Online Conversations for Equity, Action, and Networking: A Pilot Project Highlighting Diversity in the Ocean Sciences

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Abstract

The onset of the COVID-19 pandemic and the Black Lives Matter movement urged institutions to redress shortcomings in their diversity, equity, and inclusion goals and initiatives. The School for the Environment (SFE) at the University of Massachusetts Boston (UMass Boston), a public research minority serving university in the United States of America, responded to this call through launching the Online Conversations for Equity, Action, and Networking (OCEAN) program. This pilot project funded by Woods Hole Sea Grant aimed to amplify the voices of Black, Indigenous, and People of Color (BIPOC) in the marine sciences. A collective of SFE undergraduate and graduate students hosted virtual department seminars, undergraduate meet and greets, and podcast interviews for invited BIPOC speakers. Pre- and post-surveys were developed to evaluate the efficacy and reach of the OCEAN programming and the results indicate that the program had an overall positive effect on the UMass Boston community. Ultimately, the OCEAN program provides an example for launching and evaluating virtual BIPOC science engagement and outreach initiatives.

Introduction

Racism and discrimination permeate the recruitment, retention, and funding of historically underrepresented groups in the marine and environmental geosciences, one of the least diverse science, technology, engineering, and mathematics (STEM) fields in the United States. With no measurable increase in earth and ocean doctorates awarded to Black, Indigenous, and People of Color (BIPOC) (Bernard and Cooperdock 2018) and consistently lower National Science Foundation funding for most non-White principal investigators, academic and research organizations are reckoning with their role in perpetuating systemic barriers and compounding harm for individuals belonging to intersecting underrepresented groups (Steinpreis et al. 1999; Ginther et al. 2011; Maltese and Tai 2011; Chang et al. 2014; Taylor 2014; Garza 2016; Laurison and Friedman 2016; Bingham et al. 2018). In this period of reckoning, diversity, equity, and inclusion (DEI) initiatives are revealing the responsibilities institutions need to assume in shaping an inclusive and equitable geoscience community (Ali et al. 2021; Behl et al. 2021; Acosta et al. 2022; Lewis et al. 2022).

The shift to remote learning and research with the COVID-19 pandemic exacerbated existing systemic barriers, especially for BIPOC undergraduate students. DEI initiatives focused on introducing BIPOC to geoscience careers and networks needed to rapidly adapt their recruitment, internship, mentoring, and professional development infrastructure to a new virtual landscape (Scott Price et al. 2020; Sloan et al. 2020). The burgeoning of innovative science communication, education, and outreach approaches in this period of adaptation have provided a plethora of resources for the geosciences community (El-Sabaawi et al. 2020; Scott Price et al. 2020; Ghosh et al. 2022; Moore 2022). However, there remains a need to examine how online science outreach and engagement tools and DEI principles can be aligned to meet the needs of BIPOC individuals in their respective environments and institutions (Delaine et al. 2016; Canfield et al. 2020).

The unique history and structure of the University of Massachusetts Boston (UMass

Boston), United States make it a well-suited place to understand how DEI-centered programs can utilize science communication and engagement tools for meeting students' needs. UMass Boston was founded in 1964 with an explicit mission of providing equitable access to higher education and to be an urban institution that serves the City of Boston, providing both educational resources to its inhabitants, disproportionately people of color, as well as research driven solutions to urban problems. Since being established, UMass Boston continues to promote equity in education as a core tenet and is currently recognized as the largest minority serving institution in New England and the third most diverse university in the United States. Enrolled undergraduates of color, defined by UMass Boston as including American Indian/Alaska Native, Asian, Black or African American, Hispanic of any race, Cape Verdean, Hawaiian Native, or Pacific Islander, two or more races, from the United States make up more than 50% of the undergraduate population and the percentage of persons of color has steadily increased between 2018 and 2021 (Fig. 1). The percentage of undergraduates of color is slightly lower (30–40%) within the School for the Environment (SFE), a school with dedicated geoscience tracks in marine and environmental sciences. However, the steady increase in undergraduate SFE enrollment from 2018 to 2021 demonstrates growing BIPOC interests in the geoscience pathways (Fig. 2). Moreover, with graduate student and faculty populations within SFE not reflecting change in percentage of persons of color, connecting UMass Boston undergraduate students with BIPOC networks is crucial for preparing the next generation of environmental leaders.

