出國報告（出國類別：開會）

參加２０２４年美國海洋教育者年會（National Marine Educators Association, NMEA 2024 Conference）出國報告

服務機關：海洋委員會、國家海洋研究院

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派赴國家/地區：美國波士頓

出國期間：2024年7月26日-8月3日

報告日期：2024年9月11日

摘要

海洋教育者年會是全球海洋教育界的盛事，尤以美國國家海洋教育者協會（National Marine Educators Association）最具規模。本會 2024 年參加美國國家海洋教育者年會，於同年 7 月 28 日至 7 月 31 日（當地時間）在美國麻薩諸塞州波士頓大學(Boston, Massachusetts, USA)舉辦。今年主題為:極佳的海洋教育(Wicked Good Marine Education)。

在四天的議程中，計有超過 400 多人的參與、3 場主題演講及 227 名來自各國的海洋科學家與教育者分享包括海洋教育、海洋素養、氣候變遷、全球暖化、海平面上升、永續發展、青年參與、海洋酸化、海洋保育、海洋廢棄物、海洋科學研究、結合文化及藝術與海洋科學、深海探索、海洋與船舶科學、水族館保育與管理、水產養殖教育、海洋科學教育、以及海上風能等 109 篇報告。

本會為提升臺灣海洋教育國際能見度、拓展國際交流，由本會林麗英副處長以「海洋委員會整合國家資源建構海洋素養典範國家(Integrate National Resources to Build an Ocean Literacy Benchmark Nation (OLBN) by OAC)」為題目，進行 50 分鐘發表及 Q&A 答詢。此外，積極參與委員會會議座談、開放式會議、各場次簡報和主題演講，與數十位國際海洋教育專家學者溝通交流，提升參與能量，並建立未來連繫、合作之基礎。本報告就後續與會評估、參與策略等提出建議，以作為本會未來推動海洋教育之參考。

目次

壹、目的

美國國家海洋教育者協會 (National Marine Educators Association, 即 NMEA) 是一個專業、有影響力的海洋教育者組織，主要由美國的教師、非正式教育工作者、大學教授、科學家等組成，每年輪由美國各地分會辦理盛大的年會活動，就海洋教育的議題與經驗進行論文發表及討論交流。參與該年會為本會出國計畫項目之一，其議程摘述如下 ：

一、 時間及地點：113 年 7 月 28 日至 7 月 31 日，於美國麻薩諸塞州波士頓大學 (Boston, Massachusetts, USA)舉辦。

二、 本屆主題為「:極佳的海洋教育(Wicked Good Marine Education)」，包括：

（一）主題演講：

1.美國伍茲霍爾海洋研究所（Woods Hole Oceanographic Institution）海洋生物科學家 Timothy Shank 博士主講「極限生命:極端海洋深度的新探索和研究」（Life in the Extreme: New Exploration and Research in Extreme Ocean Depths）。

2. 美國新英格蘭水族館保育及管理主管拉菲爾博士(Dr. Letise LaFeir) 主講「水族館在保育與管理的角色 」(The Role of Aquariums in Conservation and Stewardship)。

3. 美國新貝德福德交響樂團的教育總監 Terry Wolkowicz 主講「用音樂和觸覺與盲人和弱視者一起探索海洋科學」（Using Music and Tactile Sculptures to explore Marine Science with the Blind and Low Vision Impaired）。

（二）9 大場次演講（每場次包括 3-5 個分場;每個分場約 1~3 個簡報發表、合計 227 名來自各國的海洋科學家與教育者分享包括海洋教育、海洋素養、氣候變遷、全球暖化、海平面上升、永續發展、青年參與、海洋酸化、海洋保育、海洋廢棄物、海洋科學研究、結合文化及藝術與海洋科學、深海探索、海洋與船舶科學、水族館保育與管理、水產養殖教育、海洋科學教育、以及海上風能等 109 篇發表報告；另有海報發表場次及展覽。

每年美國海洋教育者年會都聚集數百名致力於海洋教育工作者,各國海洋教育教師、專家學者、機關代表、科學家、沿海社區海洋環境保護工作者等，於會議中就海洋教育等議題進行論文發表、演講等討論交流，美國國家海洋暨大氣總署 NOAA 多年來除了技術諮詢輔導、經費支持外，也積極實質參與本年會進行論文發表分享。參與本國際會議能有效與美國重要的海洋教育推動專家學者、科學家、NGO 進行交流討論,並且建立聯繫管道,以促進未來國際合作機會。本會積極參與本會議，並與相關國際專家學者建立溝通管道，對本會未來政策規劃統合，及推動海洋素養典範國家中長程計畫等業務，將有重大助益。

貳、過程

目前國際海洋教育者年會，包括 NMEA(美國海洋教育者協會)、EMSEA(歐洲海洋科學教育者協會)、AMEA(亞洲海洋教育者協會)，以及 IPMEN(國際太平洋海洋教育者協會)。本次 NMEA 的年會與波士頓大學合作，為期 5 天的大會運用大量的工作人力協助，現場與會者間均因多年連續參與，彼此間均相當熟絡熟悉。 以下依各日議程及實質參與場次分別說明如下：（所有議程詳見附錄一）

Conference At-a-Glance

Saturday, July 27

8:00 am - 4:00 pm	Sea Grant Educators Network Meeting	MIT Sea Grant
6:00 pm	NMEA Board Dinner	Fenway

Sunday, July 28

8:00 am - 5:00 pm	NMEA Board Meeting	Terrace Lounge
4:00 pm	Registration Opens	Stone Lobby
5:00 - 8:00 pm	Welcome Reception	Ziskind Lounge

Monday, July 29

detailed Monday information on pages 12, 13, 28, 29, 30

7:30 am - 8:30 am	Committee Meetings	See Whova
8:00 am - 5:00 pm	Registration Open	Stone Lobby
8:45 am - 9:15 am	Welcome and Announcements	Metcalf Large
9:15 - 10:15 am	Keynote: Dr. Timothy Shank	Metcalf Large
10:15 am - 5:00 pm	Exhibits Open	Ziskind Lounge
10:30 am - 11:30 am	Concurrent Session #1	Session Rooms
11:30 am - 12:30 pm	Lunch & Buddy Lunch	Metcalf Large
12:30 pm - 2:30 pm	Concurrent Sessions #2 & 3	Session Rooms
2:30 - 3:30 pm	Afternoon Break & Poster Session & Exhibits	Metcalf Large
3:30 - 4:30 pm	Concurrent Session #4	Session Rooms
5:30 pm	Depart for New England Aquarium	See Whova

Tuesday, July 30

detailed Tuesday information on pages 16, 17, 31, 32, 33, 34

7:30 - 8:30 am	Committee Meetings	See Whova
8:00 am - 5:00 pm	Registration Open	Stone Lobby
8:00 am - 5:00 pm	Exhibits Open	Ziskind Lounge
8:30 am - 5:30 pm	Student Day (see page 18)	Various
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Dr. Letise LaFeir	Metcalf Large
10:00 am - 12:00 pm	Concurrent Sessions #5 & #6	Session Rooms
12:00 - 1:00 pm	Lunch & Chapter Meetings	Metcalf Large
1:00 - 2:00 pm	Stegner Lecture: Elizabeth James-Perry	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #7 & #8	Session Rooms
4:00 - 5:30 pm	Past Presidents' Circle	See Whova
5:30 pm	Dinner and Auction	Metcalf Large

Conference At-a-Glance

Wednesday, July 31 detailed Wednesday information on pages 20, 21, 35, 36, 37

7:30 - 8:30 am	Committee Meetings	See Whova
8:00 am - 12:00 pm	Registration Open	Stone Lobby
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Terry Wolkowicz	Metcalf Large
10:00 - 12:00 pm	Concurrent Sessions #9 & #10	Session Rooms
12:00 - 2:00 pm	NMEA Awards Luncheon, Business Meeting, and Chapter Basket Auction	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #10 & #11	Session Rooms
4:15 - 5:15 pm	New Board Meeting	XXX
7:00 pm	Boston Harbor Cruise (ticketed event)	See Whova

Thursday, Aug 1 field trip information on page 22

All day/Partial day	Optional Field Trips (must pre-register)	Boston Area

一、7 月 28 日 NMEA 委員會會議、報到、歡迎晚宴

(一)2024 年年會主題為「極佳的海洋教育」(Wicked Good Marine Education)，7 月 28 日 上午 8 時至下午 5 時為 NMEA 委員會會議，我團有幸參加該委員會會議，並與 NMEA 共同主席 Robert Rocha(新貝德福德鯨魚博物館科學與研究副館長)、共同主席 Don Pinkerton(生物教育合作者)、國家協助小組委員 Jackie Lewis、Tara Hicks-Johnson、Jennifer Magnusson、本屆委員會會議主席 Lindsay Patterson (NOAA 海洋守護者學校教育計畫經理)、上一屆委員會會議主席 Laura Diederick (NOAA 通訊辦公室主任)、下一屆委員會會議主席 Tami Lunsford、美國海洋素養委員會主席 Diana L. Payne、David Christopher 教授、NMEA 國際委員會委員 Susan Haynes (NOAA 海洋探險教育專案計畫的負責人)、NMEA 委員會會議顧問 Christy Gabbard (維吉尼亞大學卡托巴永續發展中心創始主任)等諸多委員進行當面交流，並將我國積極推動海洋教育的努力及成果，成功推展到美國海洋教育者協會中，有助提升我國正面國際形象。

(二)NMEA 委員會 7 月 28 日討論主要議題包括，委員會年度財務收支狀況報告、如何擴大青年參與、如何加強在地及國際合作、如何拓展組織參與、會議主席出國差旅費支出原則、NMEA 社群平台轉換、使用伺服器資安加強維護等議題。

(三)委員會會議確認明(2025)年 6 月 29 日至 7 月 3 日於美國路易斯安那州拉斐特(NMEA 2025 in Lafayette, LA.)辦理第五十一屆年會。下午 1 點 30 分由國際委員會成員至大會委員會進行交流報告，包括來自臺灣、日本、西班牙、智利等國與會人員說明背景與各國海洋教育推動狀況，本會說明臺灣目前積極推動 OSS 概況，以及後續推動規劃。下午 4 時開始會議報到，會後進行歡迎晚宴，亦象徵為期五天的會議正式開始，晚宴中與各國與會者交流海洋素養與海洋教育發展方向。

(四)本次共計 227 名來自各國的海洋科學家與教育者分享包括海洋教育、海洋素養、氣候變遷、全球暖化、海平面上升、永續發展、青年參與、海洋酸化、海洋保育、海洋廢棄物、海洋科學研究、結合文化及藝術與海洋科學、深海探索、海洋與船舶科學、水族館保育與管理、水產養殖教育、海洋科學教育、以及海上風能等 109 篇報告，本年度報名與會人員計有 338 位。今年有來自美國、墨西哥、臺灣、南非、西班牙、日本等地的專家學者參加，其中以美國各州海洋教育工作者、海洋科學家及 NGOs 工作者居多。

二、7 月 29 日大會開幕、主題演講、各分組發表與展覽活動

(一) 7 月 29 日議程主要為大會正式開幕、主題演講、各場次分組發表與展覽活動。首先，由美國 NMEA 大會共同主席 Robert Rocha 致歡迎詞。

(二) 由美國伍茲霍爾海洋研究所（Woods Hole Oceanographic Institution）海洋生物科學家 Timothy Shank 博士(以下簡稱 T 博士)以「極限生命:極端海洋深度的新探索和研究」為題目，進行主題演講。

1、T 博士參與超過 76 項海洋科學探索活動，其專注於深海生物及物種的生態研究，其研究聞名國際。

2、T 博士精彩的演講，說明海洋底棲生物群落及其生態多樣性和演化過程，以及影響深海物種不同族群結構的生態因素。其研究包括生活在世界各地熱液噴口和冷

泉中的生物，研究過程包括幼蟲擴散、定殖及物種形成，結合分子遺傳學和生態學研究，了解各物種在深海棲息地遷移、進化及繁衍的環境條件及實際狀況。

3、T 博士同時介紹其以水下載具進行海洋生物資源調查，並說明運用側掃聲納輔助，以及 4K 高清鏡頭攝影設備進行水下攝影的研究成果。

(三)分組發表 1，由 NOAA 西海岸地區漁業教育及推廣協調員 Tressa Arbow 及華盛頓海洋資助計畫教育專家 Maile Sullivan，以「利用漁網纏住鯨魚行為，作為 NOAA 科學營主題」為題目進行發表。

1、2014 年至 2016 年，加州沿海發生大量的鯨魚遭漁網纏住事件。

2、2024 年華盛頓州西雅圖 NOAA 科學營，以大量鯨魚被漁網纏住事件作為科學營主題探討。透過一系列調查、NOAA 辦公室活動、腦力激盪討論，以及 STEM 方式，科學營參加人員最後討論出為何如此多鯨魚被漁網纏住的結論。

3、本場次發表引導參與者積極參與討論，展示討論成果，並呈現在非正式海洋科學教育中，海洋議題的經驗分享與最佳實踐。

(四)分組發表 2，由 NOAA 教育辦公室教育委員會協調員 Andrea Sassard 及 NOAA 教育辦公室副主任 Christos Michalopoulos，以「NOAA 教育社區市政廳」為題目進行發表。

1、NOAA 教育委員會協助指導教育界，成員包括來自國家氣象局、NOAA 漁業、NOAA 研究部門、國家海洋局和 NOAA 衛星等 16 個單位，該委員會負責推動 NOAA 教育戰略計畫目標工作，並定期報告推動情況。

2、NOAA 的教育組合包括來自 NOAA、國家河口研究保護區、Sea Grant 和許多合作夥伴的教育工作者，透過為各種背景的個人提供科學學習的機會，讓社會能夠接觸並理解 NOAA 所推動的相關科學，激勵學生和民眾，幫助教育工作者將 NOAA 資源融入教學中，並建立長久的合作夥伴關係。

3、NOAA 致力於透過教育計畫及合作夥伴關係推動其使命，促使個人與社區能做好應對極端氣候、氣候變遷以及其他環境威脅的準備。

(五)分組發表 3，由作家/教育家 Michelle Cusolito 及科學傳播者/作家/插畫家 Karen Young，以「乘風破浪，從海洋科學到推廣」為主題進行發表。

1、Michelle Cusolito 和 Karen Young 都是教育家、科學傳播者和獲獎作家，他們分享如何將複雜的海洋科學，轉化為吸引年輕人閱讀的科學故事讀本。

2、分享如何透過繪本、非小說類書籍或漫畫書，推廣海洋科學體驗。

3、同時鼓勵大家一起參與書籍創作，進行海洋科學教育推廣工作。

(六)展覽活動：本屆活動由以下 25 個贊助單位進行設攤展覽，所設攤位均進行教育或推廣行為，為非營利性質。

1. Massachusetts Marine Education
2. USA Blue Schools
3. National Marine Educators Association
4. Stone Living Lab
5. TALL SHIPA AMERICA
6. BOSTON SEA ROVERS
7. NOAA EDUCATION
8. WOODS HOLE OCEANOGRAPHIC
9. MIT SEA GRANT
10. NOAA OCEAN EXPLORATION
11. NATIONAL MARINE SANCTUARIES
12. OCEAN EXPLORATION COOPERATIVE INSTITUTE
13. SEA EDUCATION ASSOCIATION
14. Bow Seat Ocean Awareness Programs
15. EDUCATIONAL PASSAGES
16. GOMMEA
17. World Ocean Observatory
18. MINIONE SYSTEMS
19. ALGALIAT
20. GILLS CLUB
21. National Energy Education Development
22. SOUTHERN ASSOCIATION OF MARINE EDUCATORS
23. Ocean River Institute
24. Marine Biology Life
25. Bermuda Institute of Ocean Sciences

三、7 月 30 日主題演講、各分組發表與展覽活動

(一) 首先，由美國新英格蘭水族館保育及管理主管拉菲爾博士(Dr. Letise LaFeir)以「水族館在保育與管理的角色」為題目，進行主題演講。

1、拉菲爾博士(Dr. Letise LaFeir)擔任新英格蘭水族館的保育和管理主管，負責督導動物保護、生態保育、社區參與、安德森卡博特海洋生物中心及保育政策。拉菲爾博士是海洋政策和保育領域的傑出專家，在政府和非營利部門擁有豐富的經驗。她曾擔任拜登政府負責海洋和大氣事務的商務部副部長，及美國 NOAA 高級顧問。她也曾在加州蒙特利灣水族館擔任海洋政策經理及 NOAA 國家海洋保護區辦公室擔任重要職位，她同時是一位出版作家和經過認證的水肺潛水員，並曾探索過七大洲和海床。

2、拉菲爾博士分享成長過程中首次接觸海洋，觀看探索頻道水下冒險，以及參觀芝加哥謝德水族館時，開啟她立志要成為海洋生物學家的志願。她表示水族館是一個能持續激勵人心的地方，她認為水族館比其他保育組織更具有獨特的優勢，為各個年齡層的人們提供幫助海洋的機會，包括承諾支持保護重要的海洋棲息地和生態系統，寫信給立法委員要求加強對露脊鯨的保護等。

3、新英格蘭水族館在馬薩諸塞州昆西(Quincy, Massachusetts) 的動物健康中心，有一家海龜醫院，海龜救援及照顧康復團隊，每年照顧數百隻擱淺的海龜，每一年都會有 300 到 500 隻海龜在 11 月左右開始出現，因為它們試圖返回南部溫暖的水域，有些生病或受傷擱淺，在海龜救援團隊幾個月照顧下恢復健康，然後在隔年六月、七月、八月裝上追蹤器，並陸續釋放它們回到大海。

4、另一個案例是，新英格蘭水族館對極度瀕危的北大西洋露脊鯨進行了 40 多年的研究，每年都會進行數百小時的空中觀測，持續更新正確的鯨魚資料，包括露脊鯨被漁網纏住，或因船隻撞擊而被沖上岸，會幫忙救護及識別這些動物。因為只剩下不到 360 隻露脊鯨，且其中只有約 70 隻是有生育能力的雌性，所以為了解露脊鯨生活史及生存威脅，他們研究鯨魚的糞便，收集血液樣本，以特別保護瀕臨滅絕物種。

5、波士頓新英格蘭水族館透過海洋保護行動基金，支持全球 60 多個國家工作的海洋領導者，並發展全球網絡，為保護藍色星球創造永續影響，同時透過青少年計畫、

志願服務實習機會，打開海洋保育職業的大門，提供年輕人獲得海洋生物學、獸醫學等的 STEM 學習經驗。

(二)分組發表 1，由美國北卡羅來納大學威爾明頓分校 Troy Frensley 副教授及該校環境科學系 Hannah Bell 講師，以「針對南非青年為期二天海洋科學教育計畫，進行海洋素養調查評估」為題目進行發表。

1、這是一個南非西部沿海的海洋保護區專案，對象為七年級學生提供為期兩天的海洋實地活動，這些學生來自距離海洋約十公里的西開普敦省，其中許多人從未有過親身接觸海洋的經驗。因此，因此本計畫旨在透過實地體驗讓學生們了解海洋，並激發他們對海洋保護的熱情。

2、計畫說明:

(1)當地教練領導：這些教練並非一定是大學畢業生，但他們擁有與海洋相關的興趣或工作經驗。他們的存在使學生們能夠認識到熟悉的面孔，這有助於建立親近感和信任感。

(2)多樣化活動：學生們在實地活動中會進行多個站點活動，包括岩石、海岸探索、觀察非洲企鵝、淨灘、浮潛、海洋科學知識學習，以及瑜珈和呼吸練習等。

(3)社交和情感學習：除了海洋保護相關活動，計畫還重視社交和情感學習，幫助學生建立對海洋的情感聯結。

(4)浮潛體驗：學生們在教練的帶領下進行浮潛，探索海洋世界，讓學生們親身觀察海洋生物，增強對海洋的了解和興趣。

(5)回顧與反思：在活動結束後，學生們會參加分享會，回顧一天的學習和體驗，並進行反思。

3、本研究針對南非約 280 位學生參加為期二天海洋科學營活動，進行海洋素養前測(24 題)、後測(46 題)、及四個月後測(36 題)，以瞭解參加海洋活動對青年海洋素養提升之效益。

4、調查結果

(1)學生成就感和興趣：初步結果顯示，學生在參加活動後對海洋的興趣和知識顯著增加，且對海洋保護的重要性有更深入的理解。

(2)情感聯繫的建立：許多學生在活動中建立了對海洋的情感聯結，這有助於他們在未來更加關心和保護海洋。

(3)教練的影響力：當地教練在活動中的引導和支持，對學生產生積極的影響，使他們更加投入和積極參與。

5、經調查分析，大部分面向均於活動後有所提升。原本預期四個月後測結果分數會隨時間推移而下降，但實際上，經比較四個月後測分數與後測結果沒有統計上顯著差異，顯示該活動訓練結果經過四個月仍然可以有效提升學生海洋素養。

6、對於學生海洋素養長期態度和行為，需要調查了解更多事情，所有計畫的長期結果很難進行評估，所以他們運用程式設計模式。他們和阿根廷、厄瓜多和科隆群島浮潛相關計畫組織進行合作，這些組織採用此模式進行調查，這種調查方式很複雜，也深具挑戰性。

(三)分組發表 2，由加州海洋資助計畫、獎學金計畫協調員 Delanie Medina，以「與 NASA 一起為加州及美國的教育工作者開發海平面上升課程計畫」為題目進行發表。

1、加州海平面上升課程計畫旨在了解，並應對海平面上升對當地的影響，這個計畫涉及多個合作夥伴，包括氣候科學聯盟和美國加州科學中心，執行團隊由加州沿海復原力專家、氣候科學聯盟教育主任，以及多位科學家和教育者組成。Delanie Medina 在北加州，研究垂直地面運動對海平面上升的影響，計畫目標為了解加州對海平面上升教育的需求，並開發適合教育者和學生使用的資源，目前市場上關於海平面上升的教學資源較少，而且不易理解。

2、研究團隊致力於整合相關機構的數據，並將其轉化為易於理解和教學的內容。其策略包括：

(1)多語言支持：在聖地牙哥，約 25%的人口講西班牙語，因此其資源將提供多語言版本支持。

(2)在地連結性：確保課程內容與加州當地的情況密切相關，並結合實地考察和故事講述的方法。

(3)便捷資源：開發便於攜帶的「旅行教具」教育包，讓教師能輕鬆使用並帶入課堂。

(4)重點社區參與：強調與在地社區的合作，確保教育內容反映在地的需求和觀點。

3、研究團隊希望這些教育資源能幫助教育者輕鬆的講授海平面上升的知識，並激發學生的學習興趣和行動。學生們經常問「我們能做什麼？」這表明他們對這個話題充滿好奇心和關注。研究團隊希望透過這個計畫，提供學生所需的知識和工具，讓學生能夠積極應對氣候變遷、海平面上升的挑戰。

(四)分組發表 3，由法爾茅斯高中科學老師 Cherly Milliken，以「法爾茅斯的海平面上升與風暴潮」為題目進行發表。

1、在氣候變遷的時代背景下，暴風和洪水的頻率及強度都在增加中，對沿海地區構成嚴重威脅，在西方國家，這些氣候變遷的影響更加明顯。Cherly Milliken 以所在的社區為例，2023 年秋天，再度面臨洪水的威脅，學生們開始意識到海平面是會不斷變動的，這讓學生們了解到氣候變遷的真實性和緊迫性。

2、Cherly Milliken 參與了一個與施工管理公司 VCC 合作的計畫，旨在利用科學知識應對氣候挑戰，他們利用現有的科學知識補充資訊，以因應未來的風暴和洪水。

3、這個計畫的主要目標是教育學生和社區居民，使學生了解洪水和海平面上升的風險。講者希望透過這些教育計畫，提高公眾對氣候變遷的認識，並促使他們採取行動。為此，計畫在鎮上設置標誌，標示出不同年份洪水可能達到的水位，並在重要地點安裝教育展示牌。

4、實施過程中，也遇到了一些挑戰，包括需要得到鎮上管理部門的許可，才可以在公共場所安裝這些標誌和展示牌。另部分社區成員對氣候變遷的現實性持懷疑態度，這也增加團隊工作的難度。

5、儘管面臨諸多挑戰，講者仍堅信教育和科學是應對氣候變遷的關鍵，希望藉由這些努力，提高公眾的風險意識，促使他們採取積極行動，以減少氣候變遷帶來的影響。講者表示，自身社區正經歷變化，需要共同努力應對挑戰，透過科學知識和教育，有信心能夠保護自身的家園，並為後代創造更安全的環境。

