

U.S. Coastal Research Program Quarterly Bulletin December 2019

Content	<p>In this edition of the U.S. Coastal Research Program’s (USCRP) Quarterly Bulletin:</p> <ul style="list-style-type: none"> ❖ Follow USCRP on Social Media ❖ USCRP 2020 Funding Opportunity planning ❖ DUNEX – Pilot Experiment ❖ Academic Survey Report ❖ USCRP at ASBPA and CERF ❖ Announcements & Upcoming Events <p>Please visit the USCRP website, https://uscoastalresearch.org/ for more information on the motivation and goals of the USCRP as well as current initiatives.</p>
Follow USCRP on Social Media	<p>USCRP is on Twitter, Instagram, Facebook, and LinkedIn. Follow us today!</p>
USCRP 2020 Funding Opportunity planning	<p>The two “virtual workshops” the USCRP will host to inform our 2020 Call for Academic Proposals and communicate the high priority coastal R&D that is ongoing in federal agencies have been postponed due to uncertainties in the Federal budget, and will be rescheduled once the budget is passed.</p> <p>In these workshops, we will focus on areas within 2 of the 3 broad research themes identified in the Nearshore Report:</p> <ul style="list-style-type: none"> • Long-term processes and coastal response (sea level changes; future storms; sediment supplies; land use changes), and • Biological and chemical interactions with the physical processes that influence healthy estuarine ecosystems’ ability to provide 1) storm protection, 2) economic benefits (fisheries, tourism), and/or 3) critical habitat. <p>Stay tuned to our website and the mailing list for more information.</p>
DUNEX: Reflections from the Pilot Season	<p>The During Nearshore Event eXperiment (DUNEX) was established with the short-term goals of collecting high-quality field measurements to better understand during-storm processes, impacts and post-storm recovery and helping enhance US academic coastal research programs. Longer-term goals include improving models and prediction of extreme-event physical processes and impacts, improving strategies for coastal resilience, and developing effective communication methods for communities impacted by storms.</p> <p>Planning the Experiment</p> <p>Careful thought in site selection and a multi-faceted planning process were required to meet these objectives. DUNEX site selection was based on the ability to collect nearshore processes data at a site that experiences frequent dune collision, overwash, and infrastructure impacts. Specific selection criteria included a region with a prevalence of storm impacts, some aspect of a controlled environment, and the ability to compare and ground truth modeling results with measurements.</p>



The northern North Carolina Outer Banks was selected for DUNEX because it is a developed region prone to frequent storms and experiences rapid coastal evolution and along-coast variation due to the dynamic dune and inlet systems. Furthermore, the U.S. Army Corps of Engineers Field Research Facility (FRF) in Duck, NC is located in this region and has a long history of physical processes and morphology measurements.



Storm Impacts to infrastructure along the NC Outer Banks

The next step was to develop a plan to host an unknown number of research teams from across the academic and federal community. This process included individuals from both the academic and federal perspectives and was established with the underlying principle of collaboration. As discussions matured it became clear that the plans required thoughtful logistics, communications, data handling, training, and cross-agency coordination; hence a sub-team was formed for each of these.

A tremendous amount of effort occurred behind-the-scenes, allowing all attendees to experience, and maximize, quality research and data-collection time while on the Outer Banks. Of particular note are the Virtual Coffee Break's and Logistics Surveys.

The Virtual Coffee Break's are webinar's established for the participating research teams to showcase their plans to fellow teams and to have an open discussion of areas of potential collaboration. These occurred each Friday from July to December. They were advertised via an internal forum for the participating teams. This type of communication allowed the teams to set their own internal day-to-day activities with an understanding of where support and / or partner teams might share anything from data to field labor.



The Logistics Surveys were submitted from each of the teams that were considering participation long before experiments commenced. These surveys, and subsequent phone calls and emails, were used to establish who was coming, along with that team's plan of work, and most importantly, to clarify the expectations that each team had for daily logistical support.