This paper evaluates a virtual pilot geoscience outreach program, Online Conversations for Equity, Action, and Networking (OCEAN), launched at UMass Boston in the Spring of 2021. The program highlighted the careers of four BIPOC marine scientists and professionals in the New England area through departmental seminars, podcast episodes, and undergraduate student conversations. Ultimately, this work reflects on the overall impact of this DEI programming on UMass Boston students and shares lessons learned in adapting and evaluating online science engagement and education tools.

Motivation and objectives

The School for the Environment Graduate Student Anti-Racism Task Force (SEGART), a collective of SFE graduate students seeking to foster conversations and actions that reduce racial prejudice and harm, implemented a webinar series to facilitate OCEAN. Supported by pilot funds from Woods Hole Sea Grant, OCEAN aimed to amplify the voices of four early-career, BIPOC marine scientists and professionals based in New England. The overarching objectives of OCEAN were:

1. Establish a webinar series for early-career BIPOC researchers and professionals to share their research and work with engaged undergraduate and graduate students
2. Host informal conversations between UMass Boston undergraduates and early-career BIPOC researchers and professionals regularly in safe spaces that may lead to a supportive network of marine scientists
3. Feature early-career BIPOC researchers and professionals on a podcast created by UMass Boston students to establish a resource that would be widely available in New England and beyond, and to initiate and support discussions about the role of race, diversity, equity, and inclusion in the marine sciences

Program overview

The OCEAN program selected four speakers to participate in the three webinar series components. A call for OCEAN speaker nominations was widely distributed, and community and self-nominations were invited. Selection panelists representing various UMass Boston affiliations (i.e., undergraduate, graduate, faculty, and SFE alumna) reviewed nominations. The panelists were asked to rank the nominated speakers based on how impactful participating in the pilot project would be for each nominated speaker, how impactful the speakers would be for UMass Boston undergraduates, as well as the speakers' previous experience with public engagement. Based on this evaluation, four speakers were selected and awarded a US$250 honorarium, and each speaker was supported by the OCEAN project team and a mentoring team, a group of UMass Boston faculty, New England environmental researchers, and professionals dedicated to supporting the career advancement of each speaker. The mentoring team size ranged from four to five mentors and pairings were based on OCEAN speaker career interests and research topics.

OCEAN team and partners

A 13-person team, comprised of SFE undergraduate and SEGART graduate students,

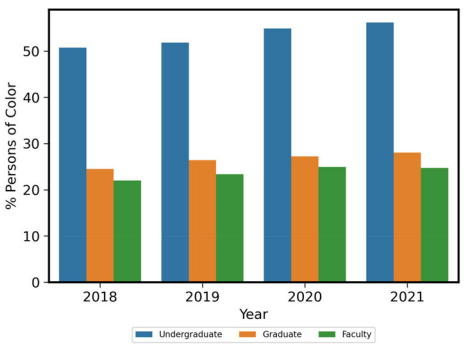

FIG. 1. University of Massachusetts Boston—Percent persons of color for undergraduate, graduate students, and faculty between 2018 and 2021. The percentage of persons of color is defined by UMass as including American Indian/Alaska Native, Asian, Black or African American, Hispanic of any race, Cape Verdean, Hawaiian Native or Pacific Islander, two or more races. This percentage only includes individuals with US citizenship (Enrollment Statistical Portrait—UMass Boston, 2021).

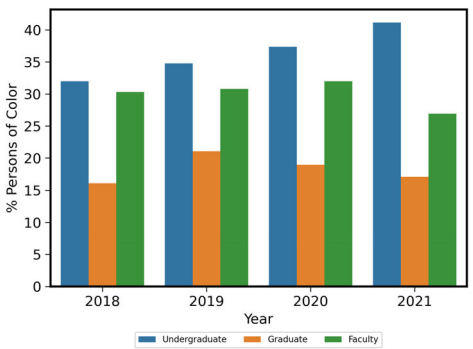

FIG. 2. School for the Environment—Percent persons of color for undergraduate, graduate students, and faculty between 2018 and 2021. The percentage of persons of color is defined by UMass as including American Indian/Alaska Native, Asian, Black or African American, Hispanic of any race, Cape Verdean, Hawaiian Native or Pacific Islander, two or more races. This percentage only includes individuals with US citizenship (Enrollment Statistical Portrait—UMass Boston, 2021).