(五)分組發表 4，由 EarthEcho International 專案副總監 Kasey Gaylord-Opalewski 及 EarthEcho International 青年參與總監 Sean Russell，以「機會的海洋：讓學生參與藍色經濟」為題目進行發表。

1、EarthEcho International 是一個非營利性組織，他們與世界各地的年輕人合作，提供知識並開發工具，推動有意義的環境行動，以保護和恢復海洋星球。其服務涵蓋 146 個國家超過 200 萬人，並支持下一代成為改變未來的領導者。

2、EarthEcho International 目前推動一系列多元的計畫，包含藍色經濟推廣，藍色經濟不僅是一個主題，更是推動多項活動的核心，最近推出新的課程，旨在透過教育提升大家對海洋保護的意識。

3、EarthEcho International 也發布了藍色經濟促進永續發展，這個課程讓教師們能夠親身體驗和教學，進一步推動海洋永續解決方案，該機構同時也針對年輕人推動水質保護活動。

4、EarthEcho International 串聯全世界超過 90 幾個國家 1200 多位年輕人，希望共同努力，以達成 2030 年保護 30%海洋的目標。

(六)分組發表 5，由本會林麗英副處長以「海洋委員會整合國家資源建構海洋素養典範國家(Integrate National Resources to Build an Ocean Literacy Benchmark Nation (OLBN) by OAC)」為題目，進行 50 分鐘發表及 Q&A 答詢。

1、發表內容包括，(1)海洋委員會簡介。(2)本會及國海院推動 OSS 教材教學辦理情形介紹。(3)本會「建構海洋素養典範國家與海洋產業人才升級計畫」介紹。

2、本會參與 NMEA 年會，最主要的任務就是透過單一完整場次的簡報發表，介紹及推廣我國投入海洋教育所作的各項努力，以讓各國更了解，並提升我國國際能見度。

3、與會人員均對本會發表議題內容展現高度興趣，對於本會在推動海洋教育及提升海洋素養所做的努力表示高度肯定，Q&A 討論時間討論熱烈。

四、7 月 31 日主題演講及各分組發表

(一)由美國新貝德福德交響樂團的教育總監 Terry Wolkowicz 以「用音樂和觸覺與盲人和弱視者一起探索海洋科學」為題目，進行主題演講。

1、20 多年來，Terry Wolkowicz 一直致力於設計創新的綜合藝術教育課程，在過去 13 年，她擔任新貝德福德交響樂團的教育總監，在麻塞諸塞州和羅德島州的 50 多所學校設計並開展音樂教育專案。2021 年，她與作曲家 David MacKenzie 共同創辦非營利組織「聲音探索」（Sound Explorations），並為美國 NOAA、美國 NASA、沃爾特·蒙克海洋基金會、伍茲霍爾海洋研究所（WHOI）、波士頓科學博物館和斯泰爾瓦根暗礁國家海洋保護區完成了許多專案。

2、Terry Wolkowicz 特別致力於為盲人與弱視者提供獨特的藝術，促進平等參與，並推動海洋教育與保育宣導。其相信科學不應該僅限於書本和圖片，而應該能被所有人感知和理解，她開發多種創新產品，包括音樂、範例圖表和互動式雕塑等，她

希望這些方法能幫助更多人，尤其是讓盲人和弱視者，感受到科學的魅力和海洋保護的重要性。

3、在執行「鯨魚運動」計畫中，創建了多元模式學習體驗，結合聲音和觸覺，讓弱視者能夠更理解海洋生態系統。利用聲音和音樂模擬鯨魚的行為，並創造三維觸覺雕塑，讓盲人和弱視者能夠“看到”鯨魚在水中的運動。

4、所使用的雕塑不僅是藝術品，更是教育工具。例如座頭鯨覓食行為的雕塑，讓參與者可以透過觸摸雕塑，感受鯨魚在水中上下移動的軌跡，這些觸覺信號結合音樂，能幫助參與者更好理解鯨魚行為；另外藍鯨進食行為的雕塑，展示鯨魚如何在水中進行覓食活動，這些雕塑不僅能幫助盲人和弱視者理解海洋生物的行為，也能讓他們感受到海洋生態系的複雜和美妙之處。

5、Terry Wolkowicz 相信，透過這種多感官的學習方式，不僅能夠增進人們對科學的理解，還能激發對海洋保護的熱情，音樂和藝術是人們的橋樑，打破障礙，可以讓更多人參與加入海洋保護的行動中。

(二)分組發表 1、2，「海洋資助計畫(Sea Grant)在海洋廢棄物處理所扮演的角色」。

1、由NOAA國家海洋資助計畫(Sea Grant)辦公室海洋廢棄物專家Madison Willert，以「海洋廢棄物投資」為題進行發表。

(1)由 203 件申請提案中，經過二輪審查，選出 50 件提案補助執行。

(2)50 件補助提案分成二類，第一類 21 件為挑戰提案：發展新的技術防治及移除海洋廢棄物。第二類 29 件為社區行動聯盟提案：在海洋廢棄物緩解的周邊區域建立社區行動聯盟。

(3)海洋廢棄物海洋資助計畫提案申請主題包括，塑膠減量 12%、海洋教育 38%、微塑膠 20%、碎片攔截 8%、海洋廢棄物循環再利用 10%，海洋廢棄物移除 8%及大型廢棄物移除 4%。

2、由紐澤西州海洋資助計畫(New Jersey Sea Grant)聯盟教育總監 Diana Burich，以「透過解決方案實驗室讓青少年參與社區科學行動」為題進行發表。

(1)合作單位:NOAA、紐澤西州海洋資助聯盟。

(2)主要辦理項目：水質監測、塑膠污染分析、GIS 基礎知識學習、微塑膠及周遭環境了解、水中的塑膠物、以故事敘述型塑社區意識，及暑期線上工作坊等。

3、由馬里蘭州海洋資助計畫(Maryland Sea Grant)生態學家 Maurice Crawford，以「教導年輕人有關塑膠污染」為題進行發表。

(1)合作單位: 馬里蘭州海洋資助計畫 (Maryland Sea Grant)，馬里蘭大學東岸分校、漢普頓大學。

(2)合作夥伴：摩根州立大學數學與科學卓越中心、生活課堂基金會、City of Annapolis Recreation and parks、EcoLations。

(3)主要辦理項目：提升海洋污染意識、提高社區對海洋廢棄物素養、參訪活動、參觀實驗室活動等。

4、由路易斯安那州海洋資助計畫 (Louisiana Sea Grant)合作專家 Vanessa van Heerden，以「人們的海洋科學」為題進行發表。

(1)主要辦理項目：海洋廢棄物防治、收集廢棄物細部資料、海洋廢棄物評估、移除及防治計畫、由 11 所學校、44 位老師及 1,050 位學生一起清除 3247 件垃圾。

5、由緬因州海洋資助計畫 (Maine Sea Grant)環境素養和勞動力發展專案經理 Keri Kaczor，以「減少緬因灣廢棄漁具：教育漁民並賦權，讓他們成為解決方案的一部分」為題進行發表。

(1)合作單位: NOAA、緬因州海洋資助計畫(Maine Sea Grant)，緬因大學。

(2)合作夥伴：Maine coast Fishermen's Association, Maine Island Trail Association, Maine Coastal Program, Maine Marine Trades Association, Maine lobstermen's association。

(3)主要辦理項目：提升民眾意識、漁民教育、減少幽靈漁具、清除海洋廢棄物、環境素養和勞動力發展等。

6、由俄勒岡州海洋資助計畫(Oregon Sea Grant)海洋教育特別專案協調員 Cait Goodwin，以「以解決方案為重點的預防策略」為題進行發表。

(1)合作單位: NOAA、俄勒岡州海洋資助計畫(Oregon Sea Grant)哈特菲爾德海洋科學中心

(2)合作夥伴：OSU Precollege Programs & Hatfield Marine Science center, Innovation Lab, OSU Precollege Programs, Tillamook Estuaries Partnership, Friends of Netarts Bay, South Slough National Estuarine Research Reserve, Oregon Museum of Science and Industry。

(3)主要辦理項目：提高民眾意識、結合 12 年級學生和老師、高中生、大學生和產業人員，確認在地海洋廢棄物問題;和社區專家合作尋求政策解方;減少商業廢棄物。

7、由麻省理工學院海洋資助計畫(MIT Sea Grant)地理空間應用程式開發人員 Ben Bray，以「馬薩諸塞州海洋垃圾從源頭到流向」為題進行發表。

(1)合作單位: NOAA、麻省理工學院海洋資助計畫 (MIT Sea Grant)。

(2)合作夥伴：Stonehill College, Cohasset Center for Student Coastal Research (CSCR), Gulf of Marine Lobster Foundation。

(3)主要辦理項目:學習 GIS、和大學合作讓 12 年級學生進行分析研究、收集廢棄物、分析廢棄物數據。

8、歸納上述各件 Sea Grant 提案執行計畫，發現共同特點為:

(1)經費均來自 NOAA。

(2)計畫執行大多與各州大學合作，以獲得專業指導。

(3)計畫強調在地社區居民共同參與。

(4)計畫執行合作夥伴多為在地數個協會、民間團體。

(5)通常會邀請在地學校(小學、中學或高中、大學)學生、老師一起推動執行。

(6)提升在地社區居民意識，為首要目標。

(7)以科學技術、科學研究分析解決社區所遭遇問題。

(三)分組發表 3，由伍茲霍爾海洋研究所(WHOI)研究員，以「社區學院學生的海洋科學研究機會」為題目進行發表。

1、伍茲霍爾海洋研究所（WHOI）為社區大學學生提供的海洋科學研究機會，旨在吸引來自多元背景、積極進取的學生，目的希望以計畫方式幫助學生認識自己。WHOI 規劃支持這些學生從兩年制大學過渡到四年制大學，幫助學生獲得學位，並指導學生職業生涯。

2、一個夏季長達九週的計畫，讓學生有機會接觸藍色經濟相關講座和活動，並與各領域的專家和研究人員互動，這些計畫旨在讓學生了解海洋科學領域的就業機會。

3、WHOI 今年有七名學生和七個研究實驗室參與，且規劃專題演講和實地考察活動，活動開始前，WHOI 會為教練舉辦一場說明會，讓他們了解即將發生的事。WHOI 的計畫非常有競爭力，每年都能吸引許多優秀的學生參加。

五、活動照片

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>與 NMEA 大會共同主席 Robert Rocha 交流合影</td><td>與 NMEA 大會共同主席 Don Pinkerton 交流合影</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>與上一屆委員會會議主席 Laura Diederick (NOAA 通訊辦公室主任)交流合影</td><td>與本屆委員會會議主席 Lindsay Patterson (NOAA 海洋守護者學校教育計畫經理)交流合影</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>與下一屆委員會會議主席 Tami Lunsford 交流合影</td><td>與 NMEA 國際委員會委員 Susan Haynes (NOAA 海洋探險教育專案計畫的負責人)交流合影</td></tr>
</table>

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">與美國海洋素養委員會主席 Diana L. Payne(右圖中間)及 David Christopher 教授(右圖右邊)交流合影。Diana L.Payne 女士為美國海洋素養委員會主席、Sea Grant 校園專案主管及聯合國海洋科學十年工作小組委員。</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>與國家協助小組委員 Tara Hicks-Johnson(美國新罕布夏大學沿海及海洋測繪中心三級通訊資訊專家)交流合影</td><td>與國家協助小組委員 Jennifer Magnusson(海洋生物學家、平面設計師、教師)交流合影</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>與 2024NMEA 委員會委員大合照</td><td>與日本笹川平和財團海洋政策研究所主任小熊幸子博士於歡迎晚宴會場進行交流合影</td></tr>
</table>

美國 NMEA 大會開幕儀式，由共同主席 Robert Rocha 致歡迎詞

由美國伍茲霍爾海洋研究所 Timothy Shank 博士進行主題演講，並於 Timothy Shank 博士主題演講之後與其交流合影

由 NOAA 西海岸地區漁業教育及推廣協調員 Tressa Arbow 及華盛頓海洋資助計畫教育專家 Maile Sullivan 進行發表

會後與 NOAA 西海岸地區漁業教育及推廣協調員 Tressa Arbow(左圖)及華盛頓海洋資助計畫教育專家 Maile Sullivan(右圖)交流合影

與 MIT Sea Grant (Massachusetts Institute of Technology Sea Grant)人員交流 MIT 推動 Sea Grant 概況

與 Sea Education Association 人員交流美國推動戶外海洋教育(含學生海洋體驗活動、航海知識學習、操船體驗等訓練)概況

美國新英格蘭水族館保育及管理主管拉菲爾博士(Dr. Letise LaFeir)進行大會主題演講及交流合影

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">美國北卡羅來納大學威爾明頓分校 Troy Frensley 副教授及環境科學系 Hannah Bell 講師，進行「針對南非青年為期二天海洋科學教育計畫，進行海洋素養調查評估」發表及交流合影</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td colspan="2">法爾茅斯高中科學老師 Cherly Milliken，以「法爾茅斯的海平面上升與風暴潮」為題進行發表與交流合影</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>與美國、歐盟、日本、菲律賓、西班牙、智利等國參加人員合影</td><td>與歐盟 EMSEA 委員會委員 Dominika Wojcieszek 交流合影</td></tr>
</table>

	
EarthEcho International 專案副總監 Kasey Gaylord-Opalewski 及 EarthEcho International 青年參與總監 Sean Russell，以「機會的海洋：讓學生參與藍色經濟」為題目進行發表。	與 EarthEcho International 專案副總監 Kasey Gaylord-Opalewski 交流合影
	
本會林麗英副處長以「海洋委員會整合國家資源建構海洋素養典範國家為題目，進行發表及 Q&A 答詢	與部分與會人員進行合影，右圖後排左 1 為 NOAA 海洋探險教育專案計畫的負責人/美國 NMEA 國際委員會委員 Susan Haynes，前排右 1 為美國 NMEA 委員會委員/美國新罕布夏大學沿海及海洋測繪中心三級通訊資訊專家 Tara Hicks-Johnson，後排左 2 為日本笹川平和財團海洋政策研究所主任小熊幸子博士，後排右 1 及右 2 為美國 NMEA 委員會委員

參、心得與建議

海洋教育者年會是全球海洋教育界的盛事，尤以美國國家海洋教育者協會（National Marine Educators Association）最具規模。本會 2024 年參加美國國家海洋教育者年會，於同年 7 月 28 日至 7 月 31 日（當地時間）在美國麻薩諸塞州波士頓大學(Boston, Massachusetts, USA)舉辦。今年主題為:極佳的海洋教育(Wicked Good Marine Education)。

參加本次會議心得及建議如下：

一、本會為提升臺灣海洋教育國際能見度、拓展國際交流，由本會林麗英副處長以「海洋委員會整合國家資源建構海洋素養典範國家(Integrate National Resources to Build an Ocean Literacy Benchmark Nation (OLBN) by OAC)」為題目，進行 50 分鐘發表及 Q&A 答詢，獲得與會人員高度肯定，建議未來本會應持續參與本國際會議進行發表，利用機會積極與眾多與會國際海洋教育專家學者溝通交流，提升參與能量，並建立未來連繫、合作之基礎。

二、在四天的正式議程中，計有超過 400 多人的參與、3 場主題演講及每天 9 大場次平行分場演講（每場次包括 3-5 個分場;每個分場約 1~3 個簡報發表、合計 227 名來自各國的海洋科學家與教育者分享包括海洋教育、海洋素養、氣候變遷、全球暖化、海平面上升、永續發展、青年參與、海洋酸化、海洋保育、海洋廢棄物、海洋科學研究、結合文化及藝術與海洋科學、深海探索、海洋與船舶科學、水族館保育與管理、水產養殖教育、海洋科學教育、以及海上風能等 109 篇發表報告。在議程及會議場地安排上，由於美國海洋教育者協會已有五十年辦理本國際研討會經驗，故在會議議程行政安排等各方面，均井然有序，且利用 Whova 軟體 APP 隨時更新會議各項活動訊息，以確保 400 多位參與人員，能隨時查詢到最新的會議資訊，該軟體也能於會議舉辦前，讓與會人員得以事先聯繫講者或其他參與人員，以利提升整體交流效益。建議本會各業務處及所屬機關未來辦理國際研討會或國際論壇能參考 NMEA 辦理模式，研議使用更進步的會議軟體，以提升整體辦會效益。

三、在大會主題演講議程中，均於會場提供手語專業服務，以利聽障與會人員，能及時瞭解講者講述內容，建議本會各業務處及所屬機關未來辦理國際研討會或國際論壇能參考 NMEA 辦理模式，研議提供手語專業服務，以提升與會人員實質參與效益。

WICKED GOOD MARINE EDUCATION

NATIONAL MARINE EDUCATORS ASSOCIATION 2024 CONFERENCE

July 28 - August 1, 2024 | Boston, Massachusetts

Hosted by

Massachusetts Marine Educators

NOAA EDUCATION

NOAA Education connects you to resources for learning and teaching about the ocean and atmosphere.

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Welcome from your Conference Co-Chairs

Well hello NMEA! It has been 13 years since the Massachusetts Marine Educators have welcomed you to Boston for the annual conference. We're happy to have you back in Beantown, smack in the middle of a region that is as well known for its marine science education resources and ingenuity, as it is for championship teams, chowder, bad traffic, and dropping the letter R, only to put it somewhere where it shouldn't go. Even though Boston University is less than two miles from Northeastern University, where we hosted the 2011 conference, this will be a different experience for those of you who joined us then. That being said, we couldn't pass up the opportunity to bring you to the New England Aquarium again. We'll have ourselves a great evening there on the patio Monday night. We'll get you on the water Wednesday night, for a cruise around the harbor and a chance to say proper goodbyes to your friends and colleagues, whether long-term or new. In between, we'll keep you educated, engaged, and entertained.

We are really excited about our Plenary and Stegner Lecture presenters. Their varied experiences and innovative approaches to learning and educating should inspire all of you. These four individuals are shining examples of the depth and quality of marine science education in this region. The field trips are further testament to the variety of marine resources in this region.

The conference website and program list us as the co-Chairs. That doesn't tell half the story. This conference doesn't happen without the hours dedicated by MME Board members Grace Simpkins, Sierra Muñoz, Jim Cleere, Marianne Walsh, and Pat Harcourt. Plus, there's the consistent support from Jackie Lewis at the National Office and Tara Hicks Johnson, Chair of the Conference Committee, who will soon become NMEA President. In addition, we acknowledge the behind-the-scenes work by Jennifer Magnusson, Kathy Fuller, Annette Brickley, Linda McIntosh, Emily Duwan, Val Perini, Kara Mahoney-Robinson, Kara Doherty and Rob Moir.

We are very appreciative of the agencies, organizations, businesses, and universities that have stepped up to sponsor this year's conference. Their underwriting keeps the conference affordable and demonstrates their support for the work we all do. Please thank them when you see them, and visit them, and all of our exhibitors, on Monday and Tuesday in the Exhibit Hall.

Please make full use of our Whova account to participate in online icebreakers, follow the conference schedule, learn about concurrent session details, and stay in touch with each other. Most importantly, support your fellow educators by attending their concurrent sessions. The information learned, resources gained, and connections made will enhance your careers (said one of your co-Chairs who has attended 21 of these in person).

It's gonna be a wicked good week together!

Your NMEA 2024 Conference Co-Chairs,

Bob Rocha & Don Pinkerton

Thank You to Our Sponsors!

Right Whale

NOAA — National Oceanic and Atmospheric Administration — U.S. Department of Commerce

Grey Seal

B-WET — 20 Years and Growing

Vineyard Wind

hhmi | Tangled Bank Studios

NOAA

My Penguin Friend

NOAA Fisheries

Sea Grant

Woods Hole Oceanographic Institution — Our Ocean. Our Planet. Our Future.

American Lobster

Boston Harbor citycruises

Sea Grant — MIT

Global Conservation Leaders

Sea Grant — Woods Hole Oceanographic Institution

Ocean River Institute

Maine Coastal Program

School for Marine Science & Technology — UMass Dartmouth

Striped Bass

Since 2011 Bow Seat — Ocean Awareness Programs

Sea Grant — New Hampshire

Maine Maritime Academy

Sea Grant — Connecticut

The Ocean Foundation

Moon Snail

eeBLUE

Sea Grant — New York

Sea Grant — Rhode Island

National Marine Sanctuary Foundation

Sea Grant — Maine

Sea Grant — Lake Champlain

Welcome to NMEA 2024!

Welcome from your NMEA Presidents Chain

Dear NMEA Members and Conference Participants,

NMEA's President's Chain extends our warmest greetings to all of you! NMEA 2024 Conference is a time to reunite with old friends, meet new ones, and expand your professional network to those who are committed to making known the world of water, both fresh and salt.

From July 28th to August 1st, enjoy an enriching experience filled with inspirational speakers, engaging presentations, and exciting field adventures that showcase the natural beauty and rich marine heritage of the Boston Harbor and Cape Cod region. The conference agenda is filled with valuable networking opportunities aimed at fostering institutional collaborations and community partnerships.

In order to enhance your conference experience, we encourage you to utilize the Whova online Event Management Platform. This platform allows you to access the event agenda, plan your personal schedule, socially connect with fellow attendees, and receive important updates such as last-minute session changes from the organizers. You can access Whova on your device or in a web browser by logging in with the email you used to register for the event. If you have any questions or need assistance with Whova or any aspect of the conference, stop by the registration desk for guidance by one of our dedicated members of the NMEA conference planning committee members.

This conference serves as a pivotal moment for us to reflect on our achievements and chart the course for the future. As part of our ongoing strategic planning efforts, NMEA has partnered with Local Concepts, LLC to reevaluate our membership and organizational needs and desires. Many of you have already contributed valuable insights through focus groups, conversations, and surveys, for which we are sincerely grateful.

I am pleased to share that representatives from Local Concepts will be attending the conference. They will present their findings and strategic planning progress during the NMEA Business Meeting on Wednesday, July 31st, offering us all an opportunity to understand the direction of our organization more clearly.

Moreover, Local Concepts will be hosting various sessions and opportunities throughout the conference to gather additional input from NMEA members. Please consider participating in these sessions to contribute your perspective and help shape the future of NMEA. Your input is invaluable as we continue to strengthen our organization and better serve our members and the marine education community at large. If you have any questions about the strategic planning process or would like to connect with Local Concepts representatives during the conference, feel free to approach them directly or inquire at the conference registration desk.

Last but not least, we are grateful to our various NMEA Conference Sponsors, Massachusetts Marine Educators (MME) Chapter, and NMEA Conference Planning Committee for your tremendous contributions to ensure a successful event.

Thank you for joining us at the NMEA 2024 Conference. Together, let's continue to inspire ocean literacy and foster a deeper appreciation for our marine and aquatic environments.

