DEPARTMENT OF THE NAVY
OFFICE OF THE PROVOST
UNITED STATES NAVAL ACADEMY
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ANNAPOLIS MARYLAND 21402-1300

9 February 2022

Dr. Eric Davidson
Director, Chesapeake Watershed Ecosystems Study Unit (CHWA CESU)
University of Maryland Center for Environmental Science
Appalachian Laboratory
301 Braddock Road
Frostburg, MD 21532

Subject: United States Naval Academy Application as a university partner to the Chesapeake Watershed (CHWA) CESU Research Network

Dear Mr. Davidson:

With this letter and its attachments, the United States Naval Academy (USNA) is presenting its application to become a university partner institution of the Chesapeake Watershed Cooperative Ecosystems Study Unit (CHWA CESU). As USNA's chief academic officer, I am responsible for leadership and oversight of all facets of the Naval Academy's academic program, including the School of Engineering and Weapons, the School of Mathematics and Science, and the School of Humanities and Social Science, the Office of Research & Scholarship, the Center for Teaching & Learning, as well as other units and centers at the Navy's undergraduate university.

The Naval Academy promotes and maintains an environment in which research and scholarly activities contribute to the professional growth of the faculty and to the educational growth of the students (midshipmen). Faculty and midshipman research projects have been funded by a variety of sponsoring agencies, including several in the Department of Defense, in the Department of the Navy, the Department of Energy, as well as research agencies such as NASA, DARPA, the National Science Foundation (NSF), the Carnegie Corporation, and the Simons Foundation.

We have read the CESU agreement and we look forward to joining the collaborative effort to support research and education in the Chesapeake watershed, and to participating in CESU as a university partner. We trust that this university partnership will strengthen the research initiatives of faculty members at the Naval Academy, while building technical expertise and collaborations with other CESU members.

We appreciate your consideration of this application for the Naval Academy to join CESU as a university member.

Sincerely,

Andrew T. Phillips
Provost

Background Information about USNA

The United States Naval Academy (USNA) was founded as a Naval School on Oct. 10, 1845 by George Bancroft. As the undergraduate university of the country's naval service, the Naval Academy prepares young men and women to become professional officers of competence, character, and compassion in the U.S. Navy and Marine Corps. Naval Academy students are "midshipmen" on active duty in the U.S. Navy throughout their education at USNA. The midshipmen attend USNA year-round for four years, graduating with bachelor of science degrees and commissions as Ensigns in the U.S. Navy or as Second Lieutenants in the U.S. Marine Corps.

The academic programs are primarily focused on science, technology, engineering, and mathematics (STEM), preparing the Academy's graduates to meet the current and future highly technical needs of the Navy. The technical curriculum is complimented with coursework in the humanities, languages and social sciences, to product well-educated students with a broad-based academic foundation.

There are 26 majors in three schools: (1) School of Engineering and Weapons, (2) School of Mathematics and Science, and (3) School of Humanities and Social Sciences. The Naval Academy provides an excellent learning environment with a student to faculty ratio of 8:1 and a total enrollment of nearly 4,500 midshipmen. Midshipmen are admitted from every state in the nation, as well as from the District of Columbia, Guam, Puerto Rico, and some countries, as coordinated with the U.S. State Department. The faculty is composed of an approximately equal mix of civilian and military professors, with a total of about 550 faculty. The Naval Academy policy is to promote and maintain an environment in which research and scholarly activities contribute to the professional growth of faculty and the educational growth of midshipmen.

USNA Mission

To develop Midshipmen morally, mentally and physically and to imbue them with the highest ideals of duty, honor and loyalty in order to graduate leaders who are dedicated to a career of naval service and have potential for future development in mind and character to assume the highest responsibilities of command, citizenship and government.

Related Academic Departments, and Faculty Expertise (https://www.usna.edu/Academics/Majors-and-Courses/Divisions-Departments.php)

Engineering and Weapons (https://www.usna.edu/EngineeringandWeapons/)

- Naval Architecture and Ocean Engineering
    - Asst Prof Liliana Velasquez-Montoya: coastal infrastructure vulnerability, tidal inlet dynamics, and natural and anthropogenic morphological changes in the coastal environment. Funded by the US coastal research program (USACE) for the project: "Long term morphodynamic stability at a bar-built estuary with implications for breach management".
    - Asst Prof Tori Tomiczek (Johnson): wave forces on coastal structures, potential of natural and nature-based infrastructure for wave and surge mitigation.

- Asst Prof Anna Wargula: coastal ocean physics that drive the flooding of coastal communities, erosion of marshes and beaches, and mixing and transport of pollutants and nutrients that control the health of inland bays.
- Assoc Prof Andrew Metzger: marine transportation infrastructure and uncertainty in engineering problems including environmental demands on coastal infrastructure.