Pilot Experiment

This past fall a total of 18 research teams participated in the pilot season, including 11 Universities supporting 14 students. USGS and USACE contributed aerial panchromatic and lidar-based imagery and elevation data, both terrestrial and bathymetric. In addition, the FRF contributed their data assets within the area of the FRF and countless hours of kinematic GPS at experiment stations and day-to-day logistics. These included office space, high-speed internet for the research teams, skilled-labor support for installation of experiments, and beach-area transportation. The region also was "fortunate" to experience Hurricane Dorian while a few early teams were on-site, and a strong Nor'easter during the primary week of data collection. A third storm came through the area, but just following the teams leaving the area.

Currently the FRF is developing a web-based project-story board, which will include research team site locations and linked pages for research teams to discuss their experiments.

An example of collaboration of the teams is the NHERI: Natural Hazards Reconnaissance RAPID Facility (<https://rapid.designsafe-ci.org/>). This team, funded by the National Science Foundation, provides equipment, software and tech support to collect, process and analyze perishable data from natural hazards. The team includes staff from the University of Washington with collaboration from Virginia Tech, Oregon State University, and University of Florida. The RAPID team was on site 7-11 October, providing equipment and training to all of the research teams that indicated interest in their support. This also happened to be the week a Nor'easter impacted the area.

Another team from Woods Hole Oceanographic Institute, Virginia Tech and Oregon State University made measurements of geotechnical sediment properties and ground-water behavior between the inner surf zone to the dune toe during a full tidal cycle with the goal of improving sediment transport parameterizations. Their work was also supported by terrestrial and airborne lidar and stereo imagery.



Nearshore processes and dune response

Another team, from the US Naval Academy, NC State University, Dewberry with collaboration from Virginia Tech and Louisiana State University, mapped the spatial variability in hydrodynamic forcing and geotechnical characteristics to refine the Delft3D model and to plan for DUNEX 2020.

This work was conducted adjacent to a new bridge built across Oregon Inlet. This area is already experiencing unexpected shoreline erosion as the construction teams are demobilizing from the site. Their measurements included boat-mounted current profiles across the flood channel, sediment sampling, land-based sediment and marsh samples, water levels and boat wakes.



Shoreline Erosion Drivers

An important goal of DUNEX is to foster improved strategies for coastal resilience and develop effective communication methods for communities impacted by storms through training and accessible technical communications available to experiment participants and the coastal community. A “formal” training week occurred in late September attracting participants from federal agencies, academic programs and local coastal municipalities. Formal classroom presentations were combined with field visits to participating research teams to extend the classroom into the experiment environment.



Training in the Field

Additionally, the DUNEX team set up a series of weekly Tech Talks. These were intended to present current academic work to the widest possible audience via webinars for most of the presentations. They also opened them to anyone, including public participation, at the FRF conference room. One Tech Talk was given to an interested audience at a local coffee shop. The Tech Talks included two citizen science projects to document coastal change and to improve understanding of coastal flooding. They also covered sound-side flooding at Oregon Inlet, the physics of dune erosion, and aeolian transport on a wet beach.

Get Involved in the 2020 Experiment!

We continue to work on communications, such as the DUNEX webmap and have requested all interested research teams complete a new logistics survey. These surveys have been requested

not later than 31 December and may be completed online at the USCRP website, <https://uscoastalresearch.org/dunex> .

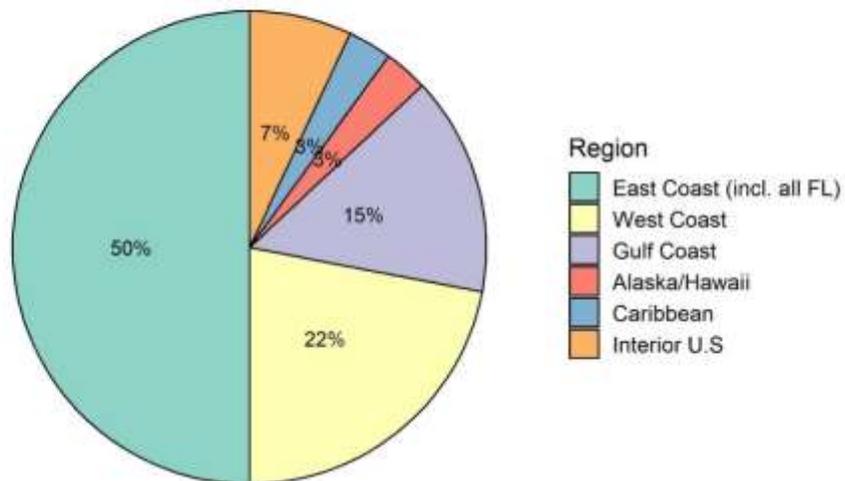
Opportunities to participate in the 2020 experiments are broad, from serving as a PI or member of a research team, participating (or teach) in a training session, volunteer supporting field work and to support communications. Perhaps, the most important communication is stated as one of the goals; to develop more effective communication with local communities and expanding the academic work to improved community resilience.