Warm regards,

Lindsay Patterson, NMEA President

Tara Hicks-Johnson, NMEA President-Elect

Laura Diederick, NMEA Past President

Conference At-a-Glance

Saturday, July 27

8:00 am - 4:00 pm	Sea Grant Educators Network Meeting	MIT Sea Grant
6:00 pm	NMEA Board Dinner	Fenway

Sunday, July 28

8:00 am - 5:00 pm	NMEA Board Meeting	Terrace Lounge
4:00 pm	Registration Opens	Stone Lobby
5:00 - 8:00 pm	Welcome Reception	Ziskind Lounge

Monday, July 29

detailed Monday information on pages 12, 13, 28, 29, 30

7:30 am - 8:30 am	Committee Meetings	See Whova
8:00 am - 5:00 pm	Registration Open	Stone Lobby
8:45 am - 9:15 am	Welcome and Announcements	Metcalf Large
9:15 - 10:15 am	Keynote: Dr. Timothy Shank	Metcalf Large
10:15 am - 5:00 pm	Exhibits Open	Ziskind Lounge
10:30 am - 11:30 am	Concurrent Session #1	Session Rooms
11:30 am - 12:30 pm	Lunch & Buddy Lunch	Metcalf Large
12:30 pm - 2:30 pm	Concurrent Sessions #2 & 3	Session Rooms
2:30 - 3:30 pm	Afternoon Break & Poster Session & Exhibits	Metcalf Large
3:30 - 4:30 pm	Concurrent Session #4	Session Rooms
5:30 pm	Depart for New England Aquarium	See Whova

Tuesday, July 30

detailed Tuesday information on pages 16, 17, 31, 32, 33, 34

7:30 - 8:30 am	Committee Meetings	See Whova
8:00 am - 5:00 pm	Registration Open	Stone Lobby
8:00 am - 5:00 pm	Exhibits Open	Ziskind Lounge
8:30 am - 5:30 pm	Student Day (see page 18)	Various
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Dr. Letise LaFeir	Metcalf Large
10:00 am - 12:00 pm	Concurrent Sessions #5 & #6	Session Rooms
12:00 - 1:00 pm	Lunch & Chapter Meetings	Metcalf Large
1:00 - 2:00 pm	Stegner Lecture: Elizabeth James-Perry	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #7 & #8	Session Rooms
4:00 - 5:30 pm	Past Presidents' Circle	See Whova
5:30 pm	Dinner and Auction	Metcalf Large

Conference At-a-Glance

Wednesday, July 31

detailed Wednesday information on pages 20, 21, 35, 36, 37

7:30 - 8:30 am	Committee Meetings	See Whova
8:00 am - 12:00 pm	Registration Open	Stone Lobby
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Terry Wolkowicz	Metcalf Large
10:00 - 12:00 pm	Concurrent Sessions #9 & #10	Session Rooms
12:00 - 2:00 pm	NMEA Awards Luncheon, Business Meeting, and Chapter Basket Auction	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #10 & #11	Session Rooms
4:15 - 5:15 pm	New Board Meeting	XXX
7:00 pm	Boston Harbor Cruise (ticketed event)	See Whova

Thursday, Aug 1

field trip information on page 22

All day/Partial day	Optional Field Trips (must pre-register)	Boston Area




NMEA Auction

The annual NMEA auction is one of the highlights of the conference...a chance to have fun, bid on unique aquatic-themed items donated by local businesses and NMEA members (like this beautiful handmade NMEA 2024 quilt!)

All of the funds raised at our annual silent and live auction will go to our scholarship programs, which directly support marine and aquatic educators.

The 2024 NMEA banquet and auction will be held on **Tuesday, July 30 from 5:30 - 10:00 pm at BU's George Sherman Union (GSU)**.

Please drop off auction items Sunday, Monday, or Tuesday morning at the Registration Desk located in the Stone Lobby.

Conference Logistics

General Information::

All conference sessions take place at Boston University George Sherman Union located at 775 Commonwealth Ave, Boston, MA 02215.

Please wear your NMEA 2024 name badge to all sessions and events.

Conference Room Information:

- NMEA Central Desk and some exhibitors will be in Stone Lobby on the 2nd Floor.
- Plenaries, Posters, Lunches, and Snacks will be in the Metcalf Hall on the 2nd Floor.
- Exhibitors will be in the Ziskind Lounge on the 2nd Floor
- Concurrent sessions, committee and chapter meetings, and meet-ups will be in the Backcourt and Academy Rooms on the 1st Floor, Metcalf Small, Conference Auditorium, and Terrace Lounge on the 2nd Floor, and East Balcony, Room 310, 312, and 315 on the 3rd Floor.
- Student Day orientation will be in the Metcalf Hall on the 2nd Floor.

Parking:

Daily parking passes for commuting conference attendees were available for purchase before Wednesday, July 24.

Daily parking passes are not valid for overnight parking. Overnight parking is available in a different lot for attendees staying in on-campus accommodations.

Daily commuter parking is available at the Warren Towers Garage at 700 Commonwealth Avenue from July 28 - August 1.

Handicap accessible parking is available in the Warren Towers Garage for attendees with handicap placards or plates.
Attendees with handicap placards or plates are allowed to park at any available street parking spot without paying at the meter. Limited street parking is available on Commonwealth Avenue a short walk from the George Sherman Union.

Transportation:

Buses for off-campus events will run as follows:
Monday evening:

- 5:30 & 5:45 pm: Buses depart; see Whova and/or morning announcements for pickup location.
- 8:30 & 9:00 pm: Buses will leave from the New England Aquarium and return to BU Campus.

Wednesday evening:

- 6:00 pm: Buses depart; see Whova and/or morning announcements for pickup location.
- 9:15 pm: Buses return to BU Campus.

Thursday Field Trips:

- See Whova and Registration Desk for info about field trip transportation.

Auction Items and Chapter Baskets:

Please drop off auction items at Registration in the Stone Lobby. Items for Chapter Baskets should be given to your Chapter Representative. Chapter Baskets can be set up Wednesday morning in the Metcalfe Ballroom anytime before 11:30 am.

Wi-Fi:

You can access the Internet from your personal devices using Boston University's guest network. Visit the Registration Desk for more info!

Meals:

Included in full conference registration:

- Breakfast pastries, lunch, coffee, and snacks (Monday, Tuesday, Wednesday)
- Heavy appetizers and drinks during Sunday's 'Kick-Off Event'
- Dinner at the Monday evening New England Aquarium Event and Tuesday Banquet & Auction

Available for additional purchase:

Choose from a full range of retail dining locations to suit your taste, budget and schedule. All cafés and markets on campus accept cash and credit cards.

Continuing Education Units (CEUs):

A certificate of participation is available at the end of this program.

Conference Program & Whova App

We will be using the Whova conference app as our main communication tool during the conference, so make sure you download it ahead of time. Scan this QR code for Whova app download information.

You can use the Whova app to:

- Explore the professional profiles of event speakers and attendees
- Send in-app messages and exchange contact info
- Network and find attendees with common affiliations, educations,
- shared networks, and social profiles
- Receive update notifications from organizers
- Access the most up-to-date event agenda, GPS guidance, maps, and parking directions at your fingertips

Questions?

You can find someone from the planning committee at the NMEA Central desk located in Stone Lobby on the 2nd Floor. You can also email us at nmea2024@marine-ed.org or contact the organizers through the Whova app.

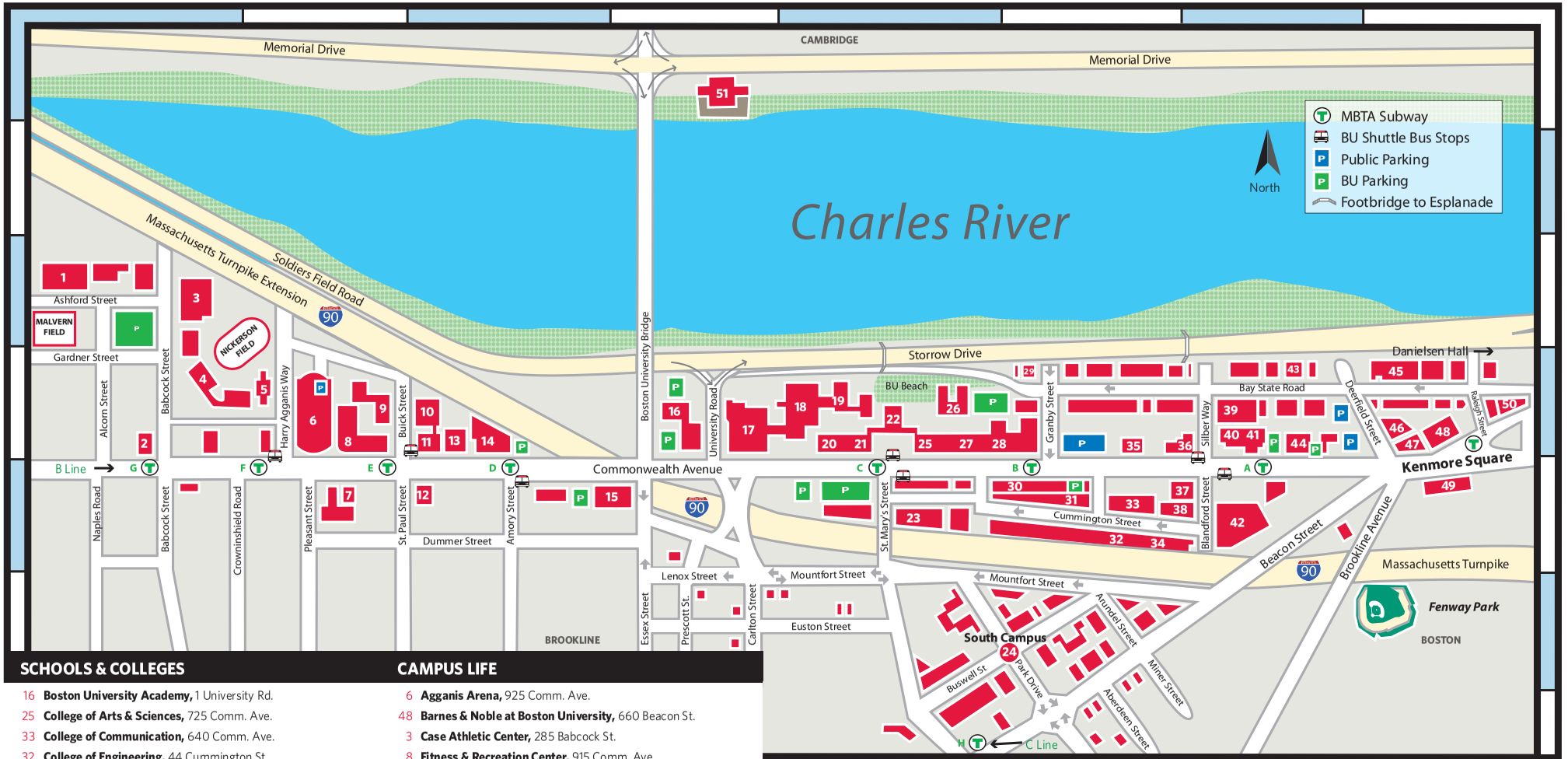
2024 Conference Planning Team

Co-Chairs
Robert Rocha
Don Pinkerton

NMEA National Support
Jackie Lewis
Tara Hicks-Johnson
Jennifer Magnusson

Planning Committee
Sierra Muñoz
Grace Simpkins
Jim Cleere

MME Committee Chairs
Marianne Walsh
Pat Harcourt
Val Perini



SCHOOLS & COLLEGES

16 **Boston University Academy,** 1 University Rd.
25 **College of Arts & Sciences,** 725 Comm. Ave.
33 **College of Communication,** 640 Comm. Ave.
32 **College of Engineering,** 44 Cummington St.
14 **College of Fine Arts,** 855 Comm. Ave.
13 **College of General Studies,** 871 Comm. Ave.
27 **Graduate School of Arts & Sciences,** 705 Comm. Ave.
20 **Metropolitan College & Extended Education,** 755 Comm. Ave. (Summer Term)
35 **Sargent College of Health & Rehabilitation Sciences,** 635 Comm. Ave.
36 **School of Education,** 2 Silber Way*
7 **School of Hospitality Administration,** 928 Comm. Ave.
19 **School of Law,** 765 Comm. Ave.
41 **School of Management,** 595 Comm. Ave.
26 **School of Social Work,** 264 Bay State Rd.
21 **School of Theology,** 745 Comm. Ave.
21 **University Professors Program,** 745 Comm. Ave.

The Goldman School of Dental Medicine, School of Medicine, and School of Public Health are located at the Boston University Medical Campus in Boston's South End

*Silber Way—formerly Sherborn Street

CAMPUS LIFE

6 **Agganis Arena,** 925 Comm. Ave.
48 **Barnes & Noble at Boston University,** 660 Beacon St.
3 **Case Athletic Center,** 285 Babcock St.
8 **Fitness & Recreation Center,** 915 Comm. Ave.
17 **George Sherman Union,** 775 Comm. Ave.
22 **Marsh Chapel,** 735 Comm. Ave.
18 **Mugar Memorial Library,** 771 Comm. Ave.
16 **Student Activities Center,** 1 University Rd.
1 **Track & Tennis Center,** 100 Ashford St.
28 **Tsai Performance Center,** 685 Comm. Ave.

MAJOR RESIDENCES

9 **10 Buick Street**
44 **575 Commonwealth Avenue**
2 **1019 Commonwealth Avenue**
Danielsen Hall, 512 Beacon St. (not on map)
50 **Myles Standish Hall,** 610 Beacon St.
45 **Shelton Hall,** 91 Bay State Rd.
24 **South Campus**
39 **The Towers,** 140 Bay State Rd.
30 **Warren Towers,** 700 Comm. Ave.
4 **West Campus,** 273-277 Babcock St.

BUILDINGS & SERVICES

43 **Admissions Reception Center,** 121 Bay State Rd.
5 **Boston University Police,** 32 Harry Agganis Way
12 **Center for English Language & Orientation Programs,** 890 Comm. Ave.
11 **Comptroller,** 881 Comm. Ave.
17 **Dean of Students,** 775 Comm. Ave.
11 **Financial Assistance,** 881 Comm. Ave.
49 **Hotel Commonwealth,** 500 Comm. Ave.
10 **Housing Office,** 25 Buick St.
31 **Information Technology,** 111 Cummington St.
46 **International Students & Scholars Office,** 19 Deerfield St.
34 **Life Sciences & Engineering,** 24 Cummington St.
42 **Metcalf Science Center,** 590 Comm. Ave.
40 **President's Office,** 1 Silber Way*
11 **Registrar,** 881 Comm. Ave.
11 **Student Health Services,** 881 Comm. Ave. (West)
47 **University Computers,** 533 Comm. Ave.
11 **University Service Center,** 881 Comm. Ave.

SPECIAL ATTRACTIONS

14 **BU Art Gallery at the Stone Gallery,** 855 Comm. Ave.
37 **Boston University Experience,** 602 Comm. Ave.
Boston University Theatre, 264 Huntington Ave. (not on map)
29 **The Castle,** 225 Bay State Rd.
51 **DeWolfe Boathouse,** 619 Memorial Drive
18 **Gotlieb Archival Research Center,** 771 Comm. Ave.
23 **Photonics Center,** 8 St. Mary's St.

Stops

A Blandford Street
B Boston University East
C Boston University Central
D Boston University West
E St. Paul Street
F Pleasant Street
G Babcock Street
H St. Mary's Street

Campus Information

617-353-INFO (4636) AskUs@bu.edu www.bu.edu/infocenter

Visit Boston University Online Maps based on Google Maps for directions and more information at www.bu.edu/maps

The distance from Kenmore Square to West Campus residences is approximately 1.3 miles.

Schedule: Monday, July 29

Monday, July 29

detailed Monday information on pages 12, 13, 28, 29, 30

7:30 am - 8:30 am	Committee Meetings	Check Whova
8:00 am - 5:00 pm	Registration Open	Stone Lobby
8:45 am - 9:15 am	Welcome and Announcements	Metcalf Large
9:15 - 10:15 am	Keynote: Dr. Timothy Shank	Metcalf Large
10:15 am - 5:00 pm	Exhibits Open	Ziskind Lounge
10:30 am - 11:30 am	Concurrent Session #1	Session Rooms
11:30 am - 12:30 pm	Lunch & Buddy Lunch	Metcalf Large
12:30 pm - 2:30 pm	Concurrent Sessions #2 & 3	Session Rooms
2:30 - 3:30 pm	Afternoon Break & Poster Session & Exhibits	Metcalf Large
3:30 - 4:30 pm	Concurrent Session #4	Session Rooms
5:30 pm	Depart for New England Aquarium	See Whova

Keynote Speaker

Dr. Timothy Shank, Woods Hole Oceanographic Institution

Life in the Extreme:
New Exploration and Research in Extreme Ocean Depths

Dr. Timothy Shank is an Associate Scientist in the Biology Department of the Woods Hole Oceanographic Institution. He has participated in more than 76 scientific expeditions and is internationally recognized for his research to understand the ecological and evolutionary factors that affect the structure and evolution of diverse deep-sea communities and species.

An Evening at the New England Aquarium

Join us to enjoy Boston Harbor at the New England Aquarium's outdoor patio for dining and drinks. Explore the aquarium's many exhibits, and visit with the penguins, the octopus, and Myrtle the Green Turtle.

Buses will depart from campus at 5:30 & 5:45 pm and will return from the Aquarium to campus at 8:30 & 9:00 pm.

Sessions: Monday, July 29

	ACADEMY	BACKCOURT	CONF AUDITORIUM	EAST BALCONY
10:30 am - 11:30 am	**Tami Lunsford** Climate Change PBL: Creating the Ocean/ Coast we Want	**Sarah Schoedinger** Don't be a Terrestrialist! Incorporating Ocean Science Concepts in a U.S. Standards-Based Teaching Environment (Part 1 - no requirement to attend both sessions)	**Joan Muller** Watershed Stewardship in Action: Deaf Students on the Estuary!	**Tressa Arbow** Using Whale Entanglements as an Anchoring Phenomenon for NOAA Science Camp
12:30 - 1:30 pm	**Annette Brickley** Ocean & Climate Story-Telling with Data	**Susan Haynes** Don't be a Terrestrialist! (Part 2 - no requirement to attend both sessions.): How to apply the Ocean Literacy Framework in a U.S. Standards-Based Teaching Environment	**Jennifer Maucher Fuquay** Expanding Accessibility to Participatory Science [...] **Keri Kaczor** Bringing the Sea to Inland and Rural Communities [...] **Alvera McMillan** Louisiana Wetland Days: Standard Aligned Learning [...]	**Andrea Sassard** NOAA Education Community Town Hall
1:30 - 2:30 pm	**Kate Schafer** Teaching Climate Change via Understanding, Connection and Empowerment	**David Christopher** Practical Applications: Environmental, Ocean, and Great Lakes Literacies and Beyond!	**Michelle Cusolito** Riding the Wave from Ocean Science to Outreach	**Tina Miller-Way** Integrating environmental and cultural history of the Gulf of Mexico using art: Postcards from the Past
3:30 - 4:30 pm	**Emily Yam** Climate Solutions, Front and Center	**Aimee Bonanno & NEOSEC Member Organizations** Hands-on Ocean Science Activities with NEOSEC Member Institutions	**Karen Young** I Was A Kid: sharing the diversity of the ocean science field, one scientist at a time	**Niki Sullivan** Lobsterfishing versus Whales; the good, the bad, and the ugly

Sessions: Monday, July 29

METCALF SMALL	ROOM 310	ROOM 312	ROOM 315	TERRACE	
Kathy Fuller A How to Guide for Leveraging NMEA Resources for Young and Emerging Professionals	**Lindsay Mossa** Navigating Sustainable Oceans for a Resilient Future	**Deborah Rose** Reading Ocean STEM with Young Children	None	**Pamela Blanchard** Putting Down Roots in a Changing Landscape	**10:30 am - 11:30 pm**
Ashley Eaton From Port to Praxis: a study evaluating the impact of vessel-based professional learning programs on K-12 teachers	**Carolyn Kovacs** Hands-on Activities for Plastics and Marine Debris Education	**Anne Smrcina** Partnering for Science and Art	None	**Lisa Lawrence** Create Your Own Splash with a VA SEA Spinoff in your State!	**12:30 - 1:30 pm**
Peter Tebeau STEM Education Under Sail – Science of the Sea & Ship in an Inspiring Venue	**Shantelle Landry** To B-WET and Beyond: Using Multiple Points of Engagement to Foster Belonging in Students	**Kat Owens** Entangled and Ingested: Sewing Session	None	**Kristen Smith** White Shark Identification	**1:30 - 2:30 pm**
Michelle Cusolito Surrounded by Water: Life on a Research Vessel in the Middle of the Atlantic	**Anna Caputo** VA SEA Turtles: Activities Created from Graduate Research on Turtles and Bycatch Reduction	**Celeste Kroeger Campodónico** Tramares, Weaving Reefs **Leann Winn** Death becomes art **Hannah McDuffie** Wide Horizons: Fostering Environmental Stewardship [...]	**Tom Savage** Rogue Drifter Buoy: When Predictions Collide with Ocean Borders	**Meghan Marrero** Becoming a USA BlueSchool **Kanesa Duncan Seraphin** Ocean Literacy Collaborations [...] **Timna Varela Sánchez** Integration Of Ocean Literacy [...]	**3:30 - 4:30 pm**

Schedule: Tuesday, July 30

Tuesday, July 30

detailed Tuesday information on pages 16, 17, 31, 32, 33, 34

7:30 - 8:30 am	Committee Meetings	See Whova
8:00 am - 5:00 pm	Registration Open	Stone Lobby
8:00 am - 5:00 pm	Exhibits Open	Ziskind Lounge
8:30 am - 5:30 pm	Student Day (see p. 18)	See Whova
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Dr. Letise LaFeir	Metcalf Large
10:00 am - 12:00 pm	Concurrent Sessions #5 & #6	Session Rooms
12:00 - 1:00 pm	Lunch & Chapter Meetings	Metcalf Large
1:00 - 2:00 pm	Stegner Lecture: Elizabeth James-Perry	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #7 & #8	Session Rooms
4:00 - 5:30 pm	Past Presidents' Circle	See Whova
5:30 pm	Dinner and Auction	Metcalf Large

Keynote Speaker

Dr. Letise LaFeir, New England Aquarium

The Role of Aquariums in Conservation and Stewardship

Dr. Letise LaFeir serves as the Chief of Conservation and Stewardship at New England Aquarium, overseeing Animal Care, Conservation Learning, Community Engagement, Anderson Cabot Center for Ocean Life, and Conservation Policy. Dr. Lafeir is a distinguished expert in marine policy and conservation, with extensive experience in both government and nonprofit sectors.

She served as Senior Advisor to the Under Secretary of Commerce for Oceans and Atmosphere and the Administrator of NOAA in the Biden-Harris Administration. She is the founder and co-owner of Upwelling Consulting, LLC, and has held pivotal roles at the Resources Legacy Fund, Monterey Bay Aquarium, and NOAA's Office of National Marine Sanctuaries. She is also a published author and certified scuba diver who has explored all seven continents and the seafloor.

Join the virtual conversation with #NMEA2024!

Stegner Lecture: Elizabeth James-Perry

Connected to Ocean Life Forever: Wampanoag Perspectives on the Atlantic

2023 National Endowment of the Arts Heritage Fellow Elizabeth James-Perry is an enrolled Aquinnah Wampanoag educator who engages with Northeastern Woodlands cultural expressions primarily in shell-carving and Northeast wampum diplomacy, naturally dyed textiles and basketry and environmental restoration.

Her work explores the connections between sustainable arts and TEK, maritime lifeways, Native identity and sovereignty. James-Perry has a Marine Science degree from the University of Massachusetts, Dartmouth, a certificate in Digital Tribal Stewardship from Washington State University; she attended Cornell and University of New Hampshire's satellite campus Shoals Marine Laboratory and Rhode Island School of Design Continuing Education. James-Perry is a Gay Head Whaling descendant and participated in the historic sailing of the Charles W. Morgan.

The Stegner Memorial Lecture is named in honor of Dr. Robert Stegner, a pioneer in marine education who died shortly after he retired from teaching at the University of Delaware. Bob hosted one of the first meetings of marine educators that would become the National Marine Educators' Association, and was a central figure in charting the course for what marine education would become. His efforts also led to the creation of project COAST, one of the first marine education curriculum projects. Over the years, this Memorial Lecture has evolved into a variety of presentations, including lectures, musical presentations, and visual displays.

Vineyard Wind is proud to be the sponsor of the 2024 Stegner Lecture.