FIG. 3. Screenshot of SEGART OCEAN planning (left). Example of OCEAN promotion flyer for Dr. Fatma Gomaa's undergraduate conversation (right).

hosted the OCEAN series (Fig. 3). The pilot grant from Woods Hole Sea Grant funded four undergraduate students to lead the podcast and student conversations, as well as one graduate student organizer to oversee event logistics, promotion, and communications with program partners. The rest of the graduate students volunteered to support event logistics and promotion, which included leading technical and survey subteams. The OCEAN team also developed partnerships with UMass Boston student groups committed to supporting historically underrepresented students. These groups include UMass Boston's Society for the Advancement of Chicanos/Hispanics and Native Americans in Science, Growing Women in Science, and the Initiative for Maximizing Student Development. In addition, partnerships were developed with SFE's directors for undergraduate and graduate student programs and UMass Boston's Office of Communications to promote the events within SFE and on the university scale, respectively. The OCEAN team and partners promoted the call for nominations, events, and OCEAN materials on a dedicated website (https://sites.google.com/view/segart/ocean-webinar-series).

Seminars

To address the objective of increasing the visibility of BIPOC marine scientists and professionals, the OCEAN seminars provided a platform for early-career BIPOC marine researchers and professionals to share their research and experiences. The OCEAN seminars were a part of SFE's weekly departmental seminar series which is open to the general public. Each of the OCEAN seminars were hosted in the Zoom webinar format. For the individual seminars, the speakers gave a 30- to 40-min talk on their work and answered questions from the audience afterwards. To prioritize undergraduate participation in the OCEAN seminar discussions, undergraduate students were encouraged to include "student" in their question submissions.

Each OCEAN speaker was supported by a mentoring team and technical team in preparing for the seminar. Support for OCEAN speakers from the mentor team included feedback on their seminar talk as well as discussions regarding networking and career advancement. Concurrently, the technical team provided Zoom and audio/visual support before and during the seminar. Each OCEAN seminar was staffed by a minimum of three technical team members. Two team members were primarily tasked with event logistics, such as speaker spotlighting during announcements and screen sharing of introduction and closing slides. An additional technical team member was responsible for facilitating chat interactions during the open question and answer periods. This role was particularly important because the Zoom webinar format allowed people to ask questions in the chat as well as through the Q&A feature. In addition to these roles, a member of the OCEAN technical team served as the point of contact for a live captioning service, Ai-Media. The technical team also met with the speakers before the seminar to practice their talk and to answer the speakers questions.

Undergraduate conversations

The OCEAN undergraduate conversations served as a space for undergraduate students at UMass Boston to connect with OCEAN speakers in an informal setting. Each of the OCEAN speakers attended a 50-min virtual conversation held via Zoom exclusively for undergraduate students, and the event was facilitated by one of the OCEAN undergraduate student team members. The undergraduate student hosts moderated discussions, starting the conversations by asking questions such as:

- Has COVID-19 affected your current research? If so how, and how have you adapted?
- What piece of advice would you want undergraduates to walk away with from your conversation/presentation?
- What was the first lab experience or experiment as an undergrad that led you to pursue your field of study in science?

The undergraduate hosts then opened the space for attendees to ask their own questions aloud or type their questions in the chat. These conversations were typically scheduled after the seminar, providing a vital space for undergraduate students to ask OCEAN speakers more details about their journey in STEM, to ask follow-up questions about the research they presented, and to share their own personal stories with speakers. Ultimately, these conversations provided a space for intergenerational networking in the marine sciences and an opportunity for students to discover new BIPOC role models.

Podcasts

In addition to highlighting the speakers' research contributions within the academic community at UMass Boston, the OCEAN team wanted to amplify their stories beyond academic platforms. To meet this objective, the OCEAN team created a podcast in which each speaker was the focus of an episode. Coordination and preparation of the podcast was led by one OCEAN graduate student team member and the undergraduate team members. Career progression and the lived experiences of each guest were the focal points of interviews, with questions drafted by each member of the podcast team. The proposed questions were shared with each OCEAN speaker prior to the actual interview to ensure topics were appropriate and relevant to each speaker's lived experiences. Each 1-h interview was led by OCEAN undergraduates asking

questions related to identity, career, experiences, and advice. The final podcast was typically 20–30 min after editing and content cutting from the team and guest speaker. A pipeline for each interview was created to receive release approval from the OCEAN speaker, which gives the speaker an opportunity to review and modify their podcast content. A collaborative pipeline between the OCEAN team and speakers ensured speakers had an opportunity to control how they were represented on the podcast.

