

ED51D-2555: Creating Multiple Pathways for Entry into the Ocean Science and Engineering Workforce via Research Opportunities for Community College Students at WHOI

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What is the challenge?

- Community college students are an untapped pool of intellectual talent, representing a diverse and inclusive population
- CC students are often underserved or disadvantaged with family or employment responsibilities, creating unique barriers to academic success
- Need to create experiences to increase and sustain the inclusion of CC students in the ocean science and engineering community

What opportunities have we created?

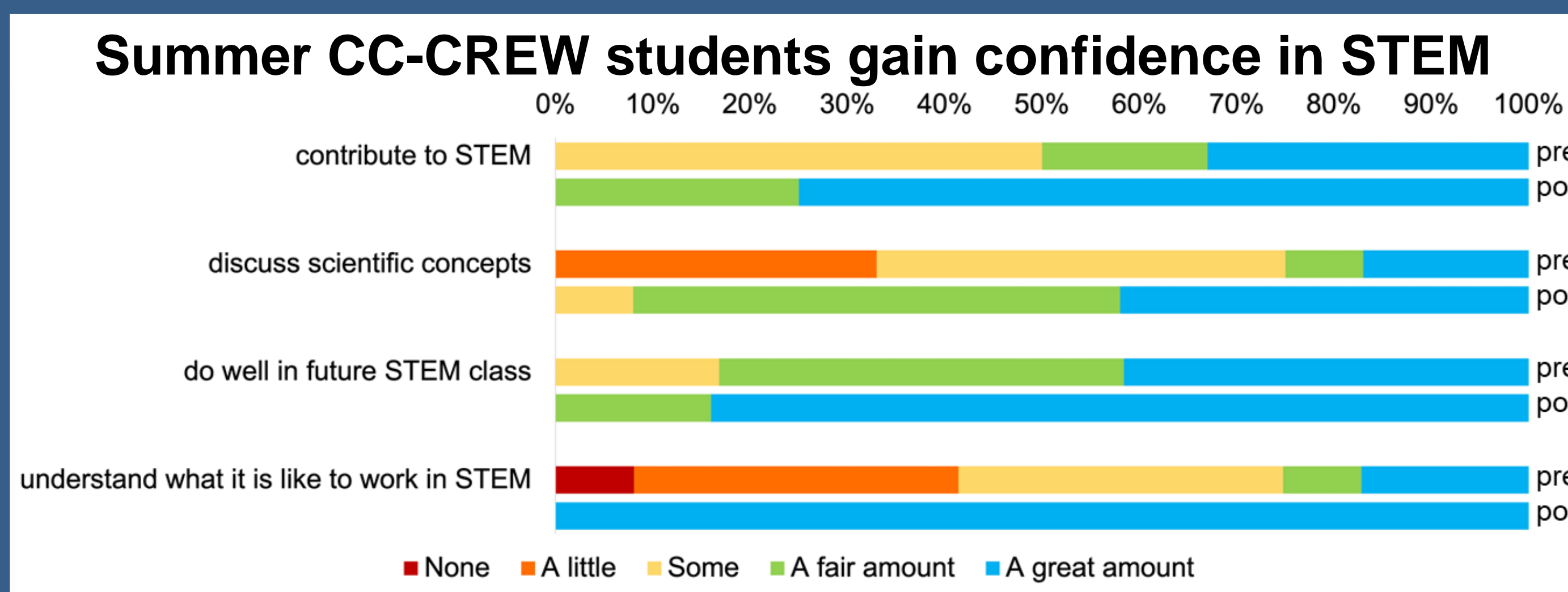
- Two different paid, non-residential research experiences
 - For “early entry” students: A spring semester program (BE, 70 hrs) that includes a Blue Economy-themed short course (20 hrs) and a semester-long research experience (50 hrs)
 - For “more advanced” students: A summer program (CC-CREW, 360 hrs) that includes 9 weeks of research experience and an ocean-related environmental studies and methodology based on mentors’ research (24 hrs)
- Each program includes 6-8 students with mentoring and support to increase students STEM identity and desire to pursue STEM higher education and career pathways

How do we promote, recruit, select, and mentor students?