Contribution from Steve DeLoach (DUNEX Team, ERDC, CHL)

Academic Survey Report

In the spring of 2019, the USCRP conducted a national survey to better understand the current demographics, status, and trends of U.S. academic researchers and programs focused on coastal processes and issues. In total, 83 participants responded, 62 of whom were at U.S. academic institutions. From the U.S. academic respondents, 50% were from the east coast, 22% from the west coast, 15% from the gulf coast, 3% from Alaska or Hawaii, 3% from the Caribbean, and 7% from other U.S. regions (see Figure 1). A synopsis of the findings with an emphasis on responses from U.S. academic institutions is provided below.

Respondent Region

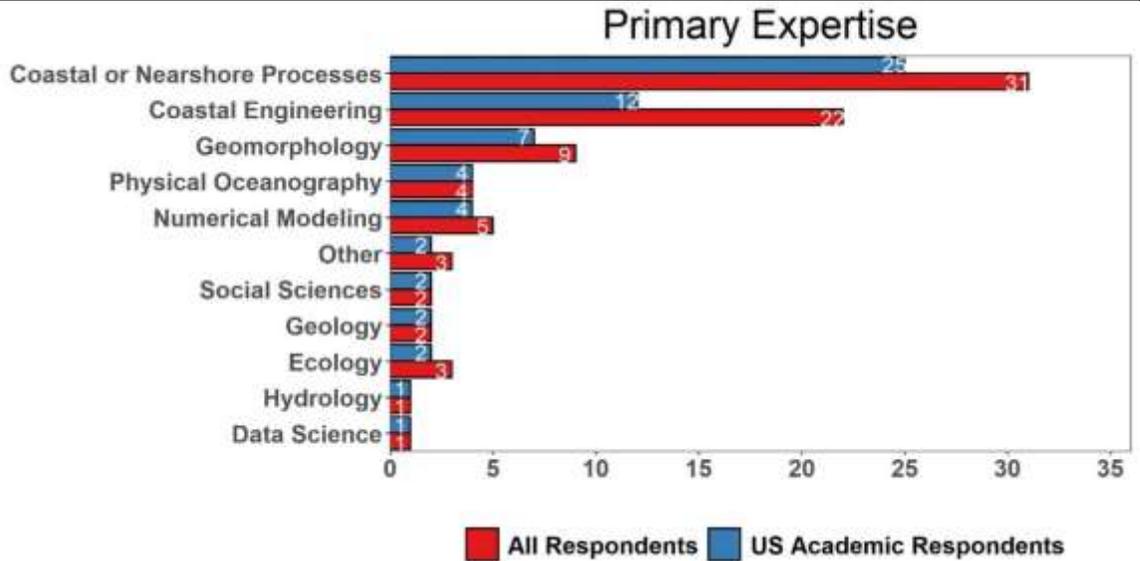


Regional representation of U.S. academic respondents.

Demographics for the U.S. academic respondents are as follows. Numbers provided in parentheses represent results from all respondents:

- 79% of U.S. academic respondents (70% of all respondents) are USCRP members.
- 59% (64%) of U.S. academic (all) respondents describe their primary discipline as coastal processes or coastal engineering. Other disciplines included physical oceanography, numerical modeling, geology, geomorphology, hydrology, ecology, social sciences, data science, urban planning, and epidemiology (see Figure 2).
- 89% (78%) of U.S. academic (all) respondents are interested in extreme events, 51% (55%) in long term evolution, and 33% (32%) in coastal ecosystem and human health.
- 84% (84%) of institutions granted PhDs, 86% (81%) Masters, and 74% (73%) bachelor's degrees.