Sessions: Tuesday, July 30

	ACADEMY	BACKCOURT	CONF AUDITORIUM	EAST BALCONY
10:00 am - 11:00 am	**Rebecca Shoer** A City is a Climate Change Laboratory: Participatory science as a means for real-world project based learning	**Kara Doherty** Engaging Students in Marine Animal Bioengineering: Designing Prosthetics	**Bob Hyldburg** Ropeless Fishing: Educatingthe public about whale safe fishing	**Amy Neblett** Beach Engagement with the Public through Art and Science
11:00 am - 12:00 pm	**Danielle Kamberalis** Marine Debris Action Plans: Creating Change in the Classroom	**Meredyth Sullivan** Using Otoliths to Better Understand Changing Ecosystems	**Juliet Fluty** Blue Horizons Global Initiative	**Rochelle Strauss** Navigating the Sea: Harnessing Illustrated Non-fiction Children's Books to Build Ocean Literacy
2:30 - 3:30 pm	**Brian Slopey** Marine Biology : An Innovative Hybrid Model	**Katie Lodes** EARTH (Education and Research: Testing Hypotheses): Engaging students using climate and ocean science data.	**Maya Pincus** Traveling through time with the International Ocean Discovery Program: Scientific ocean drilling reveals Earth's past	**Kaleigh Ballantine** Drawn to learning: Creating accessible […] **Cait Goodwin** Tsunami Quests Lead to High Ground[…] **Emily Wanous** Supporting Educators as Allies in Environmental […]
3:30 - 4:30 pm	**Robin Lea** Engaging Youth to DevelopCoastal Flood Resilience Strategies	**Miriam Sutton** Floating GO-BGC Data into the Classroom	**Victor Blanco** Scuba Diving in Extension: An innovative approach […] **Chris Payne** Leading the Way: How Cultivating Leadership […] **Laura Lilly** Communicating with Compassion […]	**Alexandria Gillen** Marine Debris Communications Lab: Support Youth to Go From Raising Awareness to Inspiring Action with NOAA

Sessions: Tuesday, July 30

METCALF SMALL	ROOM 310	ROOM 312	ROOM 315	TERRACE	
Hannah Bell Measureing Ocean Literacy and More: Outcomes from a two day marine science education program for South African youth.	**Angela Dixon** Taking Sea Level Education, Awareness and Literacy to a New Level!	**Destiny Blow** Science on the Go: Quick Interactive Science Demos for All Ages	**Jennifer Cumbest** The Role of Evaluation in Programing	**Keri Kaczor** Daylighting Careers and Training [...] **Maria Madrigal** Diversifying Marine Biology Career Paths **Molly Dushay** Diving Deep: Navigating Sustainability [...]	**10:00 am - 11:00 pm**
Alison Spasyk What is watershed education? [...] **Jamie Steichen** First year experience course [...] **Elizabeth Stratton** Learning across waters [...]	**Jolie Griffey** "When did it happen?" Sea-Level Rise game [...] **Delanie Medina** Developing Sea-Level Rise Content [...] **Cheryl Milliken** Sea Level Rise and Storm Surge [...	**Kristen Keane** Island STYLE- Systemic Training for Youth Leadership in the Environment: a collaborative effort between NOAA BWET, Artist Boat, the local school district, and natural resource organizations	**Shannon Donovan** Exploring Offshore Wind Energy	**Maggie Allen** Tapping into heat and health resources [...] **Paul Dobbins** Advancing Seaweed and Shellfish Farming [...] **Keri Kaczor** Seaweed in the Classroom [...}	**11:00 am - 12:00 pm**
Marianne Walsh Coexisting with White Sharks: How research and education initiatives are working to change public perception	**Kasey Gaylord-Opalewski** An Ocean of Opportunity: Engaging Students in the Blue Economy	**Jennifer Kennedy** Inflatable Whales Present a Unique Learning Opportunity	**Allison Rosner** NOAA's Bay Watershed Education and Training (B-WET) Program: New England	**Diana Payne** A Network of Long Island Sound Schools: Protecting the Sound One School at a Time	**2:30 - 3:30 pm**
Patrick Kirby From the Classroom to the Coast [...] **Julia Wente** Analyzing Trends in Humpback Whale [...] **Alicia Williams** From River to Ocean: Exploring [...]	**Li-Ying (Laura) Lin** Integrate National Resources to Build a Ocean Literacy Benchmark Nation (OLBN) by OAC	**Dani Dilullo** EnvironMentors: Ten Years of Lessons [...] **Vanessa van Heerden** Mapping Out Our World [...] **Kristen Smith** The Gills Club: Creating the next gen [...]	**Ginny Carlton** Coastal Engineering Education: People, Place and Practice	**Chris Flight** Aquaculture is Agriculture	**3:30 - 4:30 pm**

Schedule: Student Day

Tuesday, July 30

8:00 am	Registration	Stone Lobby
8:00 am - 5:00 pm	Exhibits Open	Ziskind Lounge
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Dr. Letise LaFeir	Metcalf Large
10:00 am - 10:45 am	Student Icebreaker & Get to Know NMEA	Metcalf Large
11:00 am - 12:00 pm	Concurrent Session #6	Session Rooms
12:00 - 1:00 pm	Lunch	Metcalf Large
1:00 - 2:00 pm	Stegner Lecture: Elizabeth James-Perry	Metcalf Large
2:00 - 2:30 pm	Afternoon Break - Student Day Checkin	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #7 & #8	Session Rooms
4:30	Student Day Concludes	

Explore the asynchronous student presentations on Whova!
More information on Page 27 and on the Whova App.

Schedule: Wednesday, July 31

Wednesday, Aug 1

detailed Wednesday information on pages 20, 21, 35, 37, 37

7:30 - 8:30 am	Committee Meetings	See Whova
8:00 am - 12:00 pm	Registration Open	Stone Lobby
8:30 am	Announcements	Metcalf Large
8:45 - 9:45 am	Keynote: Terry Wolkowicz	Metcalf Large
10:00 - 12:00 pm	Concurrent Sessions #9 & #10	Session Rooms
12:00 - 2:00 pm	NMEA Awards Luncheon, Business Meeting, and Chapter Basket Auction	Metcalf Large
2:30 - 4:30 pm	Concurrent Sessions #10 & #11	Session Rooms
4:15 - 5:15 pm	New Board Meeting	See Whova
7:00 pm	Boston Harbor Cruise (ticketed event)	See Whova

Keynote Speaker

Terry Wolkowicz, Sound Explorations

Using Music and Tactile Sculptures to explore Marine Science with the Blind and Low Vision Impaired

For more than two decades Terry Wolkowicz has been designing innovative integrated arts educational curricula. For the past 13 years she has served as the Education Director for the New Bedford Symphony Orchestra, where she designs and performs educational programming in over 50 schools across Massachusetts and Rhode Island. In 2021, she started the nonprofit organization, Sound Explorations with composer, David MacKenzie where they have completed projects for NOAA, NASA, the Walter Munk Foundation for the Oceans, WHOI, Boston Museum of Science, and the Stellwagen Bank National Marine Sanctuary.

Join the virtual conversation with #NMEA2024!

Sessions: Wednesday, July 31

	ACADEMY	BACKCOURT	CONF AUDITORIUM	EAST BALCONY
10:00 am - 11:00 am	**Angela Scapini** Navigating the Seas of Educational Innovation: Leveraging CGLL's Peer-Review Process for Dynamic Curriculum Maintenance and Accessibility	**Warren Sevaaetasi** Building Resilient Communities in American Samoa	**Madison Willert** Sea Grant's Role in Developing Marine Debris Literacy (back to back sessions)	**Sandra Bilbo** Learning How to Block Print: A Mini Art Workshop (back to back sessions)
11:00 am - 12:00 pm	None	**Austin Pugh** The Northeastern Regional Association of Coastal [...] **Nora Skinner** Fostering STEM Career Skills Through "Plan-It Marsh" [...] **Joe Dellicarpini** Storm Tide Pathways: A Collaborative Effort [...]	**Madison Willert** Sea Grant's Role in Developing Marine Debris Literacy (back to back sessions)	**Sandra Bilbo** Learning How to Block Print: A Mini Art Workshop (back to back sessions)
2:30 - 3:30 pm	**Tina Miller-Way** Development of Gulf of Mexico Literacy Principles **Madeleine Sherman** Increasing confidence in Marine Science [...] **Maya Pincus** You mean to tell me... Social media can improve [science] literacy?	**Avery Beck** Designing an Inclusive Program for a Vision Impaired Audience	**Alexandria Gillen** Let's Talk Trash! Marine Debris Educational [...] **Laura Bailes** Instilling Place-based Environmental Literacy [...] **Marisa Immordino** From Creek to Career: Exploring impacts [...]	**Susan Tang** Creative Currents: Empowering Students to Create Art for a Sustainable Future
3:30 - 4:30 pm	**Brianna Andrews** BRACKISH (Biodiversity, Relationships, and Aquatic Chemistry Knowledge in Saline Habitats)	**Elisa Caref** Classroom Teacher Collaboration for Place-based Curriculum Design in NYC	**Tracy Hajduk** Bring Ocean Literacy into Your Classroom with National Marine Sanctuaries	**Kristen Keane** Encouraging Student Voice and Choice while Developing Driving Questions and Student Designed Field Adventures

Sessions: Wednesday, July 31

METCALF SMALL	ROOM 310	ROOM 312	ROOM 315	TERRACE	
Yolanda Sánchez Strengthening Ocean Education in Latin America: RELATO's Experience	**Nancy FitzGerald** Shunt of Shuttle? Introduce your students to marine viruses and their impact on the ocean's role in the carbon cycle.	**Mary Carla Curran** Teaching students about the links between marine food webs, Harmful Algal Blooms (HABs), and food safety	None	**Sonia Ahrabi** Nature-Based Programs at Aquariums	**10:00 am - 11:00 pm**
Aimee Bonanno Working Collaboratively Toward Equity, Access, and Belonging in Ocean Science	**Savanna Finley** Bringing the Estuary into Your Classroom: A Guide on Extending Estuary Learning Through Classroom Aquariums	**Monika Pelz** Data from the deep, Ocean Science Integration for all.	None	**Laura Moore** Marine Investigators: Implementing inquiry-based, experiential learning with elementary learners to foster creative exploration and awareness about marine and coastal environments.	**11:00 am - 12:00 pm**
Margrethe Serres Marine Science Research [...] **Bethany Smith** Pathways to Ocean Science Careers [...] **Holly Morin** Speed Dating with the Blue Economy [...]	**Carly Carmack** No Marine Science Class? No worries!	**Jennifer Walker** Teaching Ocean Literacy through the Lens of Marine Mammals	None	**Valerie Cournoyer** Using Optical Illusion Art to Communicate Science Ideas	**2:30 - 3:30 pm**
Morgan Treon Ripple Effect: Using Unconventional Partnerships to Increase Impacts of "Wicked" Marine Education	**Kelsea Carmichael** Marine Robotics: A Lesson Plan Using LEGO **Grace Simpkins** Ocean Currents and Overflows: hands-on physical oceanography in the classroom	**Bjorn Grigholm** World Ocean Explorer: Free Interactive & Immersive Learning for the Classroom	None	**Katie Lodes** Getting out in the world to bring [...] **Dominika Wojcieszek** Advancing Ocean Literacy Through [...] **Shadaesha Green** Empowering youth to take action [...]	**3:30 - 4:30 pm**

Field Trips

Thursday, July 27

8:00 am – 5:00 pm	Crane Beach and Guided Hike*	Coach Bus
8:00 am – 5:00 pm	Crane Beach and Kayak Tour*	Coach Bus
8:00 am – 5:00 pm	WHOI and Waquout Bay (Cape Cod)	Coach Bus
9:00 am - 12:00 pm	Harvard Museum of Natural History	Subway/Uber
10:00 am–1:30 pm	Whale Watch to Stellwagen Bank	Subway/Uber
10:00 am–2:00 pm	Duck Boat/Museum of Science	Subway/Uber
12:15 pm-1:45 pm	Schooner Tour of Boston Harbor	Subway/Uber

*Boxed lunch provided

Field Trip Questions?

The Registration Desk (Stone Lobby) has field trip information including meeting locations, what to bring, and more!

B-WET
20 YEARS AND GROWING

B-WET is an environmental education grant program that promotes locally relevant experiential learning for K-12 students and related professional development for teachers.
Learn more at https://www.noaa.gov/office-education/bwet

Boston Harbor citycruises™

Ocean River INSTITUTE

NMEA Awards

JOHNETTE D. BOSARGE MEMORIAL AWARD

The **Johnette D. Bosarge Memorial Award** is awarded to NMEA members who have a record of service and dedication to NMEA or the local chapter; exhibit loyalty, efficiency, and enthusiasm for marine and aquatic education; and consistently earn the respect of their peers. This award is in loving memory of Johnette D. Bosarge, who served as our administrative assistant from 1999-2013.

JAMES CENTORINO AWARD

The **James Centorino Award** for distinguished performance in marine education at a regional and/or national level is awarded to NMEA members who have actively participated in NMEA and demonstrated dedication to marine issues over a career. This award was named in the memory of Jim Centorino, an inspirational and passionate marine educator who taught at Salem State College, co-founded the Massachusetts Marine Educators and later the National Marine Education Association. Through this award, we at NMEA continue to remember his contributions to marine education.

OUTSTANDING TEACHER AWARD

The **Outstanding Teacher Award** for effective and innovative classroom teaching at any level is awarded to NMEA members who are classroom teachers that have demonstrated innovation in introducing marine science into materials, classroom activities, and/or topics.

MARINE EDUCATION AWARD—INDIVIDUAL

The **Marine Education Award** for distinguished performance in marine education by professionals is awarded to educators who are not classroom teachers that have demonstrated innovation in introducing marine science into materials, activities, and/or topics.

MARINE EDUCATION AWARD—OUTSTANDING ORGANIZATION

The Marine Education—Outstanding Organization Award for outstanding work and leadership by an organization in any aspect of marine education at the local, regional, or national level can be awarded to an organization, institution, or business that demonstrates a strong commitment to supporting marine education through actions and/or financial commitments. Actions may include supporting marine education groups, offering conferences, developing and/or delivering marine-based educational activities and workshops, and promoting initiatives such as beach cleanups.

YOUTH LEADERSHIP IN MARINE CONSERVATION

The Youth Leadership in Marine Conservation Award for the furthering of marine science and conservation through education, research, advocacy, and/or community leadership is awarded to individuals or youth groups 18 years old or younger who have demonstrated passion for protecting marine environments, educated the public about the importance of the marine environment, or advocated for the conservation and protection of marine environments and/or individual marine species.

HONORARY MEMBERSHIP AWARD

The **Honorary Membership Award** is awarded to a current or past NMEA member who has actively participated in NMEA, has demonstrated leadership through their work in marine education, and has a distinguished career in teaching, research, or service in marine education. Honorary Membership shall be the highest recognition that the Association can offer and comes with a life membership to NMEA.

Nominations are accepted all year round! https://www.marine-ed.org/awards

Get Involved in NMEA!

National Marine Educators Association
making known the world of water

CHECK OUT AND GET INVOLVED IN NMEA COMMITTEES!

COMMITTEE PODS ARE LISTED BELOW. SEE OUR WEBSITE FOR INFO!

COMMUNICATIONS	**OPERATIONS**	**STAKEHOLDERS**
ISSUES & TRENDS	**EVENTS**	**AD-HOC**

The NMEA Strategic Planning team is looking for input from you! Share your thoughts at the link here or check Whova for times to engage with Local Concepts, our strategic planning partner. Those that complete the survey will be entered into a raffle to win a free registration to NMEA 2025 in Lafayette, LA.

Chapter Baskets

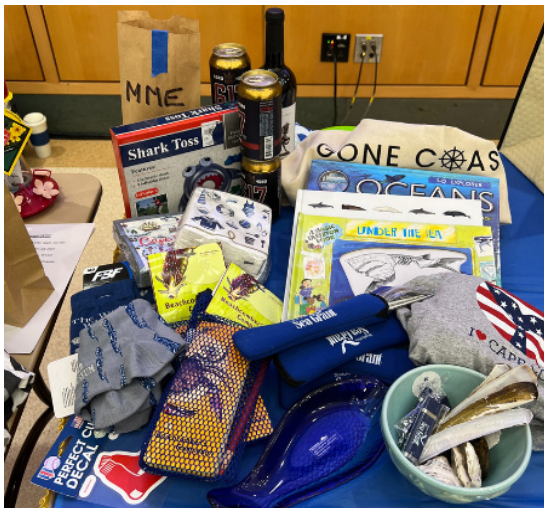
Chapter representatives should set up baskets in the **Metcalf Large Ballroom on Wednesday July 31st, before 8:30 am.**

Chapter basket tickets may be purchased in advance at the Registration Desk and from committee members during lunches. We accept cash and credit card payment for chapter basket tickets.

Tickets will be $1.00 each, $5.00 for 6, or $10.00 for 12.

The baskets will be on display in the **Metcalf Large Ballroom on Wednesday at lunch**. Place your tickets in the bag by the Chapter Baskets you hope to win.

Winning tickets will be drawn at the **NMEA AGM & Awards on Wednesday, at 12:45 pm**. Winners can collect their baskets after the meeting.

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Recorded Session Descriptions

Asynchronous Recorded Sessions - on Whova

NMEA President's Chain

NMEA 101. Are you new to NMEA? Are you looking to become more active in the organization? Do you wonder what NMEA is doing to advance our mission around the world? Please join us to learn about NMEA's history, current projects, and future goals, and how you can become more involved. Meet our leadership team and make connections, old and new.

Sara Chaves Beam, Chesapeake Bay Governor's School

Two Teachers Walk into a Marine Lab: The Effects of High Temperatures and Low pH on the Development of Lobster Embryos. Researchers at Virginia Institute of Marine Science, Dr. Emily Rivest and Dr. Jeff Shields invited two teachers, Sara Chaves Beam from Virginia and Megan Begley from Maine to collaborate in their research studying the effects of ocean acidification and warming waters on the development of Maine lobster embryos. The teachers created a series of lessons that communicate the science of this study with activities ready to go for your classroom. This session will share their six lessons and the basic findings of the study, great for New England marine science, environmental science and secondary and early undergrad classes. Lesson topics all tie into the lobster study: Bathymetry of the Gulf of Maine analysis activity, Ocean Acidification activity, Lobster Life Cycle Activity, Water Quality Activity, Experimental Design Activity and Lobster Embryo Respiration Data Lab. Keywords: ocean acidification global warming lobsters data activity. Additonal Authors: Megan Begley, Teacher; Emily Rivest, Virginia Institute of Marine Science

Sean Chamberlin, Fullerton College

Our World Ocean: A Creative Commons Textbook to Engage Diverse Learners in Ocean Literacy. Our World Ocean, a free downloadable textbook for students (8–16), researchers, and informal audiences, provides a student- and teacher-friendly approach to understanding ocean science as it's practiced by oceanographers in the twenty-first century. This presentation will focus on the textbook's benefits for student engagement, its pedagogical approach to teaching ocean literacy, and its flexible and plentiful resources that make an instructor's life easier. I'll illuminate the critical role of the ocean in our global ecosystem and ways we can foster a deep and enduring understanding of the ocean within our students. Keywords: ocean literacy, science communication, diversity.

Sandra Lund, Blue Anew Network

Combatting "Ocean Blindness" - the lack of awareness and understanding about the ocean's importance in mitigating challenges posed by climate change. Handouts describe EU Ocean Mission's objectives to restore oceans' health and well-being by promoting ocean literacy - understanding the ocean's influence on Earth's systems and processes, and raising awareness of the impact human action have on the ocean. The presentation displays an infographic of activities sponsored by three "sister" projects of Horizon Europe to raise awareness about the importance of ocean literacy in combatting climate change: providing educational material for implementation in both formal and non-formal learning environments, teaching routes, funding "blue" school projects, and creating country hubs that guide schools in joining the EU Blue Schools Network Keywords: ocean literacy, climate change, blue schools. Additonal Authors: Global Skills Network - www.globalskillsnetwork.com

Citlalli Méndez; Delfina Cruz Flores, Universidad Nacional Autónoma de México

Ola Metrópoli Arte-ConCiencia desde la Gran Ciudad de México. En esta sesión les vamos a presentar el trabajo que realizamos en Ola Metrópoli y cómo es que estamos influenciando a las comunidades e infancias en el Valle de México, desde nuestra perspectiva, nuestros logros y el impacto para seguir en la lucha por el aprendizaje, conocimiento y cuidado del Mar. Keywords: Arte, ciencia, comunidad, cultura, alfabetización.

Julianne Taylor, Bar Harbor Whale Watch; Tammy Silva, PhD, Marine Research Ecologist, SBNMS ; Andrew Thaler, PhD: CEO, Blackbeard Biologic & Co-founder of Oceanography for Everyone ; David Wiley, PhD: Research Ecologist, SBNMS

Whale Watching Vessels Serving as Platforms for Marine Science Research & Education. Whale watch operations throughout the NE US collaborated with OpenCTD, BOEM, and Stellwagen Bank National Marine Sanctuary to deploy low-cost CTDs to collect salinity, temperature, and depth data. Project goals were to engage the community in oceanographic data collection and to increase spatial and temporal resolution of oceanographic data in the NE US. Casting CTDs during whale watch cruises allowed passengers to observe and learn about methods of collecting ocean data. Additionally, the CTDs provided an opportunity for whale watch naturalists to discuss climate change and its impact on physical and biological ocean ecosystem dynamics.

This project, Community Oceanography While Watching Whales, continues to provide open-source data for educators, students, and the greater marine science community.

Robin Lea, Gulf of Maine Research Institute

Sea to School Curriculum from The Gulf of Maine Research Institute. Through the Food Vision Prize Award from the Kendall Foundation, GMRI worked with cafeteria staff, teachers and culturally diverse chefs in Maine to develop cafeteria and classroom resources promoting local seafood in schools and highlighting the environmental, economic, nutritional and cultural importance of local fish and ocean products. Learn about the Local Seafood in Maine Schools curriculum and explore ways it can be adapted to your region or setting.

YA-CHIEN (Claire) Chou, Taiwan Marine Education Center of National Taiwan Ocean University; Chang Cheng-Chieh

Ocean Literacy in Primary Schools: Cartoon Animation on Marine Science. Marine Education Issue is one of the nineteen topics stipulated in the "General Outline" of Taiwan's education curriculum. Ocean Literacy for primary school students covers the basic concepts and knowledge of the ocean and integrates the ocean attitude of "know the ocean, be close to the ocean, and love the ocean" into the key points of each field. The project conducts digital Marine Education learning resources for primary school. There are more 50 cartoon animations and videos. The cartoon animations to be put on the shelves include knowledge node construction, checkpoints, lesson plans, 2-3 question assessment test questions worksheets, etc. Additional Authors: LING-YA, HUNG, Assistant Research Fellow of Taiwan Marine Education Center, NTOU

Student Asynchronous Recorded Presentations - on Whova

Sophie Baker; Jack Owens, Northwest Academy

Have you heard of pipefish? How they surprisingly mitigate the effects of ocean acidification. This review paper uses ocean studies to theorize how to address the effects of ocean acidification on seagrass environments and observe the pipefish’s interdependent species relationships. Ocean acidification occurs when carbon dioxide dissolves into the ocean and forms carbonic acid, reducing ocean pH. This affects survivability of coral reefs and marine-calcifying organisms, a key food source for Syngnathus. However, seagrass meadows, the pipefish’s habitat, filters low-pH ocean water when photosynthesizing by absorbing carbon dioxide. Pipefish, among other animals, help control sea urchin populations that eat holdfasts, preventing the destruction of seagrass. This symbiotic relationship mitigates ocean acidification's global threat.

Onyx Brisbois; Asher Fritts-Weeks, Northwest Academy

A Synthesis Project of the Effects of Ocean Acidification on Spiny Dogfish (Squalus acanthias) This synthesis project was done to showcase the effects of ocean acidification on Squalus acanthias, commonly known as the Spiny Dogfish. The key factors of the presentation included the effects on: hunting capabilities, predator and prey relations, and reproduction. The negative effects on S. acanthias were the impact on the dermal denticles, scales that coat the skin in a rough tooth like substance. They are utilized in sharks to increase swimming speeds, and stealth. Increased CO2 can lead to denticle corrosion, compromising hydrodynamics and overall function. Overall the effects on S. acanthias are potentially grave in future ocean biodiversity.

Onyx Brisbois; LouAnne Steele, Northwest Academy

A Case Study of the Causes of Selachaphobia in Largely Oregon Residents, with Specific Focus on Media Consumption, Attitudes, and Knowledge. Sharks represent a vital part of the health of marine ecosystems. Larger sharks such as the great white shark act as apex predators, maintaining a biodiverse ocean. According to 2022 studies the shark population decreased more than 70% in the last fifty years (Carlson, 2023). The research presented here examines how humans react to sharks, and how their age and media consumption affect their knowledge of sharks. The survey data provided shows largely Oregon residents feelings toward sharks compared to their age, media consumption, and education level. Providing vital information to researchers on how to better educate the public.

Cash Daniels; Liddy Clever, Homelife Academy

Kids in Conservation. Can kids and youth really make a difference in conservation for our oceans? Absolutely! We will show you how kids from different parts of the world are changing the game and getting more and more youth involved to create change. We have formed our own non-profits to educate other kids and encourage them to find a solution to a problem they can address in their part do the world.

Jack LaBar; Kai Newbold, Northwest Academy

Ice Cores: Nature's Cool Past. Ice cores are drilled-up pieces of ice made of layers upon layers of snow that scientists then study. there are trapped air bubbles that can be measured to give scientists a picture of past atmospheric conditions. This past climate indicator is a useful tool for scientists studying paleoclimatology. One of the most crucial uses for ice cores is the study of atmospheric greenhouse gases in the past. One of the more interesting ice cores was the West Antarctic Ice Sheet Divide Ice Core which had a layer of thick ash incrusted in it. As the deepest U.S. ice core, it suggested volcanic activity in the past 68,000 of ice it was from.