- Promote programs:** Campus flyers, faculty contacts, classroom visits, STEM club panels and presentations
- Online application:** Courses taken, short answer questions, unofficial transcript, and 1 letter of recommendation
- Selection:** Include 6-10 students selected by coursework, preparedness, interview (CC-CREW), and match with host lab
- Cohort activities:**
 - Blue Economy includes field trips, project presentations, tours, and other WHOI events
 - CC-CREW includes attending seminars, being part of a journal club, meeting with program alumni, networking with scientist (“my path to science”), talking about college choices and transfers, and in some cases, doing campus visits together



CC-CREW end of summer poster presentations

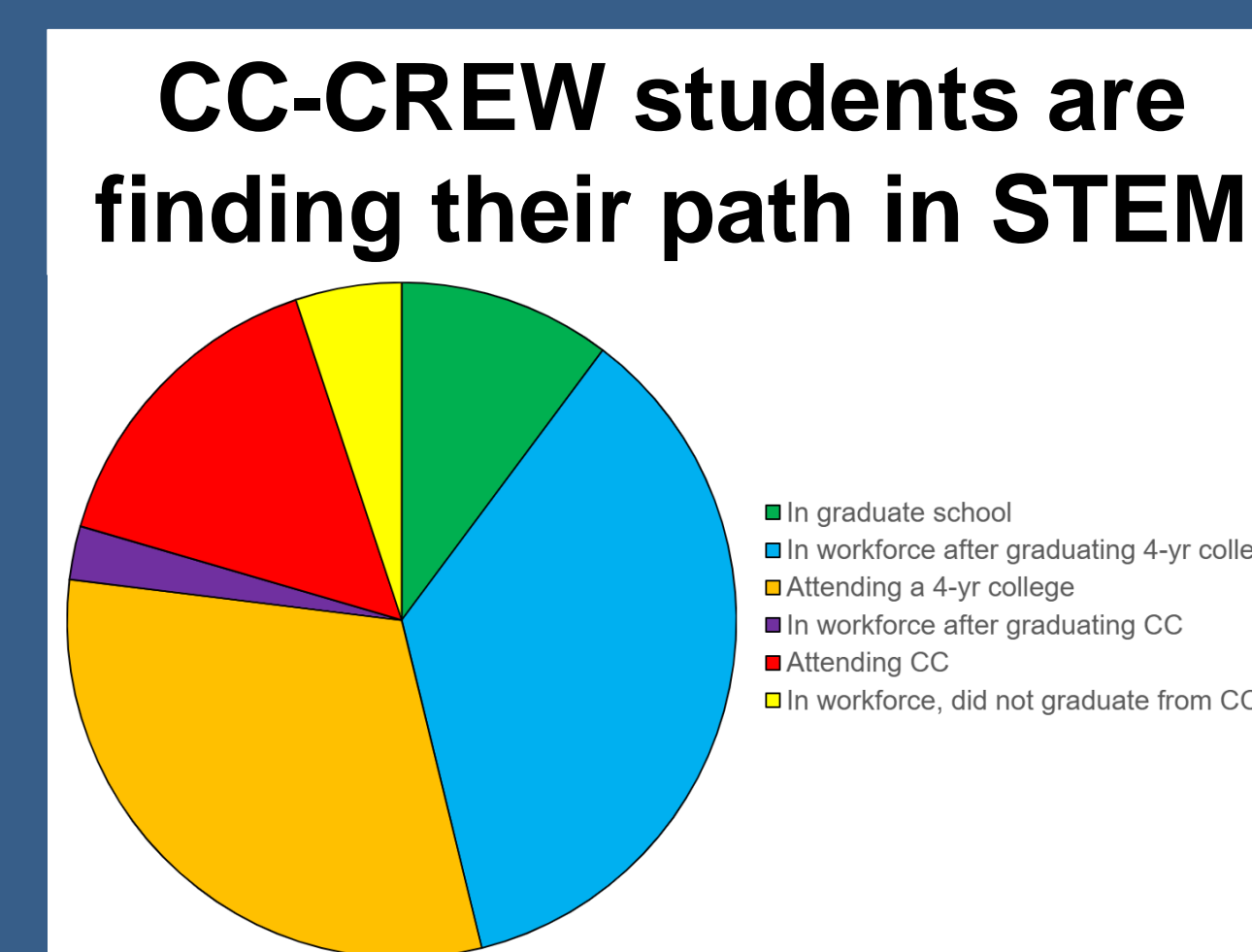


BE course-based lab activity focused on harmful algae blooms

“The best part of the summer program was being around so many people who love science, technology, engineering, math and the ocean + planet as a whole. Being in an atmosphere such as this, doing research, and feeling like a part of a community, is an extreme joy.”



CC-CREW field trip to Provincetown



CC-CREW touring the R/V Atlantis



BE field work in Cape Cod Bay

Creative, non-residential research opportunities provide multiple pathways for community college students to build STEM identities, gain confidence, and pursue their 4-yr college STEM degree and careers!