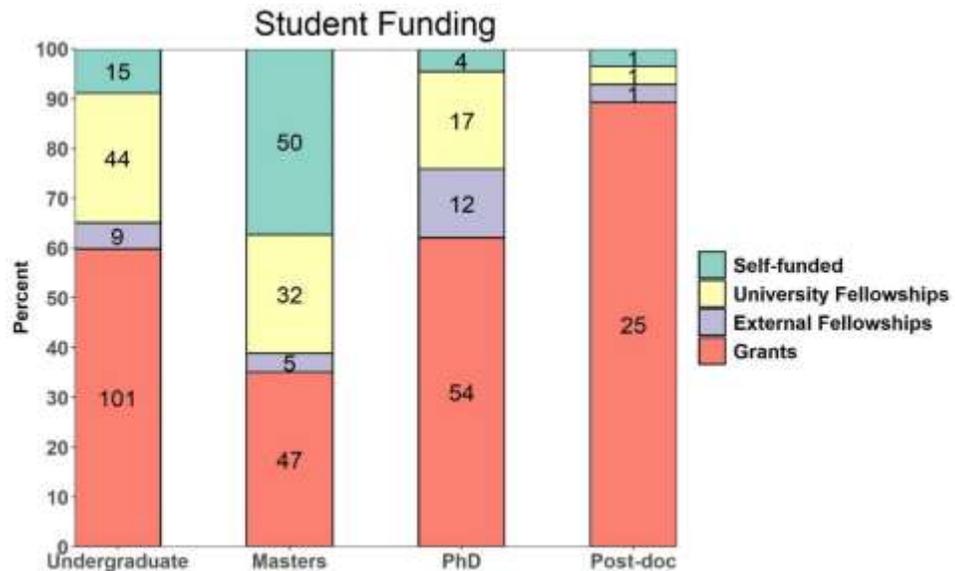




Primary research discipline indicated by respondents

Questions involving financial support for students yielded the following responses (please see Figure 3). Total and U.S. student numbers are similar:

- 101 undergraduates were funded by grants and 44 by university fellowships, 15 were self-funded, and 9 were funded by external fellowships.
- 47 U.S. Masters students were funded by grants, 32 by university fellowships, 50 were self-funded, and 5 were funded by external fellowships.
- 54 PhD students were funded by grants, 17 by university fellowships, 4 were self-funded, and 12 were funded by external fellowships.
- 25 postdocs were funded by grants, and 1 each by university fellowships, self-funded, and by external fellowships.