Anna Marks; Arwyn Stech, Northwest Academy

Synthesis Project on the Negative Outcomes of Ocean Acidification on Dungeness Crab Structural and Chemosensory Biochemical Adaptations. Dungeness crab (M. magister) is a secondary consumer that inhabits the Pacific Northeastern coast, and is a keystone species in the Pacific Northwest. Ocean acidification affects Dungeness crabs at all life stages. A multitude of stressors impact them: hypoxia, calcium scarcity, and harmful levels of low pH. These factors stunt chemosensory abilities and shell structure formation. Impacted crabs face issues with survival, development, and decreased ability to regulate movement and interact successfully with other organisms. In order to preserve this critical species, governing bodies must implement sustainable marine initiatives and fossil fuel regulations.

Will Staggers; Griff Urang, Northwest Academy

A scientific exploration of the current and future effects of ocean acidification on the yellowfin tuna (Thunnus albacraes). Our project summarizes research on ocean acidification’s impact on yellowfin tuna (Thunnus albacraes). Decreases in seawater pH negatively affects yellowfin tuna’s larval stages. An experiment by the University of California’s Marine Science Institute, found that yellowfin larvae exposed to projected ocean pH levels of 7.6 to 7.3 over a week sustained damage to critical organs, particularly the pancreas and eyes. Yellowfins may face dwindling populations in the next 20 years due to a decreased percentage of larvae reaching sexual maturity. If industrialized countries do not reduce current carbon dioxide emissions, our oceans will no longer sustain healthy ecosystems.

Kodi Young; Miles Potter; Henry Tuttle, Northwest Academy

Analyzing the direct and indirect effects of ocean acidification on the life cycle, reproduction, and survival of the Dungeness Crab (Metacarcinus magister). This presentation seeks to delineate the detrimental effects of ocean acidification on the Dungeness crab: a result of the ocean absorbing carbon dioxide which has led to a 26% decrease in the pH of the ocean. Such conditions can cause corrosion in the crab shells, while greatly affecting the life cycle of corrals, shellfish, and other marine organisms. Ocean acidification is most prominent on the Pacific Coast of North America, the primary environment for the Dungeness crab. Potential solutions to address ocean acidification may include utilizing biomass to remove carbon from the atmosphere, and transitioning to sustainable energy resources.

Concurrent Session #1: Monday, July 29—10:30 am – 11:30 am

Tami Lunsford, Newark Charter Jr./Sr. High School

[ACAD] **Climate Change PBL: Creating the Ocean/Coast we Want.** I modified my Project Based Learning Marine Science course again this year- both sequence and the climate change driving question. Come learn how I incorporated the UN Ocean Decade, AI, and climate change pedagogy into the new unit.

Sarah Schoedinger, NOAA Office of Education; Diana Payne

[BCT] **Don't be a Terrestrialist! Incorporating Ocean Science Concepts in a U.S. Standards-Based Teaching Environment (Part 1 - no requirement to attend both sessions).** Join us to learn how to incorporate Ocean Literacy into NGSS-aligned/adapted instruction. In this first of two sessions, we'll introduce the Ocean Literacy Framework, a useful tool in teaching about the ocean while also aligning with/addressing the NGSS. As a result, you and your learners will have a better understanding of ocean science concepts, be able to better communicate about the ocean, and apply what you've learned to make informed and responsible decisions about the ocean and its resources.

Participants will receive a copy of A Handbook for Increasing Ocean Literacy.

This is one of two linked sessions. Additional Authors: Catherine Halversen, emerita Senior Program Director, Lawrence Hall of Science, University of California Berkeley; chalver@berkeley.edu

Joan Muller, Waquoit Bay National Estuarine Research Reserve; Barbara Spiecker, Todd Czubek

[CONF] **Watershed Stewardship in Action: Deaf Students on the Estuary!.** Imagine if science terms were spelled out to you letter by letter – how would that impact your ability to learn? For native American Sign Language students, fingerspelling also requires them to process content in another language, English. Come learn from a unique partnership formed to work on reducing these barriers through NOAA's Teachers on the Estuary program. Get pointers for working with deaf students and learn about the Deaf Education graduate program at Boston University. Learn how to access the signs on line and try a couple of the conceptual signs yourself. Dr. Spiecker will share personal insights on growing up deaf and pursuing a STEM career.

Tressa Arbow, NOAA Fisheries West Coast Region; Maile Sullivan

[EAST] **Using Whale Entanglements as an Anchoring Phenomenon for NOAA Science Camp.** From 2014-2016, an unprecedented number of whale entanglements occurred off the coast of California. In 2024, the whale entanglements were used as an anchoring phenomenon for NOAA Science Camp in Seattle, WA. Through a series of investigations, NOAA office activities, sense-making discussions, and lots of fun and games, campers drew conclusions about why and how so many whales were entangled. This session will take participants through some of the activities and discussions students engaged in, feature student projects, and share best practices and lessons learned for using a real world climate-policy conundrum in an informal marine science education setting. Additional Authors: Lisa Hiruki-Raring, Education Coordinator, NOAA Alaska Fisheries Science Center; Casey Ralston, Education Coordinator, NOAA Northwest Fisheries Science Center

Kathy Fuller, Prince George's County Public Schools

[MET] **A How to Guide for Leveraging NMEA Resources for Young and Emerging Professionals.** If you are a young or emerging professional, someone who has just started working in the field or someone who is finishing their training or degree and will soon be working in the field, this presentation is for you! Learn what NMEA can do for you and how you can leverage those assets to support your career and your students. The session will also include time for networking with other young and emerging professionals. This session is sponsored by the NMEA Student Engagement Committee.

Lindsay Mossa, American Geosciences Institute

[310] **Navigating Sustainable Oceans for a Resilient Future.** Participants will engage with hands-on activities developed for middle and high school to introduce sustainability and its connections to water quality and ocean health. These activities were written by the American Geosciences Institute as part of our Education for Sustainable Development (ESD) Kits, which each focus on a specific United Nations Sustainable Development Goal (SDG). Participants will do activities from ESD Kit 12: Consuming Sustainably and ESD Kit 13: Impacts of Climate Change but will gain access to all four ESD Kits (including ESD Kit 6: Access to Clean Water and ESD Kit 7: Energy In Our Lives and Communities). Additional Authors: Lauren Brase, Ed Robeck

Deborah Rose, Deborah Lee Rose

[312] **Reading Ocean STEM with Young Children.** From breaching whales to waddling penguins, from marine scientists in the field to marine birds threatened by climate change, STEM children's books link ocean literacy to reading literacy. With limited STEM elementary learning time, books that engage readers with marine species and ocean science help teachers both educate and inspire. Discover Emperor penguins like most kids (and adults) have never seen them, and connect Emperors and scientists who study them (from Woods Hole to Scripps) with Ocean Literacy principles, in Deborah's Penguins Ready to Go, Go, Go!, including Antarctic photos never published in a children's book before.

Pamela Blanchard, Louisiana State University School of Education; Alvera McMillan, Dani Dilullo

[TER] **Putting Down Roots in a Changing Landscape.** The LSU Coastal Roots Program (https://www.lsu.edu/coastalroots) works with teachers in grades 3-12 from 47 schools across 17 parishes in South Louisiana to combine science-based learning, native plant nurseries, and environmental stewardship to help their students become environmentally literate about coastal issues in Louisiana. Students grow a variety of native tree seedlings and beach grass plugs in school-based nurseries to learn how they can help create and sustain coastal habitats, maintain habitat diversity, and provide food for coastal animals and birds. Come learn how to put science-based learning, native plant nurseries, and stewardship together for your students! Authors: Dr. Edward Bush, Professor, LSU School of Plants, Soil, & Environmental Science, EBush@agcenter.lsu.edu

Concurrent Session #2: Monday, July 29—12:30 – 1:30 pm

Annette Brickley, STEMming the Gaps Consulting

[ACAD] **Ocean & Climate Story-Telling with Data.** Data literacy needs to be scaffolded just like reading literacy. In this workshop, we will practice some ways to help students move beyond collecting their own data to analyzing and interpreting larger, online data collected by scientists. This interactive webinar will use authentic ocean ecosystems data and will offer different practice strategies and online techniques to use with students. The LTER Schoolyard program at Woods Hole Oceanographic Institution offers this workshop to support an ocean and climate Data Jam. In the Data Jam, the challenge for students is to graph, analyze, and interpret one of the provided data sets, collected by scientists, on oceanographic research cruises, on the Northeast US Continental Shelf, south of Cape Cod. Their goal is to creatively present their work as a compelling data-based story or message for the general public through song, dance, paint, or wherever their passions lead them. The skills of understanding, interpreting, and presenting data are essential in a world where our ability to collect data outpaces our ability to make it understandable. The skills of creative interpretation by Middle and High School students are wild!

Susan Haynes, NOAA Ocean Exploration/Groundswell; Rick Reynolds, Diana Payne, Sarah Schoedinger

[BCT] **Don't be a Terrestrialist! (Part 2 - no requirement to attend both sessions.):** How to apply the Ocean Literacy Framework in a U.S. Standards-Based Teaching Environment. Using two NOAA lessons, we will introduce participants to and demonstrate the practical application of the Scope and Sequence (S&S) and NGSS alignment as articulated in the Ocean Literacy Framework. Learn how the S&S was referenced to design a new Ocean Mysteries curriculum from the Office of National Marine Sanctuaries and how it was applied to recently developed Student Investigations from Ocean Exploration. Featured lessons will focus on climate (Essential Principle #3) and deep-sea ecosystems (Essential Principle #5).Participants will receive a copy of A Handbook for Increasing Ocean Literacy. Additional Authors: Catherine Halversen, emerita Senior Program Director and Co-Director of MARE, University of California Berkeley and UC Berkeley's Lawrence Hall of Science, chalver@berkeley.edu; Tracy Hajduk, National Education Coordinator, NOAA's Office of National Marine Sanctuaries

Jennifer Maucher Fuquay, NOAA; Steve Morton, Barbara Spiecker

[CONF] **Expanding Accessibility to Participatory Science and STEM through American Sign Language.** For Participatory Science to thrive we must provide accessibility to a wide spectrum of individuals and communities. NOAA's Phytoplankton Monitoring Network (PMN), a national volunteer network for the monitoring of harmful algal blooms (HABs), is committed to increasing accessibility to the deaf and hard of hearing by developing tools used in training new volunteers so that engagement and participation is available to a wider scope of our population. Working with Atomic Hands, whose mission is to contribute to the movement of bringing STEM alive in American Sign Language (ASL) and supporting current and future generations of deaf STEMists, we are creating new ASL signs for terminology regarding HABs. Additionally, Atomic Hands is translating PMN training videos, in which participants learn how to collect and analyze samples for the presence of potentially harmful organisms. PMN and our Atomic Hands partners will discuss the translations of training materials into ASL and increase awareness of other ASL resources for STEM in education.

Keri Kaczor, Maine Sea Grant

[CONF] **Bringing the Sea to Inland and Rural Communities.** The pandemic exacerbated gaps as far as access, opportunities, academic achievement and outcomes. Today, Maine children continue to struggle academically, and are experiencing more homelessness, poverty, and mental health crises than before the pandemic began. Inland and rural communities are hydrologically linked to the sea, yet are under-resourced with little access and opportunity to explore connections to the ocean and climate. This project is nimble and offers an array of options to engage with ocean and climate science in the field and classroom. Stipends, travel, equipment, lessons/activities, mentorship, co-teaching, and more is provided to lessen the barriers to sea exploration.

Alvera McMillan, Louisiana Sea Grant; Vanessa van Heerden, Dani Dilullo

[CONF] **Louisiana Wetland Days: Standard Aligned Learning in a Place-Based Context.** Recognizing the need for high quality place-based learning, Louisiana Sea Grant has been cultivating partnerships with school districts, universities, state agencies, and many others to co-create outdoor learning opportunities. Funded through the National Academies of Science Gulf Research Program, Wetland Days are customized explorations of habitats near participating schools. Hear some of the successes and challenges Sea Grant has encountered as they have taken their educational programming on the road. Additional Authors: Naya Black, Outreach & Community Awareness Coordinator, Louisiana Sea Grant College Program; Dr. Adronisha Frazier, Assistant Professor, Northshore Technical Community College

Andrea Sassard, NOAA Office of Education; Christos Michalopoulos

[EAST] **NOAA Education Community Town Hall.** NOAA's education portfolio includes educators from across NOAA, National Estuarine Research Reserves, Sea Grant, and many partners. Our programs are united by the NOAA Education Strategic Plan, to be updated in 2025. The proposed new plan will include these goals: 1) teaching and learning; 2) taking action; 3) navigating career pathways; and 4) building and sustaining NOAA Education. We'd like to hear from the marine education community (you!) about the proposed plan and emerging issues. We hope NOAA Education network members, NOAA partners, other field educators, and anyone interested in supporting NOAA's mission through education will join this lively conversation. Additional Authors: Christos Michalopoulos, NOAA Office of Education, christos.michalopoulos@noaa.gov

Ashley Eaton, University of Vermont; Nate Drag, Kristin TePas

[MET] **From Port to Praxis: a study evaluating the impact of vessel-based professional learning programs on K-12 teachers.** This interactive session will share the results of a doctoral dissertation study that evaluated NOAA Education and NOAA Sea Grant vessel-based teacher professional learning programs. During the session participants will have the opportunity to get hands-on with some of the research vessel activities included in the study (e.g., Great Plankton Race). This study aimed to gain a better understanding of the impact vessel-based programs have on self-reported K-12 teaching efficacy, watershed understandings, and relationships to place. While this study focuses on research vessel-based programming, the results and methods of this study have the potential to inform and build upon best practices in freshwater and marine education more broadly.

Carolyn Kovacs, Florida Sea Grant / University of Florida

[310] **Hands-on Activities for Plastics and Marine Debris Education.** This session will guide participants through educational activities centered around plastics, marine debris, and choices that individuals can make when it comes to the items we use. Through a series of experiments and games, participants will have the opportunity to make and test hypotheses, examine real world data, and reflect on their use of single-use plastics. Participants will gain access to curricula for three sets of activities that can be used in the classroom or in conjunction with a beach cleanup and be adapted for a wide range of ages. Keywords: Hands-on Activities for Plastics and Marine Debris Education. Additional Authors: Maia McGuire, Associate Director, Extension and Education, Florida Sea Grant

Anne Smrcina, Stellwagen Bank National Marine Sanctuary

[312] **Partnering for Science and Art.** For more than 20 years, Massachusetts Marine Educators and Stellwagen Bank National Marine Sanctuary have offered a marine art contest. The project has introduced K-12 students to the diversity of species in our marine backyard. In this session we will explore some interdisciplinary projects combining art and marine science (including the contest) as well as offer tips on how other NMEA chapters and marine sanctuaries (and/or other government organizations, e.g. marine reserves, national parks) can develop their own regional art competitions. Samples of creative art generated by winners from past contests will be on display at the session and at a conference exhibit.

Lisa Lawrence, VIMS-VA Sea Grant; Sarah Nuss

[TER] **Create Your Own Splash with a VA SEA Spinoff in your State!.** What is VA SEA you ask? It's not just a project -- it's a tidal wave of innovation! VA SEA stands for Virginia Scientists & Educators Alliance, an ocean literacy initiative where passionate science graduate students transform their research into captivating K-12 lesson plans. Dive deeper into the blueprint of VA SEA's success and discover how you can adapt it to make waves in your state. Unleash the potential of your local graduate students (or scientists) and watch them inspire your next generation of scientists and decision-makers! We'll also share some of our fan-favorite lesson plans.

Concurrent Session #3: Monday, July 29—1:30 – 2:30 pm

Kate Schafer, Children's School of Science

[ACAD] **Teaching Climate Change via Understanding, Connection and Empowerment.** Students often report that their experience with climate education has left them with a mixture of panic and frustration from the oft-repeated refrain, "we created the problem and now it's up to you to fix it." As educators, it is vital that we work to combat these feelings using three basic strategies that can be employed in different ways with a focus on ocean literacy: 1. Teach the science, and give students the tools that they need to talk about the problem; 2. Get out and experience nature, and give students a connection to the natural world; and 3. Focus on solutions that involve an interdisciplinary hands-on approach, and help them to realize that positive change is possible. Using these strategies we can create understanding, connection and empowerment.

David Christopher, Delaware Sea Grant / Univ. of Delaware; Diana Payne

[BCT] **Practical Applications: Environmental, Ocean, and Great Lakes Literacies and Beyond!.** Confused by all the "literacies" out there? Wondering how you can take some of these complex topics and incorporate them into your school or workplace? Join us for an interactive exploration of the variety of literacies and real-world examples of their use. We'll consider topics such as Ocean Literacy as the global cornerstone of our relationship with the ocean, nuances of environmental literacy, and making local connections. Examples may include connections to English Language Arts, the UN Ocean Decade, NMEA's Ocean and Climate Literacy Champions, regional environmental education initiatives, educator professional learning, case studies from around the world, and more!

Michelle Cusolito, Freelance/Simmons University; Karen Young

[CONF] **Riding the Wave from Ocean Science to Outreach.** So you're going into the field or visiting the lab of a scientist whose work fascinates you. How can you bring that experience to life through a picture book, middle grade nonfiction book, or comic profile? Michelle and Karen – both educators, creators, and award-winning authors – share how they translate complex science into compelling science stories for young people. You'll emerge from this session with handouts that include a list of resources, bookmarks, and trading cards – as well as inspiration and practical ideas for starting your own outreach, engagement, or book project.

Tina Miller-Way, Dauphin Island Sea Lab

[EAST] **Integrating environmental and cultural history of the Gulf of Mexico using art: Postcards from the Past.** Join us to explore a STEAM classroom-based program in which students explore anthropogenic change by adopting a radiocarbon-dated clam and investigating how different human cultures used Gulf of Mexico resources and coastal areas during their clam's lifetime. With inspiration from prerecorded videos from Alabama art educators, students express their understanding in a mixed-media Postcard from the Past. In this session, we'll introduce the program, summarize the embedded scientific research, review participating student and teacher impressions, and discuss how you can get involved. We'll also create our own Postcard from the Past using one of several art techniques. Additional Authors: JoAnn Moody, Paul Harnik

Peter Tebeau, Tall Ships America; Holly Buresh, Chloe Grey Smith

[MET] **STEM Education Under Sail – Science of the Sea & Ship in an Inspiring Venue.** Traditional sailing vessels present a challenge and opportunity for providing STEM education in a unique venue to engage, inform and inspire learners. The presentation will highlight programs on several vessels offering learning opportunities in meteorology, oceanography, marine ecology, and the science & technology of the ship. Connecting these STEM learning opportunities to the Ocean Literacy and Next Generation Science Standards will be addressed. Opportunities for linking shipboard education with traditional classroom instruction will be identified, along with resources to support this linkage. In closing, the role of education under sail in connecting learners to the sea, science, and each other, to promote youth resiliency and career aspirations will be summarized.

Shantelle Landry, The Mariners' Museum and Park

[310] **To B-WET and Beyond: Using Multiple Points of Engagement to Foster Belonging in Students.** Bay Watershed Education and Training (B-WET) grants are incredible ways to bring meaningful watershed educational experiences (MWEEs) to students of underserved communities. After three years of implementing the B-WET grant, The Mariners' Museum and Park is now using the lessons learned from this grant to improve other programs. Using the Museum's framework used for B-WET, Educators hope to help students develop a sense of belonging in their community. There will be a hands-on, lion-fish menu game as an example of one of the many activities that are used during the multiple points of engagement.

Kat Owens, University of Hartford

[312] **Entangled and Ingested: Sewing Session.** In this hands-on session, you can work with Dr. Kat Owens to collaborate on a life-sized portrait of an animal harmed by plastic pollution. Each piece is made by hand-sewing film plastics on canvas. See examples here: https://katowens.com/entangled-and-ingested/ We'll co-create a large portrait while talking about the pervasive problem of plastic pollution. All materials and supplies are provided, and no skill in sewing is required.

Kristen Smith, Atlantic White Shark Conservancy; Marianne Walsh

[TER] **White Shark Identification.** The Atlantic White Shark Conservancy (AWSC) is a non-profit organization supporting scientific research, educating the community, and improving public safety. AWSC strives to increase knowledge of Atlantic white sharks to change public perception and conserve the species.In this session, discover ongoing white shark research projects led by the AWSC research team. Participants will begin to understand how individual white sharks are identified as part of a population study and test their skills in an identification challenge. They will also investigate white shark movement in the northwest Atlantic by using AWSC's online app, The White Shark Logbook.

Concurrent Session #4: Monday, July 30—2:15 – 2:30 pm

Emily Yam, Aquarium of the Pacific; Sonia Ahrabi

[ACAD] **Climate Solutions, Front and Center.** Taking action on climate change can feel overwhelming, especially the scale of solutions that feel like they make a difference. Aquariums and museums have many opportunities to talk to the public about climate change. In this 50-minute session, we will share the ways that two aquariums prepare staff to talk about climate change, and how we present these messages through public presentations, programs, and signage. We welcome participants to join us to talk about solutions that scale to the challenge of climate change.

Aimee Bonanno, UMass Boston; Carolina Bastidas, Kate Leavitt

[BCT] **Hands-on Ocean Science Activities with NEOSEC Member Institutions.** The New England Ocean Science Education Collaborative works together to leverage assets and strengthen ocean literacy in the region with common goals of increasing belonging in ocean science education, co-learning, co-development, and co-dissemination. Join us in this mini activity fair to experience several hands-on activities that you can do in both formal and informal settings. Talk with and learn from NEOSEC members, including MIT Sea Grant, Seacoast Science Center, UMass Boston, Blue Ocean Society, Gulf of Maine Research Institute, and Northeastern University. We'll explore topics of ocean acidification, buoyancy, density, and surface area, participatory science, and more.

Karen Young, I Was A Kid

[CONF] **I Was A Kid: sharing the diversity of the ocean science field, one scientist at a time.** Award-winning author Karen Romano Young brings together her passions for writing, art, ocean science, and inclusion in her new project. In this session, she shares I Was A Kid, in a set of multimedia profiles of STEAM professionals from underrepresented communities who share their pathways with middle schoolers and high schoolers. A Vvisual storyteller, Karen uses comics, graphics, photography, audio, and text to share these stories – all of it free as downloads, and in print in this session. Find out how other educators are using this project in their classrooms, libraries, museums, and more.

Niki Sullivan, Blue Ocean Society for Marine Conservation

[EAST] **Lobsterfishing verus Whales; the good, the bad, and the ugly.** The North Atlantic right whale is a critically endangered species whose main threat is humans. Meanwhile, the lobster

fishing industry is deep-rooted in New England's history and economically important to the area. Join us and learn how traditional lobster pots were designed around lobster conservation but are endangering wildlife, specifically the North Atlantic right whales. In addition, we will discuss and evaluate possible solutions to this complex environmental issue. This program will include interactive demonstrations and content to bring back to the classroom to facilitate student discussions.

Justin Ossolinski, Woods Hole Oceanographic Insitution; Michelle Cusolito, Kayla Gardner

[MET] **Surrounded by Water: Life on a Research Vessel in the Middle of the Atlantic.** Join award-winning author and educator Michelle Cusolito, M.Ed. and a panel of experts from Woods Hole Oceanographic Institution (WHOI) for a discussion of life on board a research vessel. From moving onto the ship and unpacking equipment, to managing the personal challenges of 24-hour operations and living and working in close quarters with others, this panel shares all the details. Learn about the variety of roles on the ship from deck hand to engineer to lead scientist and find out about fascinating new equipment being used to study the deep ocean. Handout of resources provided.

Anna Caputo, Chesapeake Bay National Estuarine Research Reserve; Matthew Thayer,

[310] **VA SEA Turtles: Activities Created from Graduate Research on Turtles and Bycatch Reduction.** The Virginia Scientists and Educators Alliance (VA SEA) is a network of graduate students, teachers, and informal educators aimed at translating scientific research into usable lesson plans. This session will highlight two recent lesson plans created by graduates from the Virginia Institute of Marine Science that focus on turtle surveys and bycatch reduction research. Participants will learn about the VA SEA program, the graduate students who created the lesson plans, and get to try out these hands on lessons that bring marine research into a classroom setting. Additional Authors: Anna Poslednok, Graduate Student, Virginia Institute of Marine Science. Derek Jackson, former graduate student, Virginia Institute of Marine Science.

