.

All documents must be in English or include an official English translation.

Description The U.S. Army Engineer Research and Development Center's Coastal & Hydraulics Laboratory (CHL) performs research on ocean, estuarine, riverine, and watershed systems in support of the U.S. Army Corps of Engineers (USACE) and the Department of Defense (DOD) Task Force in support of the Ocean Commission. A multi-disciplinary team of scientists, engineers, and support personnel work in CHL's internationally known, unique facilities. This team has developed state-of-the-art experimental and computational models for solving water resource problems worldwide. CHL research and development addresses water resource and navigation challenges in a variety of hydrodynamic systems including aquifers, watersheds, rivers, reservoirs, lakes, estuaries, harbors, coastal inlets, and wetlands. Physical facilities of approximately 1.7 million square feet and high-performance computing facilities at the DOD Supercomputing Research Center (http://www.erdc.hpc.mil) are the basic infrastructure for producing cutting-edge products for successful coastal, inland water resources, and navigation management. CHL work, although primarily in support of the DOD and the Corp's districts, also interfaces with other federal, state and local agencies, academia, conservation groups, and the general public, as appropriate. The Research Participation Program for USACE-ERDC-CHL provides opportunities to participate in new and on-going applied research and development projects. Research projects range from design guidance to three-dimensional computational models. Focus is placed on inland and coastal navigation, military logistics over the shore, dredging, flood control, storm and erosion protection, waterway restoration, fish passage, hydro-environmental modeling, water/land management, and other water and sediment-related issues facing the nation. For more

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information about USACE-ERDC-CHL, please visit https://www.erdc.usace.army.mil/Locations/CHL/.

The opportunity is at the US Army Corps of Engineers Coastal and Hydraulics Laboratory's Field Research Facility (FRF) in Duck, North Carolina. The FRF is an oceanfront coastal observatory specializing in the collection and analysis of coastal data. The FRF maintains continuously operating in-situ and remotely sensed instruments (video, lidar) on-site in addition to conducting basic and applied coastal research worldwide. Over the past 10 years the FRF has developed an extensive remote sensing program focused on expanding our nation's ability to collect high-resolution spatio-temporal data of coastal processes and landscape evolution.

The prospective postdoctoral intern will conduct applied research in the area of computer vision, image processing and analysis, and data visualization. The overall objectives for this research are to develop new software tools that provide rapid analysis of coastal imagery using feature recognition and structure-from-motion and wave-kinematics inversion algorithms to calculate seamless coastal topo-bathymetric surfaces. Emphasis will be placed on automation, improving algorithm speed to reduce processing times and increase computational efficiency so that algorithms may be run onboard UAS or on small processors (e.g. mobile apps, toughbooks), as well as constructing an easy to use software interface to process and visualize results. The prospective intern will be a member of an experienced team responsible for solving complex coastal oceanographic observation challenges that support the Army Corps of Engineer’s civil and military missions using a wide range of remote sensing modalities, including imagery and lidar. The intern will have the opportunity to collaborate on additional ongoing research focused on extracting coastal processes information from these sensors from a variety of platforms (shore-based towers, unmanned & manned systems (ground or aerial), and satellites). Under the guidance of a mentor the intern will have the opportunity to learn and contribute to the following ongoing research activities may:

• Software design and algorithm development/improvement
• Rapid photogrammetric processing and analysis of coastal imagery
• Analysis, manipulation, and visualization of three-dimensional point cloud data of coastal topography and bathymetry
• Participating in the preparation of reports, presentations, or journal articles communicating research activities and findings
• Participation in demonstrations of technology

Off-site travel may be required to support ongoing research.

Appointment Length

This ORISE appointment is for a 12 month period. Appointments may be extended depending on funding availability, project assignment, program rules, and availability of the participant.

Participant Benefits

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Participants will receive a stipend to be determined by ERDC-CHL. Stipends are typically based on the participant's academic standing, discipline, experience, and research facility location. Other benefits may include the following:

- Health Insurance Supplement. *Participants are eligible to purchase health insurance through ORISE.*
- Relocation Allowance
- Training and Travel Allowance

Nature of Appointment

The participant will not enter into an employee/employer relationship with ORISE, ORAU, DOD, or any other office or agency. Instead, the participant will be affiliated with ORISE for the administration of the appointment through the ORISE appointment letter and Terms of Appointment.

Qualifications

The participant will be exposed to all aspects of the research process, from from field activities and experiment design to the collection and analysis of field data and software development. Potential candidates should have a strong understanding of photogrammetry, geomatics, computer vision, image processing, and software design.

Minimum requirements:
- PhD in Computer Science or a related field of research.
- Research experience in one or more of the following areas: software engineering, image processing, image analysis, computer vision, feature/pattern detection/analysis as evidenced by original, published work.
- Demonstrated ability to design and implement image processing/statistical analysis software, preferably shared and distributed memory parallel software, in multiple programming languages and parallel libraries/languages/environments: C/C++, Java, Scala, R, Python, Matlab, MPI, pthreads, OpenMP, OpenCL, OpenCV, CUDA.
- Experience with software engineering tools, including version control (git, svn).
- Excellent oral and written communication skills.
- Ability to work productively both independently and as part of a diverse team.

Additional consideration will be given to the candidates with experience in the following:
- Oceanography, lidar point cloud processing, Earth Sciences, geospatial analysis, unmanned aerial systems, GNSS Systems, Machine Learning, etc.

Eligibility

- **Citizenship:** U.S. Citizen Only

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Requirements

- **Degree:** Doctoral Degree received within the last 6 months or currently pursuing.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Computer, Information, and Data Sciences** (16 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Life Health and Medical Sciences** (45 👁)
- **Age:** Must be 18 years of age