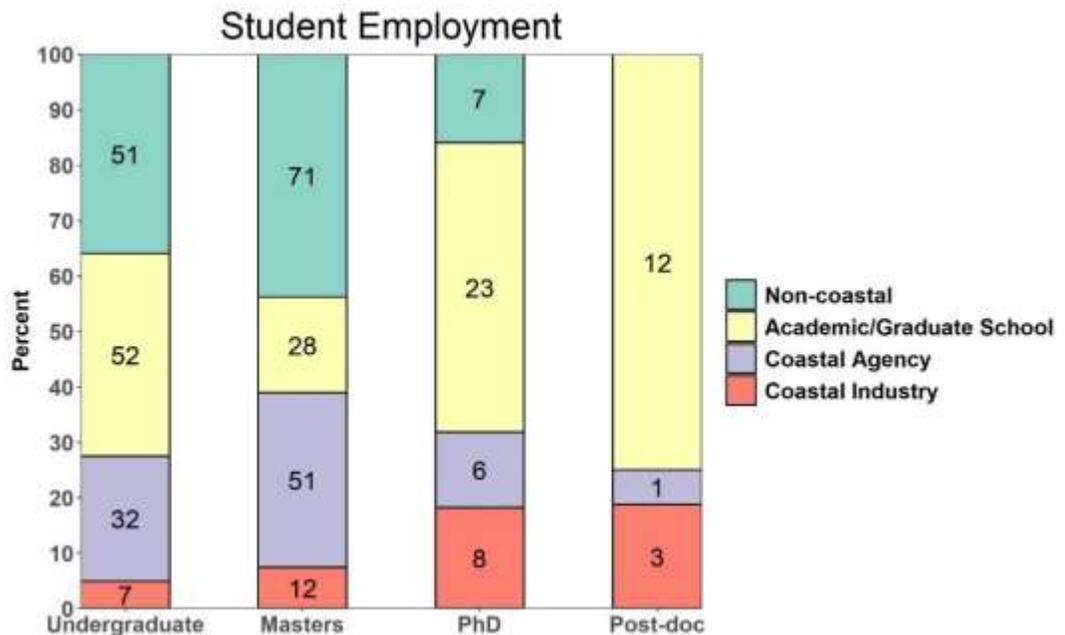


Type of funding received by undergraduate, Masters, and PhD students and postdoctoral researchers



Questions involving student employment yielded the following responses (please see Figure 4). Numbers for all respondents were similar to those for U.S. respondents:

- 37% of 142 U.S. undergraduate advisees since 2014 were employed as coastal academics or graduate students, 23% were in coastal industries, 5% in coastal agencies, and 36% were in non-coastal fields.
- Of 162 U.S. (168 total) Masters advisees since 2014, 44% became employed in non-coastal fields, with 31% taking jobs in coastal industries, and 17% going into academia (including graduate school) and 7% into agencies.
- A little more than half the PhD advisees remained in academia (52%), with about 18% employed in coastal agencies, 14% in coastal industries, and 16% in non-coastal fields.
- All postdoc advisees remained in coastal fields, with the majority (12 of 16) remaining in academia.



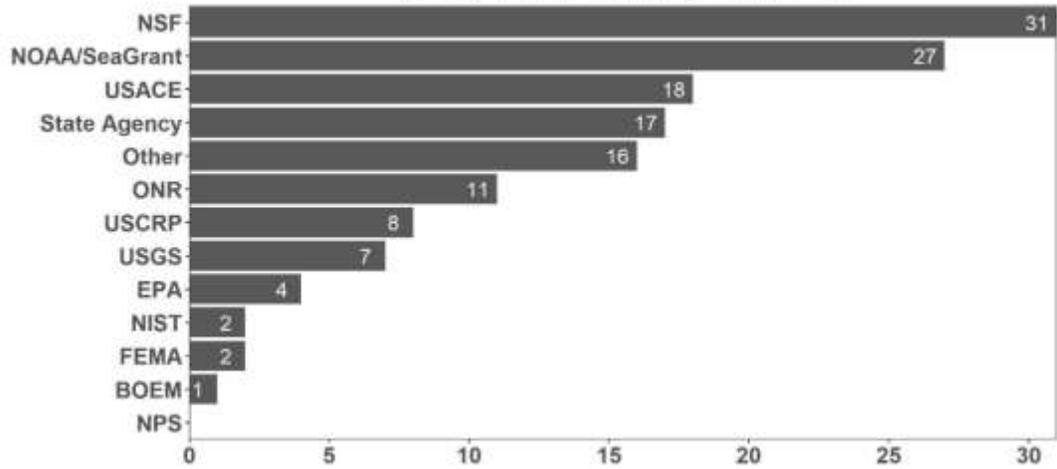
Employment of undergraduate, Masters, PhD, and postdoctoral advisees over the past 5 years (2014-2019)

Questions involving research funding yielded the following responses (please see Figures 5 and 6):

- On average about 66% of respondent time is spent on research (range 15-100%, standard deviation 22% for U.S. academics).
- 65% of U.S. academic participants received funding from NSF, 56% from NOAA, 38% from USACE, 35% from state agencies, 23% from ONR, 17% from USCRP, 15% from USGS, 11% from NASA, 8% from EPA, and 4% from either FEMA, BOEM, NIST, or other agencies (Figure 5).
- Average annual budgets for individual U.S. academic grants are \$225k (standard deviation \$220k), with average total yearly funding per respondent of \$321k (standard deviation \$255k). Grant sizes and ranges are similar for all respondents.
- 43% of U.S. academic participants feel that funding has remained constant, while 31% reporting a decrease and 26% indicating an increase. Total numbers were similar (Figure 6).