Celeste Kroeger Campodónico, Millennium Nucleus for Ecology and Conservation of Temperate Mesophotic Reef Ecosystems

[312] **Tramares, Weaving Reefs.** "Tramares, Weaving Reefs" is the culmination of the collaborative efforts of over a hundred artists, predominantly women aged over 60, from small coastal communities in central Chile that meticulously crafted 600+ distinct pieces blending geometry, ecology, and knitting giving life to Chile's first crocheted twilight reef.The resulting artwork has been showcased in 8 exhibitions across Chile, serving as a source of inspiration for crochet artists and enthusiasts in other communities. The initiative was spearheaded by the Milenio Center NUTME, the Faculty of Mathematics, and the Vice-Chancellor's Office for Research at Universidad Católica and drew inspiration from the Coral Crochet Reef and Arrecife Hiperbólico projects. Additional Authors: Mariana Milos (Pedagogy in Visual Arts, Master of Theory and History of Art; Catholic University of Chile) / Sandra Cerda (Crochet knitting teacher) / Constanza del Campo (Master in Mathematics; Catholic University of Chile) / Carla Alonso (Journalist; Catholic University of Chile) / Katherine Cornejo (Occupational therapist; Community Center for Elder People, El Quisco Municipality) / Alejandro Pérez-Matus (PhD Marine Biology; Millennium Nucleus for Ecology and Conservation of Temperate Mesophotic Reef Ecosystems (NUTME) and Catholic University of Chile)

Leann Winn, Trevor Day School / Sharks4Kids

[312] **Death becomes art.** You have probably seen diaphonized creatures, transparent yet colorful specimens in glass jars, and not even realized it. Learn how a method performed by scientists since the 1970s has been transformed into a 10th grade assignment that focuses on technological skills and concepts used in Biology and Chemistry, all while creating a work of art in order to address student research questions.

Hannah McDuffie, University of Southern Mississippi; Patrick Kirby

[312] **Wide Horizons: Fostering Environmental Stewardship in Coastal Mississippi Middle Schoolers through Art and Marine Science Education.** Wide Horizons is an interdisciplinary place-based educational initiative funded by the National Academy of Science for middle school students on the Mississippi Gulf Coast. It integrates marine science, ecology, history, geography, and artistic expression to address environmental challenges in the Gulf of Mexico and encourage community action. The project involves immersive field experiences, art creation, journaling, and peer dialogue. Following field days, students collaborate with local artists on climate action projects to communicate data-driven environmental solutions. This session will discuss program objectives, evaluation findings, and how these findings can inform similar informal K12 STEAM education programs and initiatives. Additional Authors: Patrick Kirby, Graduate Research Assistant, University of Southern Mississippi

Tom Savage, Henderson County Early College

[315] **Rogue Drifter Buoy: When Predictions Collide with Ocean Borders.** This presentation merges the thrill of scientific discovery with a powerful classroom activity that challenges students' ability to predict ocean currents. Inspired by my participation in NOAA's Teacher at Sea program aboard the NOAA Ship Fairweather (2018), the lesson plan utilizes a drifter buoy I deployed off the coast of Kodiak Island, Alaska. Students transform into oceanographers, making predictions about the buoy's path based on their knowledge of ocean currents. When predictions clash with surprising discoveries revealed through historic track lines, the lesson unveils the ocean's hidden currents and their impact on coastal climates. Additional Authors: Jennifer Hammond, Director Teacher at Sea, NOAA

Meghan Marrero, Mercy University; Kayla Poole

[TER] **Becoming a USA Blue School.** The USA Blue Schools are a network of K-12 schools committed to improving ocean literacy in their school community, and engaging students in action projects to protect our global ocean. Attend this session to learn more about USA Blue Schools activities, as well as how to join our network and connect with teachers across the country and beyond!

Kanesa Duncan Seraphin, University of Hawai'i SOEST / Hawai'i Sea Grant; Joanna Philippoff

[TER] **Ocean Literacy Collaborations: pairing formal and informal educators with ocean science graduate students.** We will present findings from collaborative workshops, bringing together formal and informal educators to partner with Hawai'i Sea Grant graduate students researching local ocean science issues. The workshop aim is to provide training in education pedagogy, research methods, and communicating ocean science. The educator-researcher partnership structure is intended to build collaborations that result in increased ocean literacy—grounded in place and related to current research. We will share findings and strategies for building effective partnerships, incorporating standards in outreach, engaging multiple learning modalities in lesson plans, and sharing ocean science in both formal and informal learning environments. Additional Authors: Maya M. Walton, Assistant Director for Research and Fellowships, University of Hawai'i Sea Grant, waltonm@hawaii.edu

Timna Varela Sánchez, Partners In Education Roatan

[TER] **Integration Of Ocean Literacy And Environmental Education In To The School Curriculum.** Warm-up, slides describing step by step how to integrate Ocean Literacy into the curricula, present teachers' guides and students booklets, Blue Schools, and next steps.

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

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Session Descriptions - Tuesday

Concurrent Session #5: Tuesday, July 30—10:00 am – 11:00 am

Rebecca Shoer, Stone Living Lab; Elisabeth Colby

[ACAD] **A City is a Climate Change Laboratory: Participatory science as a means for real-world project based learning.** In this session we will explore how educators and partners are working together in Boston to create climate change Project-Based Learning opportunities for students in grades 6-12. During a summer climate institute developed by The Stone Living Lab and the National Park Service, educators are immersed in project-based learning principles and participatory climate science. Educators then utilize their experiences to create standards-based lessons for the following academic year. We will share teacher-created climate focused PBL tasks in our session, resources for educators, strategies for building sustainable partnerships.

Kara Doherty, Wade Institute for Science Education; Mary Finkel; Sandra Ryack-Bell

[BCT] **Engaging Students in Marine Animal Bioengineering: Designing Prosthetics.** Give your students the chance to become apprentice engineers specializing in animal prosthetics as they create a prototype for an injured animal! Experience the Wade Institute's Engineering Design Challenge: Animal Adaptations and Bioengineering. Engage in a dynamic curriculum designed to spark inquiry, exploration, and hands-on design challenges for students in grades 5-8. This curriculum provides the opportunity to explore animal adaptations, integrate new knowledge about prosthetics, research a specific animal, and use the Engineering Design Process to design, build, and redesign a prototype prosthetic for a marine animal. During the presentation, participants will experience firsthand one of the guide's captivating design challenges and will be provided with a digital copy of the curriculum guide. Additional Authors: Buttonwood Park Zoo, Lloyd Center for the Environment, and the National Marine Life Center

Bob Hyldburg, Gotham Whale; Rich Riels

[CONF] **Ropeless Fishing: Educating the public about whale safe fishing.** Ropeless fishing is technology that removes the vertical fishing lines used in fixed gear fishing and replaces that with an acoustic or timed release that brings gear to the surface on demand. Vertical fishing lines and entanglement result in the loss and injury of 100's whales, turtles, and marine life around the world annually. In this workshop learn about the new forms of ropeless fishing systems that are available and in development that can both improve the lives of fishermen and provide the public with "whale safe" seafood.

Amy Neblett, Artist Boat

[EAST] **Beach Engagement with the Public through Art and Science.** Artist Boat and community partners brought Bucket Brigade and Project SIT (Seawall Interpretive Trail) to Galveston's beaches. Bucket Brigade is a free interpretive hands on exploration that demonstrates the diversity of life of Galveston's Coastal Ecosystem for beachgoers in an effort to improve perceptions of beaches and water quality on the Texas Coast. Project SIT transformed 70 concrete benches into educational works of art along 4.4 miles of Seawall with educational hand painted tile mosaics that highlight Galveston and the Gulf of Mexico's ecology, biodiversity, economy, heritage and history and promote an appreciation for conservation of our oceans. Additional Authors: Sarah Frantz, Education Program Manager , Artist Boat; Kristen Keane, Lead Eco Educator, Artist Boat

Hannah Bell, UNCW; Troy Frensley

[MET] **Measureing Ocean Literacy and More: Outcomes from a two day marine science education program for South African youth..** Join us as we discuss an exciting multi-year evaluation project with the I AM WATER: Ocean Conservation organization in South Africa on their flagship two-day marine science program for underserved 7th grade students. We will share our participatory approach to building evaluation capacity at the organization and lessons learned along the way. We will also share results from pre, post, and follow-up student surveys measuring ocean literacy, and much more, to highlight the successes of this program. We look forward to interactive discussions on how your organization can also use evaluation to learn, adapt, and improve.

Angela Dixon, Dauphin Island Sea Lab; Katie Higgins

[310] **Taking Sea Level Education, Awareness and Literacy to a New Level!.** Bring your climate education to a new level with SEAL! NASA's Sea Level Education, Awareness and Literacy (SEAL) Science Activation Team will explore sea level science concepts, engage in hands-on activities, and bring some of NASA's newest data into your educational setting! Join us to learn more about our program and to find out how you can get involved. We will share activities with a focus on up-to-date lessons and a positive message of mitigation and coastal resilience!

Destiny Blow, Virginia Aquarium & Marine Science Center

[312] **Science on the Go: Quick Interactive Science Demos for All Ages.** At the Virginia Aquarium, we take science on the go! Through simple, repeatable, and flexible demonstrations, educators are able to explain a variety of science topics to audiences of all ages. We will share a few of our favorite activities for attendees to take and implement in their classrooms, home institutions, or outreach curriculums. Most of these activities use easy-to-acquire materials that you may already have at home or in the classroom. Additional Authors: Dorothy Schetzel, , Program Educator II, Virginia Aquarium & Marine Science Center / Karen Burns, Program Educator III, Virginia Aquarium & Marine Science Center

Jennifer Cumbest, Grand Bay National Estuarine Research Reserve; Sandra Bilbo

[315] **The Role of Evaluation in Programing.** Evaluation can play a key role in program facilitation, adaptation, and implementation. Programming at the Grand Bay NERR can be anything from an outreach booth at a small community event, a large open house themed event, education programs both in the classroom and on site, to teacher professional development workshops. In this session, we will discuss and review different types of measurement used at Grand Bay NERR and how we adapt our programming. Participants are encouraged to think of an education program they would like to evaluate and leave the session with ideas for their own program evaluations.

Keri Kaczor, Maine Sea Grant

[TER] **Daylighting Careers and Training Opportunities in Maine's Seafood Economy.** Maine's seafood economy- from harvesting, to transportation, logistics, marketing, biotechnology, food service – offers valuable employment and career opportunities. The sector has a total economic output of $3.2 billion, representing over 33,000 jobs, with seafood sales over $904.1 million in 2021. The industry struggles with a workforce to support the industry now, and into the future. The Seafood Economic Accelerator for Maine (SEA Maine) is an industry-led collaborative bringing together leaders from across the seafood economy. Participants will learn about the strategies and assets developed by SEA Maine to attract, train and retain new talent to the industry, including K-12 engagement.Additional Authors: Anne Langston-Noll, Associate Director, Maine Aquaculture Innovation Center

Maria Madrigal, University of Southern California Sea Grant

[TER] **Diversifying Marine Biology Career Paths.** The Sea Grant Program at the University of Southern California (USC) is part of the National Oceanic and Atmospheric Administration's National Sea Grant College Program integrating research, education, and outreach with a specific focus on the Urban Ocean. USC Sea Grant will share their experience leading a unique partnership offering an entry point into a marine biology career path. A local conservation corps, an aquarium, and an after-school program provider leveraged their strengths and resources resulting in a mutually beneficial program. We will share the initial pilot program design and its evolving iterations. Learn about our challenges and successes. Additional Authors: Laura Rink (Associate Aquarium Director, Heal the Bay) Deana Porras (Senior Program Manager, Los Angeles Conservation Corps' After School Program), Adrianne Calbreath (Special Projects Manager, Los Angeles Conservation Corps), Jennifer Kolbauer (Associate Director, USC K-12 STEM Center) Linda Chilton (Education Manager, USC Sea Grant)

Molly Dushay, Trumbull High School; Meghan Reilly

[TER] **Diving Deep: Navigating Sustainability through the Four Zones of the Open Ocean.** NAMEPA would like to present on exploring sustainability through the open oceans four zones: the sunlight zone, the twilight zone, the abyssal zone, and the polar zones. We will address the connections between the four zones and the impact pollution has on them. We will present how to make sustainable choices and its impact on improving the health of the individual zones and the ocean as a whole. Participants will take away insights on how to live a more sustainable lifestyle and why they should incorporate sustainability into their everyday lives and curriculums. NAMEPA's educational materials will be available during the presentation. Keywords: ocean, zones, sustainability, education, connections.

Concurrent Session #6: Tuesday, July 30—11:00 am – 12:00 pm

Danielle Kamberalis, NOAA Marine Debris Program; Alexandria Gillen

[ACAD] **Marine Debris Action Plans: Creating Change in the Classroom**. Action Plans are one tool the NOAA Marine Debris Program uses to coordinate collaborative action to prevent, remove, and study marine debris. This hands-on session will engage participants in the components of student-led action planning, including a waste audit and implementation plan. Participants will understand the purpose and adaptability of action planning components to suit different classroom needs and address various environmental or community issues. Channel students' creative problem-solving skills and concern for the ocean into action using a real-world, data-driven process used by marine debris professionals. Lesson plans and other resources will be available. Additional Authors: Demi Fox, Northeast Region Coordinator, NOAA Marine Debris Program

Meredyth Sullivan, Gulf of Maine Research Institute; Kim Clarke

[BCT] **Using Otoliths to Better Understand Changing Ecosystems.** Climate change is causing unprecedented changes in the world's ocean, affecting the composition of species living there. It's essential for scientists to study these changes and their impacts. In this session, we will use digital tools and hands-on activities to explore large datasets and understand how warming waters are affecting the ecosystem, fisheries, and the communities that depend on them. Learn how fisheries biologists use otoliths, the inner ear bones of fish, to understand species growth rates and life cycles better, knowledge can help set effective fishing regulations and gain a deeper understanding of the changes taking place.

Juliet Fluty, University of New England/ Educational Passages; Cassie Stymiest

[CONF] **Blue Horizons Global Initiative.** In my session, I will present my documentary on my senior project. It will highlight our enriching trip to Ireland and my impactful teachings in Biddeford, Maine. The documentary will showcase our adventures, insightful interviews with students and teachers, and much more. The main focus is cross-cultural teaching of STEM education in Ireland and Maine through the Mini-Maine Boat Project.

Rochelle Strauss, Strauss House; Lauren Rader

[EAST] **Navigating the Sea: Harnessing Illustrated Non-fiction Children's Books to Build Ocean Literacy.** Award-winning author Rochelle Strauss and science teacher Lauren Rader team up to share their innovative approach to teaching about ocean and climate science, using illustrated non-fiction children's books. As powerful learning tools, these books create effective and meaningful educational experiences that build ocean and climate literacy, and inspire young people to take action. Showcasing a selection of non-fiction illustrated books; this session will provide practical tips for educators on modifying and supplementing existing resources to address gaps in ocean science and climate change education materials. A crowdsourcing activity will also build a reference list of additional books for classroom use.

Alison Spasyk, Lake Champlain Sea Grant Watershed Alliance; Ashley Eaton

[MET] **What is watershed education? Defining the objectives and competencies of watershed education initiatives.** A watershed is defined as the area of land that drains into a common water body. Everyone lives in a watershed and has a stake in protecting it. Many students learn about

water in a place-based context, but few researchers have explored how and why watershed education is taught, and what makes watershed education unique. This lightning talk will provide a brief overview of what we already know about watershed education and ask attendees to participate in an ongoing research project that aims to define the objectives and competencies of watershed education by gathering expert opinion through an open survey.

Jamie Steichen, Texas A&M University

[MET] **First year experience course: Increasing student engagement with hands on learning and high impact practices both in and out of the classroom at the university level.** In my classroom, I work to incorporate current topic examples so that the students are not only learning skills and techniques but are also becoming better informed citizens. If you are looking for new tools to incorporate in your upper level classrooms, please join! I will focus on sharing information about a few of the strategies that have worked best thus far including the graphical syllabus, 3-2-1 Go! activity, participation bingo cards, creating an infographic, creating a 5 min video and the SiS networking reception.

Elizabeth Stratton, University of North Carolina at Wilmington, North Carolina State University

[MET] **Learning across waters: Developing a comparative evaluation for the Oceans for All Alliance.** Please join us as we share our work on a comparative evaluation of a new alliance of immersive ocean-focused programs for youth in the Galapagos Islands, Ecuador, and South Africa. We are developing a single crosscutting survey instrument to measure diverse and aspirational student outcomes across this alliance. This approach allows for comparisons across the participating organizations to enhance organizational learning through evaluation and to build a community of practice across organizations and cultures. Participate in this presentation to learn about the beginning stages of development for the Oceans for All Alliance! Additional Authors: (B. Troy Frensley, Associate Professor and Applied Learning Coordinator, University of North Carolina at Wilmington, Department of Environmental Sciences; frensleyb@uncw.edu) (Ms. Hannah Bell, Lab Coordinator and Lecturer, University of North Carolina at Wilmington, Department of Environmental Sciences; bellh@uncw.edu)

Jolie Griffey, PLACE with Mississippi State University Extension;

[310] **"When did it happen?" A Sea-Level Rise game for everyone!.** Wanna play a game? "When Did It Happen?" timeline game is an interactive game designed to bridge the gap between citizens and sea level rise (SLR) science using NASA SLR data. The game uniquely addresses the challenge of timescale comprehension by combining popular world events with real-world SLR data from the past 30 years. During the session, participants will be able to play the game to receive a better understanding of how it can be adapted to their needs. "When Did It Happen?" can be modified for all ages to promote a deeper understanding of climate impacts on local communities. Additional Authors: Ali Rellinger, PLACE Director, PLACE with Mississippi State University Extension. Renee Collini, Director of the Gulf Center for Equitable Climate Resilience, The Water Institute

Delanie Medina, California Sea Grant

[310] **Developing Sea-Level Rise Content with NASA for Educators in California and the U.S.** The Sea Level Education, Awareness and Literacy (SEAL) project is a national NASA and NOAA Sea Grant partnership effort to expand and improve sea-level rise (SLR) educational content and activities. The presentation will describe how team members, California Sea Grant and the Climate Science Alliance, are developing Climate Kids Traveling Trunks to provide hands-on science, storytelling and art resources to help teach SLR topics. It will also highlight ways the project is expanding SLR content for informal and formal educational learning institutions, with a specific focus on strategies for engaging and supporting Spanish speaking and Tribal educators and youth. Additional Authors: Laura Engeman, Extension Specialist, California Sea Grant, Scripps Institution of Oceanography, University of California San Diego/Jeanette Starpine, Director of Education & Engagement, Climate Science Alliance/Benjamin Hamlington, NASA JPL Scientist/Angelica Rodriguez, NASA JPL Scientist/Claire Earlie, NASA JPL Scientist/Kyra Adams, NASA JPL Scientist/Renee Collini, Executive Director, The Water Institute/Ali Rellinger, PLACE Director, MSU Extension Instructor/Jolie Griffey, PLACE Education & Outreach Specialist, MSU Extension Associate/Angie Dixon, Marine Educator, Dauphin Island Sea Lab/Jill Gambill, Executive Director, Coastal Equity & Resilience Hub, Georgia Tech/Katie Higgins, Marine Educator & Volunteer Coordinator, Georgia Sea Grant/Tyler Kinner, Research Scientist II, Georgia Tech Research Institute, Georgia Tech/Jayma Koval, Research Associate II, Center for Education, Integrating Science, Mathematics, and Computing (CEISMC), Georgia Tech/Anne Lindsay, Associate Director or Marine Education, Marine Extension & Georgia Sea Grant/Karen DeMeester, Public Service Associate, Carl Vinson Institute of Government/Bilijana Birac, Graduate Research Assistant, Carl Vinson Institute of Government

Cheryl Milliken, Falmouth High School

[310] **Sea Level Rise and Storm Surge in Falmouth.** Students in Falmouth High School's Marine Ecology class developed a proposal to the town to install visuals to help the public understand sea level rise (SLR) and its implications in Falmouth. Falmouth can expect to see an increase in frequency and intensity of storms and localized flooding is already a problem; education and awareness are key to resilience. Students came up with a number of visual representations to install in a few highly visible sites around town.

Kristen Keane, Artist Boat

[312] **Island STYLE- Systemic Training for Youth Leadership in the Environment: a collaborative effort between NOAA BWET, Artist Boat, the local school district, and natural resource organizations.** The youth on Gulf of Mexico islands are uniquely poised to be the future leaders in their communities facing a dynamic changing ocean. Island STYLE was designed to engage a 6th grade campus on NOAA BWET MWEE's through teacher led curricula that would result in student led decision making. Through permanently embedded inquiry lessons, students determined a burning question to investigate and develop into a field adventure and environmental action project. Island STYLE curriculum included teacher professional development, core subject lessons based on NOAA priorities and trust resources, and Artist Boat led workshops and kayak adventures. Addl Authors: Sarah Frantz, Education Program Manager, Artist Boat; Amy Neblett, Operations Director, Artist Boat

Shannon Donovan, The NEED Project

[315] **Exploring Offshore Wind Energy.** Hands-on, critical thinking activities to help students explore the technology, siting, and benefits of floating offshore wind turbines. Lessons designed to help students develop a comprehensive understanding of the scientific, economic, environmental, technological, and societal aspects of wind energy and offshore wind development. Participants will learn about the physics of wind, and how we harness wind's energy today both offshore and onshore, just as their students would in the classroom. Learn how energy is used and how electricity is generated in the United States and how wind can do work!

Maggie Allen, NOAA

[TER] **Tapping into heat and health resources with NOAA.** Did you know that NOAA works in human health? Because human health is intricately linked to the health of other animals and the environment, all of which are influenced by the weather and climate, NOAA is a great fit to house a One Health Program. This initiative has relevant focus areas including "benefits from the sea", "aquaculture", and "aquatic organism health". NOAA also hosts Heat.gov, a source of heat and health information that contains useful activities and tools for various audiences and settings. Come to this lightning talk to learn more about NOAA's resources on heat and health! Additional Authors: Juli Trtanj (Climate and Health Program Director and One Health Lead at NOAA) and Alice Lau (One Health Coordinator for NOAA), Hunter Jones (Deputy Climate and Health Program Director and NIHHIS Program Manager for NOAA), Morgan Zabow (Community Heat and Health Information Coordinator for NOAA), and Lauren Balotin (NIHHIS Communications Coordinator for NOAA)

Paul Dobbins, World Wildlife Fund US

[TER] **Advancing Seaweed and Shellfish Farming for Climate and Societal Gains.** Using storytelling and visuals, Paul explains how seaweed and shellfish farming can be beneficial to environment, coastal communities and local oceans.

Keri Kaczor, Maine Sea Grant

[TER] **Seaweed in the Classroom: A Program to Grow Ocean Literacy in K-12 Audiences in Maine.** Maine's working waterfronts are diversifying, and innovative businesses and dynamic supply chains are key to the future resiliency of the marine economy. This collaborative project increases ocean literacy and builds career aspirations into K-12 classrooms. Project themes include the history of seaweed use globally, seaweed biology and ecology, how seaweed is a sustainable, highly-nutritious food source, its role in providing income and food security, its contributions to solutions for a changing climate, and other ways seaweed supports coastal communities and economies. The project's impacts and accomplishments, including lessons learned and future directions will also be shared. Additional Authors: Maya Pelletier

Concurrent Session #7: Tuesday, July 30—2:30 – 3:30 pm

Brian Slopey, Vtvlc

[ACAD] **Marine Biology : An Innovative Hybrid Model.** Marine Biology combines online and hands-on learning (VTVLC), and is designed to inspire young adults to understand and care about the ocean, regardless of what occupation they pursue. One of the main goals of Brian Slopey's teaching has been to motivate students with authentic activities that are real contributions to the community and nature and that involve students with organizations outside the school. Students have collaborated with Friends of the Winooski, the UVM Watershed Alliance, the Montpelier Conservation Board, CCMI (Central Caribbean Marine Institute), BIOS (Bermuda Institute of Ocean Science), and The Reef Environmental Educational Foundation to name a few. Students are motivated to learn more and at a deeper level when they know their work is real and is available to the public.