Mathematics and Science (https://www.usna.edu/MathSci/)

- Mathematics
  - Dean and Director of Research Reza Malek-Madani: data analysis, corresponding to transport and mixing in the Bay; development of mathematical models based on dynamical systems derived from basic principles.
- Oceanography
  - Prof Cecily Steppe: coastal and oceanographic process that drive population dynamics of marine and estuarine fish and invertebrates; marine ecology; habitat restoration; aquaculture
  - Assoc Prof Joseph P. Smith: biogeochemistry; radiochemical and biogeochemical tracers; cycling of inorganic and organic constituents between water, soil, and sediments in linked watershed-estuarine-coastal systems
  - Instructor of Practical Applications Alexander R. Davies: Intra-seasonal physical ocean variability, coastal water level variability and drivers, physical oceanography, meteorology

Related Academic Facilities

Naval Academy Hydromechanics Laboratory (NAHL)

The Naval Academy Hydromechanics Laboratory (NAHL), a 35,000 FT^2 naval education/research facility, began operation in the basement of Rickover Hall in 1975. NAHL leverages a multitude of experimental facilities including: (1) a 380 FT towing tank supporting large to prototype-scale physical models; (2) a Coastal Engineering Tank with wave making capabilities for evaluating the efficacy of breakwaters, groins, nature-based infrastructure, among other tests; (3) a 120 FT towing tank, supporting student laboratory and research; (4) a Ballast Tank for measuring ship stability and calibrating instrumentation; and (5) Recirculating Water Tunnels for studying propeller cavitation, dynamic pressures/forces on underwater bodies, and boundary layer flow measurements. The primary mission of NAHL is to directly support/enhance the technical education of midshipmen. The secondary mission of NAHL is to support USNA faculty/sponsored research. Faculty within the School of Engineering & Weapons, and particularly the Naval Architecture & Ocean Engineering (NAOE) Department, use NAHL for a wide variety of research activities, including the investigation of ship resistance/propulsion, marine vehicle motion in waves (seakeeping), submersible vehicle functionality, basic ocean wave mechanics, wave-structure interactions, and coastal engineering principles/behaviors. The NAHL staff also performs sponsored research tests for a wide variety of organizations, including the Department of Defense (DoD) and the Department of the Navy (DoN).

Hendrix Oceanography Laboratory Complex

The Hendrix Oceanography Laboratory (HOL) is staffed and maintained by the Naval Academy's Oceanography Department. Named for Captain Charles N.G. (Monk) Hendrix, the lab began operations in September 1985. It is located at the mouth of the Severn River, a tidal tributary to the mesohaline Chesapeake Bay. The primary purpose of this multi-use facility is to further the education of Midshipmen by supporting hands-on scientific inquiry. The HOL houses a wide range of oceanographic and meteorological equipment and instrumentation to support instructional laboratories as well as faculty-led Midshipman research and project-based learning and externally-supported faculty research. Past and present external research sponsors include the Office of Naval Research (ONR); the Naval Research Laboratory (NRL); The Defense Threat Reduction Agency (DTRA); the Department of Defense Strategic Environmental Development Program; the U.S. Army Corps of Engineers; and the National Oceanic and Atmospheric Administration (NOAA). HOL also supports the Center for Chesapeake Bay Observation and Modeling (CCBOM) and it serves as an institution-wide resource to support research of midshipman and faculty from departments across USNA.

The HOL consists of 4 laboratory spaces: a teaching laboratory, a biological oceanography laboratory, a general-purpose laboratory primarily used to maintain and calibrate oceanographic instruments, and an open-bay wet laboratory that supports a wide range of activities, including developing of custom unmanned and autonomous systems. HOL provides pier-side access to small boats and a Navy Yard Patrol Craft (YP-686) specially outfitted to conduct oceanographic research. HOL serves as the central node for the Severn River Watershed Observatory (SRWO), a continuous monitoring network that collects data on meteorological and physical and water quality conditions of the lower Severn River. HOL and SRWO are co-located with the NOAA. Annapolis Tide/Water Level Station (ID: 8575512).

The HOL is the core of a larger group of laboratory and field, and computing facilities designed to promote hands-on, experiential learning and support research. These include a new Geophysical Fluid Dynamics Laboratory (Rotating Tank Lab) and the Environmental Data, Monitoring and Prediction System (EDMAPS) consisting of a dedicated data Server to house and handle 'big data' and an Environmental Data Laboratory where students and faculty can work with these data in applied data science activities related to meteorology, oceanography, and climatology.

Related Funding

The Naval Academy policy is to promote and maintain an environment in which research and scholarly activities contribute to the professional growth of faculty and the educational growth of midshipmen. In the recent past, faculty and midshipman research have been funded by a variety of sponsoring agencies, including the Office of Naval Research, the Naval Research Laboratory, the Naval Surface Warfare Center (Carderock and Indian Head), the Naval Air Warfare Center at Patuxent River, the U.S. Army Corps of Engineers, as well as by the Department of Energy and the National Science Foundation.

During discussions with Dr. Filer, it was confirmed that there are no financial or facility obligations incurred by USNA if the Academy is approved as a university member. Research projects and proposal awarded through CHWA-CESU will be subject to USNA's overhead rate, appropriate to the identity of the funding source. (max 15%)

Technical and Administrative Representatives

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