BE course-based lab activity focused on wind farms

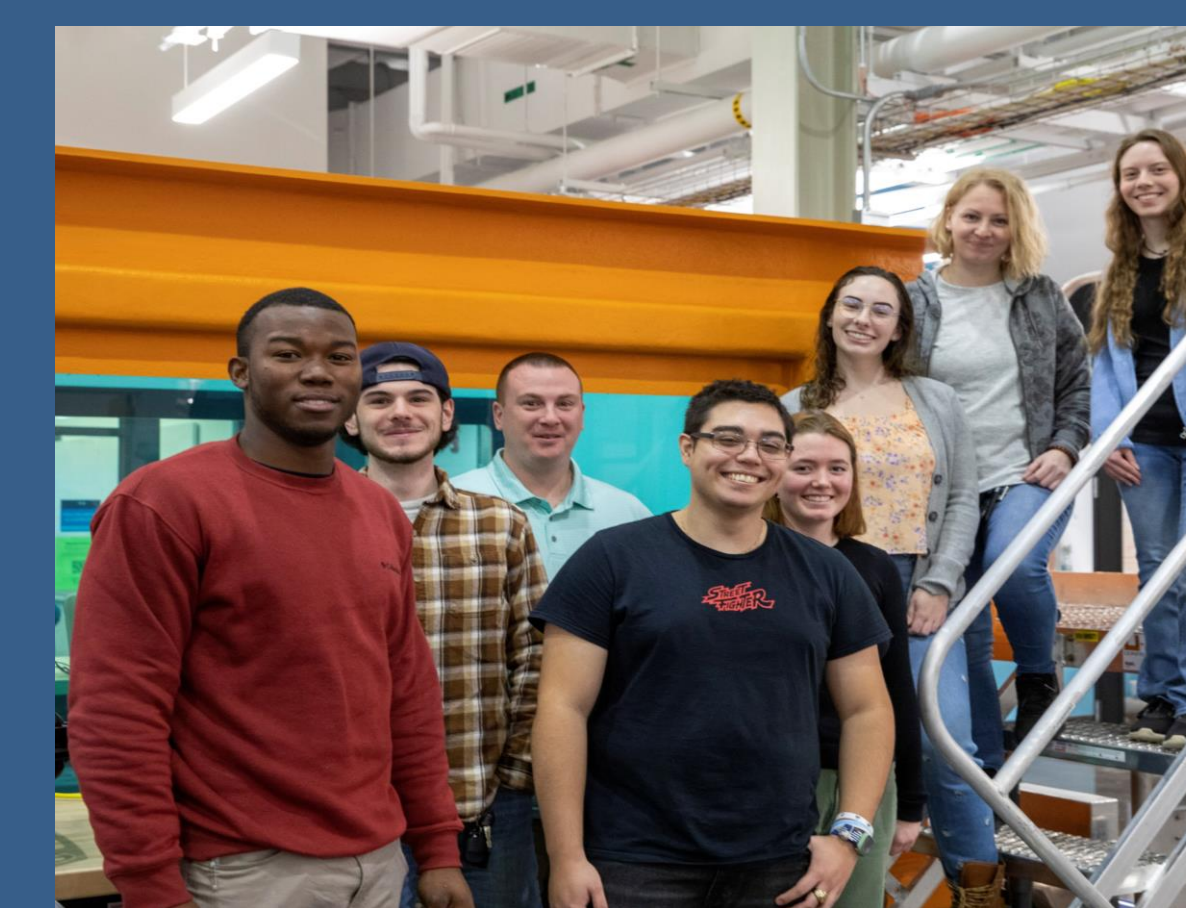


BE touring the R/V Armstrong



BE course-based lab activity focused on submersible vehicles

“I got to understand how a science research group and how a science institution works. I got to meet people from the most diverse areas of study and all that just made me feel confident and ready to go back to school and finish my bachelors degree.”