Katie Lodes, St. Joseph Academy, St. Louise, MO; Nancy FitzGerald; Miriam Sutton

[BCT] **EARTH (Education and Research: Testing Hypotheses): Engaging students using climate and ocean science data.**. EARTH affiliated teachers will lead participants through lessons that use ocean and climate data in interactive and engaging ways. The activities will include: Using a digital breakout to understand the climate and ecosystem of Antarctica; Using the card game 'War' to show how changes in ocean chemistry affect life in the ocean; and Using art and data visualization to engage students in climate data. Participants will take away three ready-to-use lessons and will be given an overview of the Monterey Bay Research Institute's (MBARI) EARTH website to find additional lessons that can be adapted for a K-12 classroom. Additional Authors: Kathleen Couchon, educator, email: kmcouchon@gmail.com Jacqueline Galella, educator, email: jgalella@kearnyschools.com Joanna Chierici, Content specialist: Imagine Learning, email: jchierici@gmail.com

Maya Pincus, International Ocean Discovery Program; Sharon Cooper

[CONF] **Traveling through time with the International Ocean Discovery Program: Scientific ocean drilling reveals Earth's past.** The JOIDES Resolution is a research vessel that drills into the ocean floor to collect samples on behalf of the International Ocean Drilling Program. Data collected during IODP expeditions are used to better understand climate change, geology, Earth's history, natural hazards, and the evolution of life. In this workshop, participants will learn how to incorporate free JR resources into their curricula to make science real for their students. Participants will engage with hands-on activities that take students on a time-traveling adventure through Earth's geologic history, coming away with several data-based, standards-aligned lessons that involve students in real-world science. Additional Authors: Ed Robeck, AGI; Lindsay Mossa, AGI; Lauren Brase, AGI; Sequoyah McGee, AGI

Kaleigh Ballantine, NOAA Office of Education

[EAST] **Drawn to learning: Creating accessible and engaging visual communication materials.** The visual aspect of science communication and education is critical, but is often treated as a last-minute addition rather than an integrated tool. Take it from a recent student: before learners can understand the content, they first have to understand the format that it's being presented in. This

session will provide tips on creating accessible, engaging, and effective visuals for science communication and education from the perspective of a graphic designer for NOAA Education. From colors to fonts to layouts, together we'll explore design best practices — and have some fun with worst practices along the way!

Cait Goodwin, Oregon Sea Grant

[EAST] **Tsunami Quests Lead to High Ground.** Knowing what to do in an emergency can be critical to life safety. Developed by Oregon Sea Grant's Oregon Coast Quests program, "Tsunami Quests" are fun and active outdoor hunts that help people of all ages learn about earthquake and tsunami preparedness on the Oregon Coast. Using maps and engaging directions, participants collect clues from the environment as they discover when and how to evacuate to high ground. Join this session to see how Tsunami Quests build community resilience and promote a culture of preparedness among residents and visitors.

Emily Wanous, Algalita Marine Research and Education

[EAST] **Supporting Educators as Allies in Environmental Movements.** Introducing Wayfinder Society for Environmental Education: an innovative, free online program empowering educators with current environmental education resources on plastic pollution. climate change, and related issues. Resources include reusable classroom toolkits, downloadable lesson plans, educator mini-grants, and more. This lightning session is brought to you by, Algalita, the organization that started the movement to end plastic pollution nearly 30 years ago when they were the first organization to bring attention to the swirling soup of plastic in the Pacific – commonly known as the Great Pacific Garbage Patch. Since then, Algalita has revolutionized the plastic pollution conversation by building a web of connections between researchers, activists, educators, and young people across the globe. Come explore the world of environmental education with us!

Marianne Walsh, Atlantic White Shark Conservancy; Kristen Smith

[MET] **Coexisting with White Sharks: How research and education initiatives are working to change public perception.** Join the AWSC Education Team and learn how you can bring shark education to your students and community. This workshop will introduce you to standards-based curriculum that connects learners to the natural history of white sharks in new england and empowers them to investigate how humans and wildlife can coexist. Workshop participants will receive free resources to use this curriculum on their own and will have an opportunity to get wet while participating in an engineering lab that teaches about research technology used in tracking sharks. This workshop will be wicked jawesome!

Kasey Gaylord-Opalewski, EarthEcho International; Sean Russell

[310] **An Ocean of Opportunity: Engaging Students in the Blue Economy.** Connect youth to the sustainable blue economy with EarthEcho International! Join us to explore EarthEcho Academy resources, including An Ocean of Opportunity interactive module and companion activities that examine renewable energy, explore plastic alternatives, and inspire wave energy capture through biomimicry. Learn how your students can participate in EarthEcho's Ambassador programs, an immersive learning and capacity building experience to develop their own community-based projects focused on the blue economy, regenerative ocean aquaculture, and plastic pollution. Come away with access to FREE E-STEM resources and introduce your students to a growing community of young ocean advocates through EarthEcho's GenSea community platform.

Jennifer Kennedy, Blue Ocean Society for Marine Conservation; Cynde McInnis

[312] **Inflatable Whales Present a Unique Learning Opportunity.** Inflatable whales provide a unique opportunity to teach people about marine mammals. There's nothing like a 60-foot, life size whale to give students an appreciation of the size of these magnificent animals. Programs can be tailored to teach students about habitat, behavior, and human impacts, depending on the age of the students and the geographic area. They can also inspire enrichment activities like reducing plastic use and inspiring students to explore STEM careers. Learn about the life-sized whales you can bring to your classroom and activities that anyone can do to help students learn about whales. Additional Authors: Nicole Sullivan, niki@blueoceansociety.org

Allison Rosner, NOAA Fisheries

[315] **NOAA's Bay Watershed Education and Training (B-WET) Program: New England.** This session will introduce how the B-WET program funds projects engaging teachers and students across New England in Meaningful Watershed Educational Experiences (MWEEs) leading to environmental action. We will touch on national program evaluation results that help to support the MWEE framework and best practices for teacher professional development and longer-term integration of outdoor experiential learning in sustained curricular experiences. This session will highlight resources for using the MWEE framework in informal and formal education settings, and showcase current New England B-WET grant recipient successes working directly with schools, teachers, students, and other community partners. Additional Authors: Bronwen Rice (NOAA Office of Education), Jaime Frungillo (NOAA Office of Education), Tim Zimmerman (NOAA Office of Education)

Diana Payne, Connecticut Sea Grant; Meghan Marrero; Molly Dushay; Jamie Mack; Laura Moore; Michael O'Connor

[TER] **A Network of Long Island Sound Schools: Protecting the Sound One School at a Time.** How can we cultivate the next generation of environmental leaders and stewards? Involve teachers, students, and entire school communities in caring for local watersheds! Modeled on USA Blue Schools, this network showcases 10 schools from Connecticut and New York committed to protecting and conserving local watersheds, Long Island Sound, and our one global ocean. Hear directly from program leads and teachers involved in the network who will share their experiences and results, and how being recognized as a Long Island Sound School has validated district efforts to "make learning about Long Island Sound an integral part of the curriculum." Additional Authors: Ashley Morrell, Student, University of Connecticut ashley.s.morrell@uconn.edu

Concurrent Session #8: Tuesday, July 30—3:30 - 4:30 pm

Robin Lea, Gulf of Maine Research Institute; Meredyth Sullivan

[ACAD] **Engaging Youth to Develop Coastal Flood Resilience Strategies.** Come learn about the Planning Forward resource developed by the Gulf of Maine Research Institute which helps people living in coastal areas of Maine think about and prepare for flooding in their communities. This interactive, card-based activity is part of a larger set of strategies designed to engage students, educators, community members, businesses and municipal leaders in thinking and action around climate resilience. Participants in this workshop will experience the Planning Forward activity and have opportunities to think about how to adapt it to their own communities and settings.

Miriam Sutton, Science by the Sea; Katie Lodes

[BCT] **Floating GO-BGC Data into the Classroom.** This session introduces participants to the Global Ocean Biogeochemical (GO-BGC) Array used to monitor our global ocean. Participants are guided through two lessons to complete investigations of the ocean's biogeochemical cycle: 1) An introductory lesson (Adopt-a-Float Starter Lesson) to navigate the GO-BGC website and data portal to complete a graphing activity and 2) An extension lesson (Ocean Check Up) to investigate additional data from the data portal for analysis. Participants will gain full access to each lesson, including answer keys and background information to assist in assimilation to their classrooms. Additional Authors: Katie Lodes, Science educator, St. Joseph Academy, St. Louis, MO

Victor Blanco, University of Florida Extension and Florida Sea Grant

[CONF] **Scuba Diving in Extension: An innovative approach for youth development and underserved groups inclusion.** In Taylor County, the Extension office explored using scuba diving as an educational tool for youth and individuals with disabilities. Objectives included offering access to hands-on underwater experiences, educating about aquatic ecosystems, and fostering life skills like teamwork and emotional intelligence. Methods involved the 4-H Summer Dive Camp and Diving with Disabilities activities, incorporating lectures, pool practice, and open water dives. Results showed high exam scores and increased awareness and knowledge of marine ecosystems. This approach enhances diversity and inclusion in marine extension programs while fostering a deeper understanding of the underwater world and life skills development.

Chris Payne, Dirigo Science Connection

[CONF] **Leading the Way: How Cultivating Leadership Skills Strengthens Science Education.** A brief presentation on how valuable leadership development is for scientists in all areas, especially science education. This will involve audience participation and a presentation of ideas, leadership traits, and ways to approach leadership development in the science field. If this was to be a full session, it would be more involved with activities/handouts and group participation.

Laura Lilly, Hyannis Whale Watcher Cruises

[CONF] **Communicating with Compassion: Using Perspective Taking to Achieve Results and Reduce Burnout.** Wondering how you or your team can advance educational effectiveness, build rapport, and alleviate burnout? As educators, we often focus on the scope of our objectives and goals but ensuring that our message reaches diverse and ever-changing audiences can be difficult. This session offers strategies for developing greater cognitive empathy to allow for clearer communication and higher levels of engagement across various platforms. Understanding where misconceptions arise and building on learners' expectations allows for a well-rounded approach to messaging and reduces emotional fatigue.

Alexandria Gillen, National Oceanic and Atmospheric Administration

[EAST] **Marine Debris Communications Lab: Support Youth to Go From Raising Awareness to Inspiring Action with NOAA.** It can be challenging to communicate information on pressing environmental issues like marine debris without losing hope. The NOAA Marine Debris Program will share best practices and resources for communicating about marine debris in a way that leaves audiences, including youth and local communities, feeling empowered to make a difference. When the science is effectively communicated, youth can quickly recognize the issue of marine debris and then turn their knowledge into solutions with immediate relevance and long-term impacts on their communities. We will model and demonstrate tools to inspire those voices with meaningful, energizing knowledge on marine debris.

Patrick Kirby, Center for STEM Education-University of Southern Mississippi; Hannah McDuffie

[MET] **From the Classroom to the Coast: Connecting High School Students to Ocean Science and Engineering Career Pathways through Immersive Experiences and Collaborative Partnerships.** GenSea is a marine STEM workforce development program that connects high school teachers and students to career pathways along the Coastal Mississippi corridor through immersive field trips, internships, and teacher professional development. The University of Southern Mississippi leads the program in collaboration with over 20 partner organizations, including educational institutions, government agencies, and private companies. By developing a diverse partnership ecosystem, GenSea exposes students to authentic STEM settings, applications, and professionals. This session will discuss the program's institutional partnership development, impacts on student awareness, attitudes, and interests in STEM careers, and implications for future growth and informal STEM education initiatives. Additional Authors: Hannah McDuffie, Graduate Research Assistant, University of Southern Mississippi, hannah.mcduffie@usm.edu

Julia Wente, Montana State University-Bozeman

[MET] **Analyzing Trends in Humpback Whale Abundance Using Citizen Science.** Every year since 1996, the Hawaiian Islands Humpback Whale National Marine Sanctuary has hosted its signature Sanctuary Ocean Count during the peak season of humpback whale activity in Hawai'i. The Sanctuary Ocean Count brings together volunteers three times a year to count whales from almost 70 sites across O'ahu, Hawai'i Island, and Kaua'i. This citizen science project is not only a fun education and outreach opportunity but, with this analysis of the complete dataset for the first

time, gives a "snapshot" of whale sightings across the islands, providing insight into population trends and supplementing data collected from other Sanctuary research.

Alicia Williams, University of New England; Charles Tilburg

[MET] **From River to Ocean: Exploring Nutrient Impacts on Phytoplankton in the Saco Estuary, ME.** A Course Based Undergraduate Research Experience (CURE).. CURE pedagogies enrich student experiences through active learning with authentic scientific research. This multi-lab CURE focuses on understanding nutrient/phytoplankton dynamics in estuaries. Across successive labs students collect water samples along an estuarine gradient and establish nutrient enrichment bioassays. Standard curves and in situ nutrient concentrations are determined with color chemistry. Chlorophyll a concentrations are measured before and after nutrient enrichment. Students generate scientific figures and apply statistics to collected data culminating in a writing assignment styled like a scientific research article. These methods deepen comprehension of complex concepts and foster practical skills that prepare students for futures in Ocean Science.

Li-Ying (Laura) Lin, Ocean Affairs Council

[310] **Integrate National Resources to Build a Ocean Literacy Benchmark Nation (OLBN) by OAC.** Ocean Literacy Benchmark Nation (OLBN) proposed by the Ocean Affairs Council, focuses on two main objectives: "Constructing a Benchmark Nation for Ocean Literacy" and "Promoting the Upgrade of Talent in the Marine Industry." Under these two main objectives, information technology is integrated to establish two major systems: the Ocean Literacy Digital Academy (Project 1-1) and the Marine Talent Digital Academy (Project 2-1). These systems facilitate the integration of information on ocean literacy and the marine industry. Additionally, the project involves creating ocean literacy and marine industry talent learning passports through information systems. The development of the Ocean Literacy Competency Model (Project 1-2) and the research and development of common and core competencies in the marine industry (Project 2-2) contribute to the establishment of a foundational framework for talent training that aligns with international standards. Furthermore, the project includes marine talent supply and demand surveys (Project 2-4) and an annual marine talent supply and demand report (Project 2-5) to establish a comprehensive database. Through the Ocean Literacy Academic Conference (Project 1-6), research talent is nurtured, optimizing and expanding the project's capacity continuously. Collaborative efforts with Lawrence Hall of Science, UC Berkeley, US in developing OSS 9-12 lesson plans (Project 1-7) address gaps in ocean literacy lesson plans. The research output is used to promote foundational competency training for leadership talent (Project 1-3), facilitate international connections for leadership talent (Project 1-4), and enhance the social influence of leadership talent (Project 1-5). Ultimately, the project aims to establish an industry talent training system and enhance industry competitiveness through partnership relations (Project 2-3). The project is scheduled to commence its four-year mid-to-long-term development plan from January 2025 to Dec 2028. In addition to proposing the mechanism for a model nation in ocean literacy, the project also aims to collaboratively promote Asian ocean literacy through joint efforts with AMEA (Asian Marine Educators Association) and contribute to achieving the United Nations Sustainable Development Goals. Additional Authors: Ray (Chia-Dai) Yen, Director of Planning and Training Center; Chih-Chang Chou, Section Chief, Department of Science, Technology, Culture, and Education, Ocean Affairs Council

Dani Dilullo, Louisiana Sea Grant; Vanessa van Heerden

[312] **EnvironMentors: Ten Years of Lessons Learned from a High School Science Mentoring Program with Underserved Youth.** LSU EnvironMentors (EM) is an award-winning, after-school science mentoring initiative that pairs underrepresented students from area high schools with LSU graduates and undergraduates. For over ten years, Scotlandville High School, LSU College of the Coast & Environment, and Louisiana Sea Grant have partnered on this initiative that bridges local schools and the college campus. Hear perspectives from the multiple partners involved in this project: a high school biology teacher, a graduate student coordinator, and the university partner. Each will share the valuable lessons they have learned and how they are continuing to adapt the program to changing students' needs. Additional Authors: Dr. Brian Snyder, LSU, Department of Environmental Science; Hannah Beck, LSU, Department of Oceanography and Coastal Sciences

Vanessa van Heerden, Louisiana Sea Grant; Pamela Francis; Dani Dilullo

[312] **Mapping Out Our World Through the GeoStewards Program.** High school students from underrepresented communities gained new insight into data visualization and science communication through an afterschool STEM leadership initiative. Participants conducted independent research projects using ArcGIS Pro and StoryMaps, modeled how applied geospatial research aids in understanding environmental issues, and left the program career ready with a GIS certificate. Learn from project partners about the lessons learned and insights gained from the pilot year of this program, ideas for the future, and how students in the program are becoming informed environmental stewards for their communities. Also, come see some of the work they have created! Additional Authors: Naya Black, Louisiana Sea Grant; Brian Snyder, Associate Professor in Environmental Sciences, Louisiana State University; Sibel Bargu, Professor of Oceanography and Coastal Sciences, Louisiana State University

Kristen Smith, Atlantic White Shark Conservancy

[315] **The Gills Club: Creating the next generation of shark and ocean stewards through a diverse array of educational opportunities.** The Gills Club is Atlantic White Shark Conservancy's STEM-based education initiative dedicated to connecting girls with female scientists from around the world, sharing knowledge, and inspiring the next generation of shark and ocean advocates. A strong piece of this program is the direct access to leading female researchers who are a part of the Gills Club Science Team. During this presentation, we will share how you can bring shark researchers and shark research projects to your audience through our podcast, Gills Talk. As more programs have students looking to engage with a career professional, this is a great way to provide access to your students. Additional Authors: Marianne Walsh, Atlantic White Shark Conservancy, Cynthia Wigren, Atlantic White Shark Conservancy, Dr. Heather Marshall, Julie Patterson

Ginny Carlton, Wisconsin Sea Grant

[315] **Coastal Engineering Education: People, Place and Practice.** Erosion and sediment transport are natural processes that engineers strive to modify to achieve particular objectives. This session will share resources (e.g., lesson plans and a small-scale wave tank model activity) created as part of a BWET grant for middle school students. Coastal Issue Quest storymaps will also be highlighted. Participants, please bring the following for use in hands-on activities: 1) a 2-4 oz sediment sample from your local waterway, and 2) a news article describing either: a) a coastal infrastructure project designed to mitigate erosion or sediment transport or b) the impact of coastal erosion on people, property (place) or practices. Additional Authors: Anne Moser, Senior Special Librarian and Education Coordinator, Wisconsin Sea Grant; Adam Bechle, Coastal Engineering Outreach Specialist, Wisconsin Sea Grant

Chris Flight, Maryland Sea Grant; Amy Lang

[TER] **Aquaculture is Agriculture.** The Aquaculture is Agriculture program teaches 7th grade students about innovative agricultural practices and related college/career opportunities. This session will outline the interactive activities used to teach over 500 youth about this topic. Genetics punnett square race · Tragedy of the commons – Aq v. Wild · Aquaculture selfie station - roleplay scenario allowing youth to handle tools, and discover how they are used. To build upon youth interest generated during Ag Awareness Days, youth are invited to join a 4-H aquarium club to learn the basics of fish husbandry and explore college/career related opportunities in greater detail. Additional Authors: Catherine Frederick, Extension Associate, University of Maryland Extension

Concurrent Session #9: Wednesday, July 31—10:00 am – 11:00 am

Angela Scapini, Michigan State University Extension; Meaghan Gass; Ginny Carlton; Angela Greene

[ACAD] **Navigating the Seas of Educational Innovation: Leveraging CGLL's Peer-Review Process for Dynamic Curriculum Maintenance and Accessibility.** Explore how to keep curriculum and lessons up to date using CGLL's piloted peer-review process focused on content, alignment, and digital accessibility. In this session, participants will learn about current education resources available online and how Sea Grant partners review and manage their digital library. Throughout these neverending efforts, we focus on our target audience and call to action - getting educators to use the resources with youth! Additional Authors: Meghan Loughlin-Krusky, Training Program Developer & Instructional Designer, Michigan State University Extension, loughli5@msu.edu; Lyndsey Manzo, Education Specialist, Ohio Sea Grant, manzol@wcsoh.org; Brandon Schroeder, Extension Educator, Michigan Sea Grant and Michigan State University Extension, schroe45@msu.edu

Warren Sevaaetasi, Department of Marine and Wildlife Resources; Naomi Galea'i

[BCT] **Building Resilient Communities in American Samoa.** The people of American Samoa have always been dependent and reliant on their natural resources for sustenance and livelihood. The Department of Marine and Wildlife Resources promotes management, conservation and sustainable development of American Samoa's Coral Reefs and their supporting ecosystems through programs like the Community-based Fisheries Management Program. A co-managed approach by the department and villages to develop Village Management Plans and designate Marine Protected Areas to help ensure that Village Communities have a sustainable way of protecting and using their resources. Empowering and preserving the "Fa'a Samoa," the process utilizes traditional village council meetings with Matais(Chiefs), Untitled Men, Women and Youth Groups. These meetings identify different resource users, historical village resource profiles, village legends, tales and tapu. Additional Authors: Maria Vaofanua, Division Head, Christina Samau, Education Assistant, Naomi Galea'i, Information Technician, Department of Marine & Wildlife Resources

Madison Willert, NOAA Sea Grant; Diana Burich; Maurice Crawford; Vanessa van Heerden; Keri Kaczor; Cait Goodwin; Ben Bray

[CONF] **Sea Grant's Role in Developing Marine Debris Literacy**. (Back to Back Session) This session showcases current Sea Grant-funded efforts via the Bipartisan Infrastructure Law and the Inflation Reduction Act to advance marine debris literacy. Included projects span the nation and will cover curriculum development, public outreach campaigns, community stewardship, and other relevant topics.

Sandra Bilbo, Grand Bay NERR

[EAST] **Learning How to Block Print: A Mini Art Workshop**. (Back to Back Session) Block printing is a fun way to recreate and share artwork. Inspired by the Walter Anderson Museum of Art, Grand Bay NERR educators have incorporated block printing into education programs. In this mini-workshop, participants will learn how to carve their own blocks and print pieces to share. There will be discussions among participants on how to bring block printing and other art into your programs. Everyone should have a marine-themed image in mind that could fit on a 2"x3" block. The simpler your design, the better! Due to limited supplies, we may have to share materials.

Yolanda Sánchez, Independent; Celeste Kroeger Campodónico

[MET] **Strengthening Ocean Education in Latin America: RELATO's Experience.** The Latin American Marine Educators Network (RELATO) emerges to promote ocean literacy and marine conservation, spotlighting educators' efforts in the region. Through the "Marine Plankton: Ocean Wanderers" project, RELATO designed and facilitated an interactive workshop for teachers from 8 Latin American countries, impacting 1171 participants across 33 institutions. This experience underscores the importance of meaningful didactic activities and teacher support, revealing student learning. Are you ready to be part of this workshop and share with us your learnings? Additional Authors: Celeste Kroeger Campodónico, Master in Marine Biodiversity and Conservation. Millennium Nucleus for Ecology and Conservation of Temperate Mesophotic Reef Ecosystems. RELATO's Co-founder celekroeger@gmail.com

Nancy FitzGerald, Rutgers University; Kay Bidle; Kim Thamatrakoln; Kathy Couchon

[310] **Shunt of Shuttle? Introduce your students to marine viruses and their impact on the ocean's role in the carbon cycle.** Participants will be introduced to a convergent team of experts in ocean research led by Rutgers University that is studying how phytoplankton are affected by viruses. The results of these interactions impact the ocean's role in the carbon cycle and the ecosystem's impact on climate change. The research is supported by the 'Tools of Science' program that provides an engaging way to include scientific research into the classroom. Educators will leave with access to ready to use data, lessons, and videos allowing them to incorporate this interdisciplinary unit into their advanced middle school, high school or junior college classroom. Additional Authors: Janice McDonnell professor, Department of Youth Development Rutgers University email: mcdonnel@marine.rutgers.edu Kay Bidle Professor, Department of Marine and Coastal Sciences, Rutgers University Ph.D., Marine Biology/Oceanography, Scripps Institution of Oceanography email: bidle@marine.rutgers.edu Kim Thamatrakoln. Professor, Department of Marine and Coastal Sciences, Rutgers University Ph.D. Marine Biology, Scripps Institution of Oceanography email: thamat@marine.rutgers.edu Kathy Couchon Science Teacher at Narragansett High School email: kmcouchon@gmail.com

Mary Carla Curran, M.I.T./Woods Hole Oceanographic Institution

[312] **Teaching students about the links between marine food webs, Harmful Algal Blooms (HABs), and food safety.** Photosynthetic phytoplankton such as diatoms and dinoflagellates produce oxygen and are important in marine food webs. We present several K-12 activities about phytoplankton highlighting their role in marine ecosystems and harmful algal blooms (HABs). Students learn how data are collected and used to predict blooms and ensure seafood safety, and analyze "real" data about HAB growth responses and bloom dynamics. Thought questions focus on data interpretation and the relevance to public health managers. Modifications for visually impaired students are provided. The activities conform to NGSS and Ocean Literacy Principles. Door prizes and handouts will be distributed! Additional Authors: Mindy L. Richlen

Sonia Ahrabi, New York Aquarium; Emily Yam

[TER] **Nature-Based Programs at Aquariums.** Families in historically-excluded communities do not always have access to healthy, green spaces and benefit from nature and play-based experiences in cultural organizations. Aquarium of the Pacific and New York Aquarium will discuss programs that engage families in their local urban audience. Aquarium-based guided exploration is a helpful tool to demonstrate to families how to safely explore and utilize these spaces. Additionally, programs that engage families help to inspire multi-generational conservation advocates. This session will include opportunities for others to share-out their own successes and challenges with nature-based programs.