Evaluation plan

Understanding the impact of the OCEAN program on speakers and students necessitated an evaluation plan capable of synthesizing the multiple virtual engagement activities. Thus, when developing this program the OCEAN team partnered with Northeastern University's Program Evaluation Lab (NU-PEL) to align objectives of the OCEAN program with evaluation-based methods and tools. As clients of NU-PEL's Techniques of Program Evaluations course (Public Policy and Urban Affairs, 6509), the OCEAN team met with a group of graduate students throughout the Fall of 2020 to outline and process the outcome evaluation objectives. The NU-PEL students developed a series of deliverables (i.e., stakeholder map, logic model, methods collection grids) to connect program objectives with indicator and performance measures and optimal data collection and analysis methods (Fig. 4). The structure of this logic model aided the OCEAN team in identifying the linkages between program components, available resources, and intended outcomes. The OCEAN team then used the NU-PEL materials to develop pre-activity and post-activity survey questions to evaluate the implementation of OCEAN's program structure. The surveys were distributed via Qualtrics before and after OCEAN's seminar program components. In addition, activity metrics such as Zoom participation for the seminar and undergraduate conversation were documented.

Response to program as indicated by survey responses

The OCEAN series engaged 220 individuals in the webinar series (N = 195) and undergraduate conversations (N = 25). OCEAN podcast engagement numbers are not included in the OCEAN overall attendance metrics because of delays in podcast editing and uploading. However, to kick off the podcast and the OCEAN series, the podcast team recorded a podcast about the history of Carson Beach, a site adjacent to UMass Boston known for desegregation protests in 1975. This podcast was submitted to the 2021 National Public Radio student podcast competition and to date has received 219 plays (https://soundcloud.com/user-929599699/npr-contest-ocean-1).

For survey participation, 42 surveys were completed, with 28 pre-surveys and 14 post-surveys. With the low number of surveys completed, metadata on the age, gender, racial/ethnic background, and career stage of survey participants are broadly grouped and reported to be aligned with the UMass Boston Institutional Review Board (No. 2021008). The age demographics for the pre-survey and post-survey spanned 18–58 years old with a majority of the respondents being less than 30 years old. The majority of respondents identified themselves with the pronouns she/her (50%), while the remaining respondents either identified as he/him (21%) or prefer not to say (29%). The racial and ethnic makeup was compiled of Caucasian (42%), non-Caucasian (26%), and prefer not to answer (32%). For the career status, the majority of the respondents (57%) were students and the rest of the respondents indicated faculty (3%), not in academia (11%), and prefer not to answer (29%). Most respondents identified as studying or working in STEM (61%), while the remaining individuals noted work in business/management (14%) or prefer not to answer (25%).

In assessing the pre-survey results, responses indicate that there is a need for academic institutions to amplify BIPOC scientists and foster connections between BIPOC scientists and students, while noting factors that can limit such efforts. For UMass Boston affiliated survey responses, 28% of the respondents agreed to varying degrees (i.e., somewhat agreed, agreed, strongly agreed) that UMass Boston adequately highlights BIPOC scientists and their contributions. However, 39% of respondents agreed to varying degrees that the COVID-19 pandemic affects the ability for UMass Boston to connect respondents