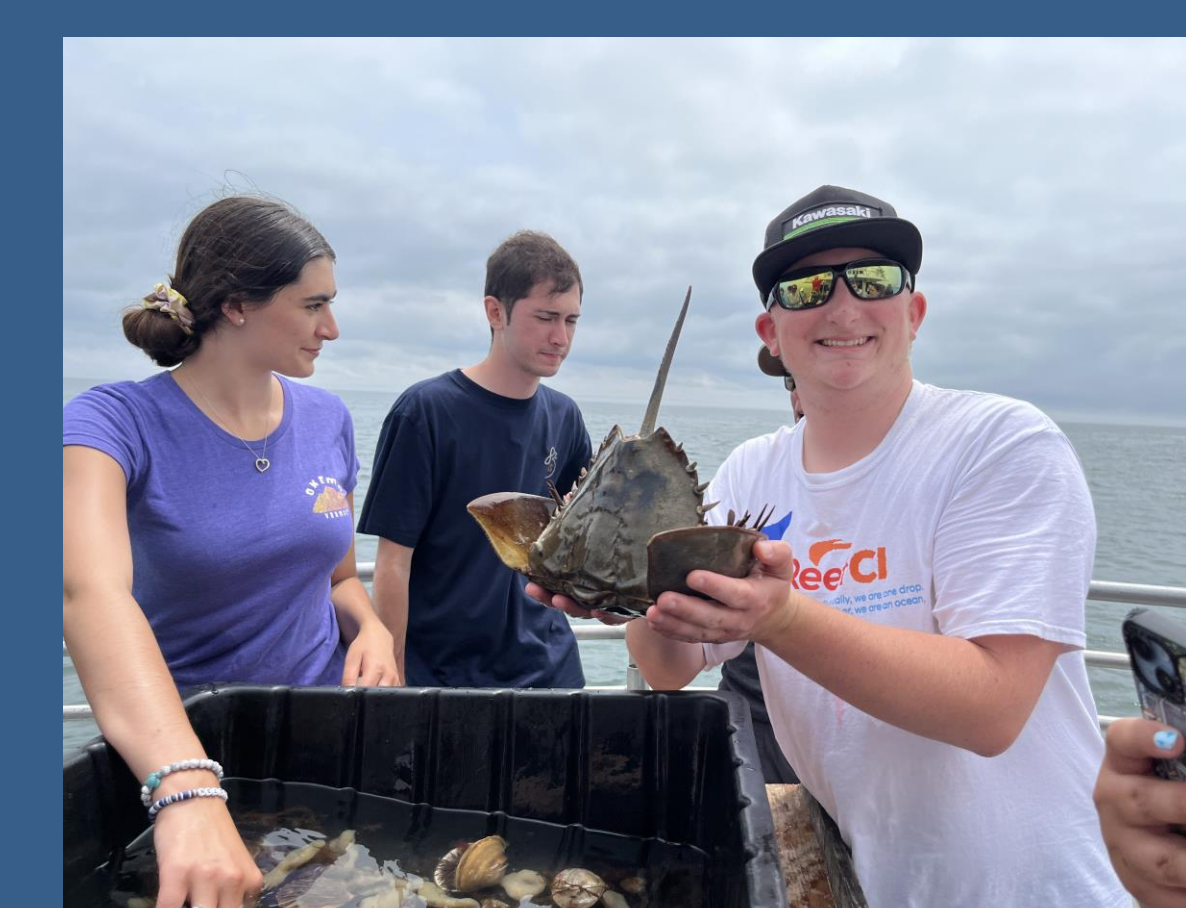
BE at a test tank in AVAST



CC-CREW touring HOV Alvin



BE final project presentations



CC-CREW Vineyard Sound field trip

“I have discovered interests I didn't know I had, including oceanography. This experience has opened up my mind to all the possibilities that STEM holds for me and I could not be more eager.”

Are students succeeding in our programs?

- 100% retention rate across all of our programs
- Pre- and post-experience evaluations show that students gain confidence in many aspects of STEM
- Being an integral part of an inclusive and supportive lab while participating in research has the highest impact in building the students’ STEM identity and a desire to transfer to a 4-year college and pursue a career in STEM
- 92% of summer participants (out of 39) are in/have completed/or are continuing a path to a 4-year college. All that enrolled at a 4-year college have graduated with a STEM degree, and a few are even in graduate school
- After getting a 4-year degree, many participants join the workforce in STEM fields, including biotech and jobs in Woods Hole
- Many of BE students continue to be guest students at WHOI while pursuing their degrees; 6 students also completed both the BE and then CC-CREW programs

How do we support mentors?

- A mentor meeting is held ahead of each session to provide overview of schedule and expectations
- Mentors recommended development of a “Research and Communication Plan” which was implemented for CC-CREW
- Mentors are supported via overall coordinator who provides back-up, scheduling support, more mentoring, etc.

What are some important best practices we have learned?

- Connect with faculty at home institutions to increase recruitment
- Long commuting challenges for some are addressed by offering limited housing, gas stipend, and flexible work plans
- Remain flexible to changing demographics and economy (e.g. application process, crash course, COVID, etc.)
- Create a welcoming environment and respect for outside commitments such as family and other work obligations
- Multiple program options means we can engage a more diverse student body; one program can be a stepping stone to the other
- Staying connected with the alumni and encouraging near peer-mentoring creates a community benefitting all participants

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