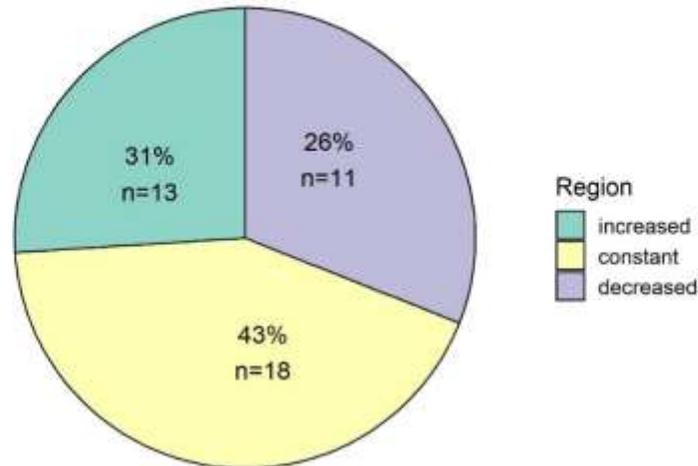


Research Funding Sources



Sources of funding for U.S. academics. Note that "other" includes NASA, which accounts for 11% of the funding

Perceptions of Funding Consistency



U.S. academic perceptions of funding changes

Below are comments/caveats related to the analysis of the survey data collected.

- As not every participant responded to all of the questions, percentages for each question were calculated using the number of respondents per question, not the total number of survey respondents.
- Regarding the higher percentages of Masters and PhD degrees than undergraduate degrees, some respondents indicated their institution grants graduate degrees but did not respond about undergraduate degrees. While those universities may have undergraduate degrees, they may not be in coastal engineering or coastal sciences.
- Based on the qualitative comments received, some respondents did not include teaching-assistantship positions in the 'university fellowship' category so the total number of teaching assistantships may not be reflected.



- One entry was removed because it indicated 1000 undergraduate advisees graduated in the last 5 years. Moreover, many other questions from that respondent were not answered and there was no institutional affiliation to confirm it was a US academic. Consequently, the entire entry was removed from analysis.
- A 'no' response related to each funding agency could mean they skipped the question or they do not receive funding from that agency.

Contribution from USCRP Academic Team

USCRP at ASBPA and CERF

Four USCRP-funded researchers (3 graduate students and 1 early-career academic researcher) presented their coastal storms research in the USCRP-dedicated session, moderated by American Shore & Beach Preservation Association (ASBPA) Science Director and USCRP co-Executive Director Nicole Elko, at the ASBPA National Coastal Conference in Myrtle Beach, SC.



L-R: Dr. Nicole Elko (ASBPA, USCRP co-Executive Director), Mr. Alireza Ghargozlou (NCSU), Ms. Rachel Housego (WHOI), Dr. Tori Tomiczek (US Naval Academy), and Mr. Sam Boyd (FIT)

Mr. Derek Brockbank, ASBPA Executive Director, presented a lightning talk on how the USCRP addresses coastal research challenges through Federal, stakeholder, and academic partnerships, at the 25th Biennial Coastal and Estuarine Research Federation (CERF) conference in Mobile, AL.

Announcements & Upcoming Events

Do you know of a pressing coastal management need that would benefit from further research? Take our [survey](#) to help inform future research topics.

2019 American Geophysical Union (AGU) Fall Meeting, December 9-13, 2019
 San Francisco, California
<https://www.agu.org/fall-meeting>

Ocean Sciences Meeting (OSM) 2020, February 16-21, 2020
 San Diego, California
<https://www.agu.org/ocean-sciences-meeting>



2020 ASBPA Coastal Summit, March 24-26, 2020

Washington, DC

<http://asbpa.org/conferences/>

37th International Conference on Coastal Engineering (ICCE) 2020, September 13-18, 2020

Sydney, Australia

<http://icce2020.com/>

Restore America's Estuaries | Coastal States Organization 2020 Summit, October 4-8, 2020

Providence, RI

<https://estuaries.org/summit/>

2020 ASBPA National Coastal Conference, October 13-16, 2020

Long Beach, California

<http://asbpa.org/conferences/future-meetings/>

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