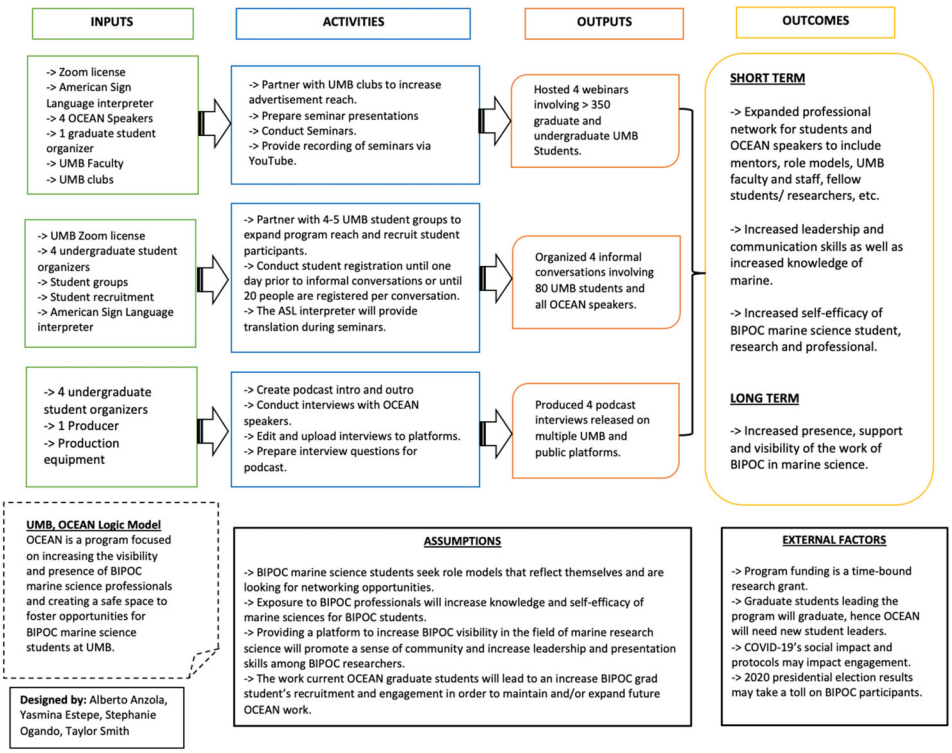

FIG. 4. Logic model designed by Northeastern University's Program Evaluation Lab (NU-PEL) students linking OCEAN inputs, activities, outputs, and outcomes. This figure was provided by graduate students (Alberto Anzola, Yasmina Estepe, Stephanie Ogando, Taylor Smith) in Northeastern University's School of Public Policy & Urban Affairs Fall 2020's Techniques of Program Evaluation course.

with BIPOC mentors, while a similar proportion neither agreed nor disagreed (40%). These results indicate that UMass Boston has room for growth in introducing students to BIPOC scientists and networks, and that it was especially important to do so during the COVID-19 pandemic.

In addition, responses indicate the importance of finding and connecting with academic role models. Thirty-nine percent of respondents strongly agreed it is important they personally identify with role models within the same field of study; while 44% indicated they agreed to varying degrees it is important that they personally identify with role models of the same race; and 56% indicated they agreed to varying degrees it is important they personally identify with role models of the same gender. When survey respondents were prompted with "Think about people that have been role models for you. Where were you first introduced or where did you first hear about them?", 57% of undergraduates indicated "School." Interestingly, all graduate students' responses identified "School" as a place they were first introduced to role models. These survey results reveal that identifying with the background of role models has some level of importance for respondents and that school is a place for finding and connecting with role models along the academic career path.

While there was a low post-survey turnout ($N = 12$), the post-survey results indicate that the OCEAN program had a positive impact on UMass Boston students. Most of the post-survey responses were completed by UMass Boston undergraduate and graduate students (83%). The respondents agreed to varying degrees that OCEAN introduced them to a new role model (53%) and that OCEAN activities changed how they viewed their skills or experiences (61%). One respondent in particular stated the seminar was impactful because "being able to listen to these educators helps me form my own ideas, and grow a better knowledge of certain ideas." Ultimately, all post-survey respondents indicated that OCEAN met their expectations.

Reflections and recommendations for future programs

An evaluation framework provides a foundation to reflect on program adaptation. For example, tracking Zoom metrics such as the number of event registrations and number of attendees helped the team assess how outreach and communications with registrants could be improved with each event. After the first webinar, the OCEAN team noticed that there was a 63% attendance rate (No. of attendees/No. of registrants × 100). Since OCEAN events were advertised 2 weeks in advance to the events, this prompted the OCEAN team to send out email reminders the day of the event. The following webinar events attendance rate increased, ranging from 69% to 80%. Zoom metrics informed additional outreach efforts such as emailing administrators from environmental departments in New England about OCEAN events, tracking institutional affiliation of Zoom attendees to observe the broader reach to the New England area, and partnering with SFE professors to increase UMass Boston student engagement. Ultimately, the evaluation framework aligned program adaptations with the overarching objectives of the program.

Synthesizing the survey responses with respect to Zoom engagement metrics also contextualized survey takeaways. With only a small fraction (~14%) of the total number of attendees completing the pre-survey and an even smaller fraction completing the post-survey (~6%), survey responses are sensitive to nonresponse bias, the impact of respondents not willing or unable to complete the survey. Given the unpredictable nature of COVID-19 on individuals, Zoom burnout in academic environments, and the nature of launching of pilot initiative, the low survey turnout is unfortunate yet understandable. OCEAN only had two surveys, but the pre-survey was distributed four times, at the start of each webinar event, and the post-survey was distributed eight times, at the end of each webinar event and in the follow-up email after each webinar event. Compounding Zoom fatigue with survey fatigue may have overwhelmed potential survey respondents and such an effect calls on program organizers to optimize survey design and distribution, especially in a virtual landscape (Manfreda et al. 2008). For instance, simple survey design modifications such as narrowing the objectives of the survey to decrease the number of survey questions and number of times a survey is distributed can increase in survey response rate. In addition, offering incentives for completing the survey have been shown to improve survey turnout (Sammut et al. 2021). The combination of virtual engagement metrics and survey responses deepens program organizers' understanding of their program's efficacy and reach.

Building university wide collaborations is essential for consistent engagement in a virtual environment. OCEAN partnered with the director of graduate programs to incorporate the OCEAN webinar events into the SFE department seminar, which resulted in a consistent graduate student audience at the OCEAN webinar events. In addition, one of the SFE freshmen seminar classes participated in the OCEAN webinar and undergraduate conversation events when the OCEAN events overlapped with their course time block. Fostering connections with SFE professors proved to be important in maintaining an undergraduate and graduate student audience at OCEAN events. However, the low survey response rate indicates that future iterations of the program would benefit from collaborating with more professors earlier in the OCEAN planning process.

Collaborating with professors would also have helped identify optimal time windows for hosting OCEAN-like events and may improve community building across courses. Many of the OCEAN events were scheduled later in the day to avoid conflicting with morning classes, but after a heavy day of classes, students would be prone to Zoom fatigue (Wiederhold 2020; Nesher Shoshan and Wehrt 2022), which only worsened as the semester progressed. Integrating OCEAN components into existing course schedules would prevent students from attending additional, non-credit bearing Zoom activities. Working with professors may also help with community and networking building in marine sciences. Not only was building a supportive network an overarching objective of the OCEAN program, but it was also important to respondents of the OCEAN pre-survey. A majority of respondents agreed to varying degrees that the support of their peers affected their career paths (87%). Thus, by working with a cohort of professors, programs like OCEAN can reduce Zoom fatigue while enhancing their programs with peer networking and community building opportunities.

Finally, the OCEAN team was comprised of a community of undergraduate and graduate students on different degree timelines, and passing along programmatic and logistical knowledge for future iterations was a reoccurring topic of conversation. The OCEAN team envisioned providing planning documentation, survey results, and Zoom activity metrics to assist future OCEAN hosts. For each speaker, planning documents were created, which included information on the seminar run-of-show, technical set-up, and advertising plan. However, given the amount of time and resources that went into launching the program, substantial investment of logistical and financial support by the hosting department is essential for ensuring the long-term success of programs like this. To continue with a student run initiative, one idea could involve incorporating OCEAN or similar DEI programming as a one-credit course where organizers would receive credits toward their degree for hosting and planning the program. Flexible, supportive, and innovative approaches at the department and institutional level will be crucial to the success of programs like OCEAN.

Conclusion

Overall, the OCEAN program shares its virtual science engagement and outreach findings as a measure of transparency to the broader marine and environmental geoscience community. While the survey results indicate OCEAN had a positive impact on the UMass Boston community, lessons learned reveal that there is much room for improvement in future iterations of this program. In particular, future programs utilizing virtual science communication and engagement would benefit from narrowing programmatic and survey objectives and fostering cross-university collaborations early in program planning. As the support of geoscience outreach programs continues to deepen, OCEAN provides an example of a virtual space where BIPOC speakers and students shared their experiences and stories to build a supportive geosciences network.

Author Contribution

All authors contributed to the writing of the manuscript and the development and implementation of the OCEAN program.

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