Concurrent Session #10: Wednesday, July 31—11:00am–12:00pm

Austin Pugh, NERACOOS

[BCT] **The Northeastern Regional Association of Coastal Ocean Observing Systems: meeting stakeholder information and educational needs.** As part of our mission to meet societal and end user needs, NERACOOS produces, integrates, and communicates information about our region's coasts and oceans. We regularly engage with stakeholders to transform data collected by our observation network into products, including the mariners dashboard which provides information on marine conditions like wave height and wind speed. The NERACOOS educational objective is exemplified by an ongoing project, the Northeast Coastal Acidification Network's Education and Outreach working group, which is tasked with developing educational products. By working with educators, NERACOOS can bring local ocean observing into the classroom and better meet our mission. Additional Authors: Jake Kritzer, Jackie Motyka, Tom Shyka, Rob Cardeiro, Emily Silva, Katy Bland, Cameron Thompson, Anna Simpson

Nora Skinner, Mississippi State University Coastal Conservation and Restoration Lab;

[BCT] **Fostering STEM Career Skills Through "Plan-It Marsh" & "GRITS".** Advancing STEM career skills and coastal resilience through the Mississippi State University Coastal Research and Extension Center's "Plan-It Marsh" and "G.R.I.T.S." programs. This talk provides an overview of these hands-on programs for middle and high school aged students. Participating students learn skills such as growing marsh and dune grasses for restoration projects, UAS operation, boat operation, and navigation and mapping. Flyers will be brought to hand out to interested educators with information about the programs and links to the complementary curriculum that is associated with both programs. Additional Authors: Stacy Hines - Assistant Professor and Extension Range Specialist, Texas A&M AgriLife Extension, Allie Koehn - Extension Program Associate, Mississippi State University, Anthony Vedral - Extension Associate, Mississippi State University, Eric Sparks - Assc Extension Prof & Director, Mississippi State University, Mississippi-Alabama Sea Grant Consortium

Joe Dellicarpini, NOAA National Weather Service

[BCT] **Storm Tide Pathways: A Collaborative Effort to Mitigate Coastal Flood Impacts.** Recent collaboration with the Center for Coastal Studies (CCS) in Provincetown, MA identifies and maps storm tide pathways (locations where water flows from the shore). This information is integrated with NWS Boston's forecasts and can be used by emergency managers to prepare for coastal flooding events and to plan for future improvements. This presentation will describe the NWS forecast process and how Storm Tide Pathways are developed. An examples of how the partnership worked in Provincetown, MA to mitigate flood impacts will be shown in order to demonstrate the utility for other communities that are affected by coastal flooding. Additional Authors: Mark Borrelli and Steve Mague

Madison Willert, NOAA Sea Grant; Diana Burich; Maurice Crawford; Vanessa van Heerden; Keri Kaczor; Cait Goodwin; Ben Bray

[CONF] **Sea Grant's Role in Developing Marine Debris Literacy** (Back to Back Session) . This session showcases current Sea Grant-funded efforts via the Bipartisan Infrastructure Law and the Inflation Reduction Act to advance marine debris literacy. Included projects span the nation and will cover curriculum development, public outreach campaigns, community stewardship, and other relevant topics.

Sandra Bilbo, Grand Bay NERR

[EAST] **Learning How to Block Print: A Mini Art Workshop.** (Back to Back Session) Block printing is a fun way to recreate and share artwork. Inspired by the Walter Anderson Museum of Art, Grand Bay NERR educators have incorporated block printing into education programs. In this mini-workshop, participants will learn how to carve their own blocks and print pieces to share. There will be discussions among participants on how to bring block printing and other art into your programs. Everyone should have a marine-themed image in mind that could fit on a 2"x3" block. The simpler your design, the better! Due to limited supplies, we may have to share materials.

Aimee Bonanno, UMass Boston; Diana Payne; Grace Simpkins

[MET] **Working Collaboratively Toward Equity, Access, and Belonging in Ocean Science.** The New England Ocean Science Education Collaborative works together to leverage assets and strengthen ocean literacy in the region with common goals of co-learning, co-development, and co-dissemination. In 2022, we added a goal to make ocean science education more equitable, inclusive, and accessible in New England. We are using intersectionality, an equity ethic, and a critical consciousness framework to change systems and make ocean science education more inclusive. Please join us as we illustrate what makes NEOSEC resilient, share our journey with equity, access, and belonging, and provide examples from member institutions and how they take critical action.

Savanna Finley, Parrish Community High School;

[310] **Bringing the Estuary into Your Classroom: A Guide on Extending Estuary Learning Through Classroom Aquariums.** This presentation focuses on creating connections to estuary animals through collection aquariums. While charismatic animals like manatees get all the fame, local juvenile fish are left unnoticed and potentially unprotected. Using data from a classroom study on place based education to get students interested in estuary animals, this framework gives teachers a methodology for extending estuary learning beyond the field and into the classroom. This framework focuses on giving teachers the tools for how to collect local estuary/ marine animals, how to measure student engagement with the animals, and how to encourage student participation and interest outside the classroom.

Monika Pelz, Ocean Networks Canada; Dwight Owens

[312] **Data from the deep, Ocean Science Integration for all.**. Snag ready-to-use resources and experience the awe of deep sea creatures and ocean data. Explore and examine how Ocean Networks Canada's (ONC) underwater observatories can be used to introduce oceanographic concepts in many subject areas. Participants will explore Oceans 3.0, the free online data portal available for all to dive into the ocean, whether they have access to a coastline or not! A natural fit as we approach the halfway mark in the UN Decade of Ocean Science for Sustainable Development (2021-2030), this session will help you integrate Ocean data in new and creative ways!

Laura Moore, East Lyme Public Schools

[TER] **Marine Investigators: Implementing inquiry-based, experiential learning with elementary learners to foster creative exploration and awareness about marine and coastal environments.**. Engage in examples of learning tasks and lessons that will immerse the youngest students in meaningful learning opportunities about marine topics to be used in the classroom or during field experiences. This session will cover best practices to incorporate marine education into content areas aligned with NGSS and CCSS. Lesson and learning task ideas will touch on seashore communities, Indigenous connections with oceans, marine life, stewardship ideas, and more. Participants will leave the session with sample lesson plans, suggested book lists, hands-on project ideas, field experience plans as well as recording sheets for inquiry-based tasks.

Concurrent Session #11: Wednesday, July 31—2:30 – 3:30 pm

Tina Miller-Way, Dauphin Island Sea Lab; Dani Dilullo

[ACAD] **Development of Gulf of Mexico Literacy Principles.** The Ocean Literacy (OL) campaign was developed to highlight the importance of the ocean in people's lives. During the Ocean Decade, this endeavor continues to remain relevant. The OL model's success has led to the development of topical (e.g. climate, energy) and regional literacies (e.g. Great Lakes, Mediterranean). These frameworks have allowed groups to build capacity around emerging issues, ascertain gaps, and collaborate more effectively on environmental literacy projects. We are proposing a regional literacy framework focused on the Gulf of Mexico. Join us to share your thoughts on this effort and help co-produce the nascent GoM Literacy Principles.

Madeleine Sherman, Hawaii Institute of Marine Biology

[ACAD] **Increasing confidence in Marine Science and invoking stewardship through place-based programs in Hawai'i.** To encourage students to pursue science careers, we developed and launched two programs, the Marine Molecular Mentorship Program (MMMP) and Tree to Sea Camp. MMMP provides opportunities for underrepresented and marginalized high school girls by removing barriers. This program fills a niche for molecular biology-focused activities, and creates long-lasting relationships with mentors and peers within each cohort. Tree to Sea Camp partners with nonprofits and takes a holistic approach to watershed restoration. Middle school students are inspired to become stewards through cultural and environmental activities throughout the week. Both programs had positive evaluations and are becoming institutionalized programs. Additional Authors: 1. Laura Bailes, Education and Outreach Coordinator, Mālama Maunalua 2. Eva Majerova, Coral Molecular Biologist, Coral Resilience Lab - Hawai'i Institute of Marine Biology 3. Kira Hughes, Managing Director, Coral Resilience Lab - Hawai'i Institute of Marine Biology

Maya Pincus, International Ocean Discovery Program

[ACAD] **You mean to tell me… Social media can improve [science] literacy?.** Many educators struggle to hold their students' attention, because they have to compete with social media platforms that are designed to transfix users and keep them scrolling. Instead of trying to win this uphill battle, educators can leverage these websites to get students excited about science. In this session, participants will be introduced to classroom strategies and activities that increase literacy and engagement in science through the social media accounts of science organizations such as the ocean-drilling research vessel JOIDES Resolution.

Avery Beck, Grand Bay National Estuarine Research Reserve

[BCT] **Designing an Inclusive Program for a Vision Impaired Audience**. Join us to hear more about the Grand Bay National Estuarine Research Reserve's (NERR) efforts in designing programs for a visually impaired audience. Learn different tips as we walk through the entire design process of creating this program and be inspired to adapt programs at your facility for visually impaired audiences.

Alexandria Gillen, National Oceanic and Atmospheric Administration

[CONF] **Let's Talk Trash! Marine Debris Educational Resources from the NOAA Marine Debris Program**. Marine debris is a growing, global issue that can be difficult to bring to life for students in the classroom, and even more difficult to leave students feeling inspired and empowered to make a difference. The NOAA Marine Debris Program has a variety of hands-on lesson plans, activities, and opportunities for students of all ages to learn about marine debris and how they can be a part of the solution - all available online for free! We will share new and updated resources for engaging youth in marine debris education and action, including standards-aligned, hands-on, and place-based flexible materials.

Laura Bailes, Mālama Maunalua

[CONF] **Instilling Place-based Environmental Literacy and Stewardship Through Experiential Learning in Hawaii.** Mālama Maunalua's restoration work has inspired the development of hands-on lessons and a place-based experiential learning camp. The 2-part classroom curriculum educates students about watersheds and coral reefs through a cultural, ecological, and socioeconomic lens, while facilitating their understanding of anthropogenic impacts on these ecosystems and solutions to mitigate human induced threats. At Tree to Sea Camp, students learn about traditional and modern resource management while developing stewardship skills and deepening their understanding of science and Hawaiian culture. Both programs aim to foster environmental literacy and inspire the next generation of stewards so they become advocates for our oceans. Additional Authors: Madeleine Sherman, Project Manager, Coral Resilience Lab - Hawai'i Institute of Marine Biology

Marisa Immordino, Lake Champlain Sea Grant Watershed Alliance

[CONF] **From Creek to Career: Exploring impacts of watershed education internship opportunities.** What leads professionals into water related fields? This lightning talk will discuss research that examines the impacts of semester-long, watershed education internship opportunities for undergraduate students, highlight career trends that emerged in participants post-internship and investigate the extent that these experiences facilitated career pathway transformation. Data utilized in this work was collected through surveys and interviews with alumni from three different watershed education internship programs in Vermont, New York, and Pennsylvania. Results from this research may fill data gaps in understanding long-term impacts of participation and help improve future recruitment and retention of interns in similar programs.

Susan Tang, Bow Seat Ocean Awareness Programs

[EAST] **Creative Currents: Empowering Students to Create Art for a Sustainable Future.** The creative arts have long been a powerful vehicle for challenging injustice and bringing about political and social transformation. Join Bow Seat Ocean Awareness Programs to learn how to incorporate the creative arts into your environmental curricula through Visual Thinking Strategies (VTS) and the Ocean Awareness Contest! By inviting youth to explore environmental issues through the arts, the Contest empowers them to share their questions, concerns, visions, and hopes in a discussion frequently dominated by adults. Explore how VTS and the Contest use the power of art to promote evidence-based reasoning, build empathy, and deepen cultural and self-understanding.

Margrethe Serres, Woods Hole Oceanographic Institution; Julie Huber

[MET] **Marine Science Research Opportunities for Community College Students at WHOI.** Community colleges contain an untapped source of diverse and talented students. We have created two non-residential research experiences for regional community college students with the goal to increase and sustain the inclusion of these students into the marine science education and research community. By participating in authentic research experiences, the students gain a better understanding of professional practices that complement their classroom learning. The students are also exposed to STEM careers and educational paths. We offer a spring semester program and a 9-week summer program. Our evaluations indicate both experiences impact STEM identity and continued education for participating students. Additional Authors: Kama Thieler, kthieler@whoi.edu, Undergraduate Programs Coordinator, Academic Program Office, Woods Hole Oceanographic Institution; Bridget E Burger, beb66@hi.is, PhD student, University of Iceland; Rob Evans, revans@whoi.edu, Interim Vice President for Academic Programs and Dean, Woods Hole Oceanographic Institution; Margaret K Tivey, mktivey@whoi.edu, Senior Scientist, Marine Chemistry and Geochemistry Department, Woods Hole Oceanographic Institution

Bethany Smith, The Virginia Institute of Marine Science; Sarah Nuss

[MET] **Pathways to Ocean Science Careers: Which significant life experiences play a key role?.** This study examines the life experiences leading to a range of ocean science careers, to uncover which significantly impacted participants' choices to pursue a career in this field. These previous life experiences (or combination of experiences) may lead us to understand which produces the greatest success, and this information could be beneficial across multiple perspectives. Ultimately, results could lead end user groups to make data based decisions regarding their education and outreach activities, and to prioritize education and outreach activities that are shown to most significantly lead to successful ocean science careers. We plan to share results from our pilot study, as well as the call for additional survey responses nationwide. Additional Authors: Dr. Sarah Nuss, Education Coordinator, Chesapeake Bay National Estuarine Research Reserve in Virginia

Holly Morin, University of Rhode Island, Graduate School of Oceanography

[MET] **Speed Dating with the Blue Economy: Making a Match with Potential Career Opportunities.** In the ocean sciences and other STEM fields, experiential, hands-on learning opportunities often occur during the summer, and, for some students, especially those from low-income and/or unrepresented populations, who need to work, have family obligations, cannot travel, or have other limitations, access to such opportunities may be challenging. NOAA's Ocean Exploration Cooperative Institute, hosted at the University of Rhode Island, aims to reduce this access gap, as well as the mismatch between recent graduates and the Blue Economy (BE). Through its Bridge to Ocean Exploration (B2OE) Program, community college students are engaged in an academic-year, part-time, paid experiential learning opportunity to gain foundational experience in ocean science and technology while also acquiring flexible, professional skills, and a greater sense of belonging in STEM. A virtual Blue Economy Career Exploration Fair is a central B2OE event and provides a valuable networking opportunity for B2OE students, as well as other undergraduate and graduate students across the U.S. Key to the career exploration fair is a series of "speed dating" rotations between small student groups and BE sector representatives, where students can and ask a diversity of questions about an individual's background and career path, skills and experiences required in their position, how to apply for jobs, challenges in their fields, etc. These casual conversations help foster a better appreciation for BE job opportunities and the diversity of skills required to succeed in these positions. We hope to open a dialogue about academic-year programs to build non-traditional and unrepresented student interest and capacity in STEM and the BE and would love to hear from others who have used virtual platforms in innovative ways to engage student audiences. Additional Authors: Samuel A. Soule, University of Rhode Island; Deborah Smith, University of Rhode Island; Tara Hicks Johnson, University of New Hampshire; Patrick Flanagan, University of Rhode Island; and Liz Hoadley, NOAA Ocean Exploration.

Carly Carmack, Portsmouth Public Schools (Churchland High School)

[310] **No Marine Science Class? No worries!.** If you're like me... you have so much passion and excitement for bringing marine science into the classroom... buuut you teach core biology or ecology classes with stringent standards. Let me help you integrate marine science into your curriculum while still following all of the state standard requirements! You'll meet the Pacific Northwest Tree Octopus and walk away with various activities and assessments geared toward scientific investigation and source checking. You will also gain access to a Google Drive folder with samples of my resources. These resources can be used for various classes but have been created with high school biology and ecology courses in mind.

Jennifer Walker, The Marine Mammal Center; Jade Fugini-Laws; Cecilia Ledesma

[312] **Teaching Ocean Literacy through the Lens of Marine Mammals.** Interested in teaching students about Sea Lions world-wide or Marine Science Careers in Antarctica or taking action to help marine mammals and their ocean home? The Marine Mammal Center (a non-profit organization advancing global ocean conservation through rescue and rehabilitation, scientific research, and education) is sharing online learning resources designed for educators to integrate with their classroom learning. During this session, we'll introduce our Life by A Whisker (grades 3-5, 6-8) and Growing Up on Ice (grades 6-8) ocean literacy curriculums and dive into a few activities designed to highlight work in global marine mammal conservation. These free comprehensive Educator Guides are connected with NGSS and OLPs and accessible on our website at https://www.marinemammalcenter.org/ Additional Authors: Life By A Whisker: Karina Abou-Chakra and Alana Springer, Educators, The Marine Mammal Center; Growing Up on Ice: Sara Smith and Raymie Poole, Educators, The Marine Mammal Center

Valerie Cournoyer, Amity Regional High School

[TER] **Using Optical Illusion Art to Communicate Science Ideas.** We will make an optical illusion artform called an agamograph. This art is well suited to show cross cutting concepts including cause and effect, stability and change and more! Perfect for climate change impacts and solutions, tides, nocturnal and diurnal activity in habitats and glaciation topics. Two pictures are drawn (or printed), cut apart and alternately sequenced. One side of the agamograph will show the before image and the other will illustrate the after. Students create labels explaining their concepts and display work at school. The lesson and student work will be available. STEAM Day events will be shared.

Concurrent Session #12: Wednesday, July 31—3:30 – 4:30 pm

Brianna Andrews, Grand Bay National Estuarine Research Reserve

[ACAD] **BRACKISH (Biodiversity, Relationships, and Aquatic Chemistry Knowledge in Saline Habitats).** BRACKISH is a three-day program utilizing place-based and hands-on learning to enhance environmental literacy skills in eighth grade students from coastal Mississippi. Students monitor water quality using current technology, role play in mock case studies involving water quality issues and identify potential solutions to environmental issues. In this session, NMEA participants will learn about the BRACKISH program and engage in a "town hall" meeting activity from the program. We will discuss water quality issues impacting a community, while being challenged to think outside of our everyday environmentally conscious mindsets and work together through unfamiliar lenses to find potential solutions. Additional Authors: Dennis McGrury

Elisa Caref, Billion Oyster Project; Kristin Schreiber

[BCT] **Classroom Teacher Collaboration for Place-based Curriculum Design in NYC.** Billion Oyster Project provides place-based, inquiry-driven curricula for teachers, which involves collaboration with teachers as part of a "pilot program" that pays them to use the curriculum and provide feedback. Our two pilot programs over the last two years comprised 18 teachers to pilot up to 30 lessons. Through regular discussion and written responses, teachers provided meaningful feedback that improved the final curricula, which are now available online for free. Our presentation will describe the pilot process: recruitment of teachers, biweekly meetings, editing, and results from teacher evaluations. This process of engaging teachers directly, and paying them for their time, significantly improves our curriculum and ensures that we spend time writing material that teachers are excited about utilizing in their classroom. Additional Authors: Ann Fraioli, Director of Education, Billion Oyster Project; Annie Lederberg

Tracy Hajduk, NOAA Office of National Marine Sanctuaries; Rick Reynolds; Anne Smrcina

[CONF] **Bring Ocean Literacy into Your Classroom with National Marine Sanctuaries.** Discover exciting educational materials, focused on a new free Ocean Literacy curriculum. This curriculum makes it easy to teach the seven Ocean Literacy principles while meeting NGSS, Common Core and Climate Literacy standards targeting grades 4-12. Also learn about topical resource collections that allow you to explore NOAA videos, lesson plans, background information, webinars, web stories, virtual reality, infographics, and much more about a variety of topics, including coral reef ecosystems, whales, and ocean sound and the impact of noise. Explore all of this and our exciting and interactive virtual reality content through this engaging session. Additional Authors: Claire Fackler, National Education Liaison, NOAA's Office of National Marine Sanctuaries

Kristen Keane, Artist Boat

[EAST] **Encouraging Student Voice and Choice while Developing Driving Questions and Student Designed Field Adventures.** Join us for a workshop that will walk you step-by-step through a student led decision making process to develop student driving questions that result in student designed field adventures and environmental action projects. At the end of this workshop, you will be able to center this process around your organization's resources and existing field experiences. The model shared is a part of Artist Boat's Island STYLE curriculum that included teacher professional development, core subject embedded lesson plans based on NOAA priorities and trust resources, and Artist Boat led Eco-Art Workshops, Blue Carbon, & Kayak Adventures. Additional Authors: Amy Neblett, Artist Boat - Operations Director

Morgan Treon, S.C. Sea Grant Consortium

[MET] **Ripple Effect: Using Unconventional Partnerships to Increase Impacts of "Wicked" Marine Education.** Small educational staff with big responsibilities? No problem! This interactive session will explore partnership models that can increase the impact and reach of your marine education programs. Case studies will be shared that highlight how the S.C. Sea Grant Consortium's two-person education team engages in partnerships to extend programs and resources statewide, including collaborations related to salt marsh restoration, marine science careers, Title 1 school engagement, educator professional development, and scientific research. Come join the session and receive "wicked" educational resources, engage in hands-on activities, and participate in small group discussions related to partnerships and your specific program needs.

Kelsea Carmichael, Center for Coastal and Ocean Mapping; Tara Hicks Johnson

[310] **Marine Robotics: A Lesson Plan Using LEGO.** In this session, you will learn how to turn standard LEGO robotics elements into underwater robots inspired by marine exploration technology. This activity is designed for middle school-age students, both in and outside of the classroom, and can be modified to take anywhere from 30 minutes to multiple class periods. The goal of the activity is for students to gain hands-on experience building a device that on a large scale, is used to solve real-world marine issues. Students will learn how to identify a marine problem and then choose and execute a design to solve this issue.

Grace Simpkins, WHOI Sea Grant

[310] **Ocean Currents and Overflows: hands-on physical oceanography in the classroom.** I will provide an overview and demonstration of our lesson plan exploring ocean currents and specifically "underwater waterfalls", i.e., overflows in the North Atlantic. I will share editable slides that include a quiz, instructions for a hands-on experiment, and two videos (a video presentation by one of the researchers introducing themselves and their research, and a video of the experiment). We recommend conducting the experiment during the activity, but the video works as a backup. The slides are annotated with teacher notes to help with narration, background information, and conduction of the experiment. Additional Authors: Stefanie Semper, University of Bergen, Norway, Stefanie.Semper@uib.no; Mirjam Glessmer, Lund University, Sweden

Bjorn Grigholm, Trisha Badger, Peter Neill; World Ocean Observatory

[312] **World Ocean Explorer: Free Interactive & Immersive Learning for the Classroom.** Get familiar with World Ocean Explorer: a free immersive platform for the classroom. Educator-designed curriculum activities and expeditions follow objectives to drive exploration of 3D environments and species. We'll explore 2D gamified activities for educators grades 7-10, including drag-and-drop, Q&A forms and hands-on activities for classroom use and discussion, and ideas for tactile creative projects and pursuits. Participants are encouraged to bring their laptop, practice the controls, access educator resources for the Deep Sea module, and learn how to bring this free web-based resource into the classroom. The experiences within World Ocean Explorer will captivate young learners, ensuring a deeper understanding of marine science concepts, focusing first on hydrothermal vent systems and whale falls, with endless possibility for curricular connection. Learn more WorldOceanExplorer.org. Additional Authors: Nell Herrmann, marine science educator, Blue Hill Consolidated School, Maine

Katie Lodes, St. Joseph Academy, St. Louise, MO

[TER] **Getting out in the world to bring the world to your classroom.** The Grosvenor Teacher Fellowship (GTF) is a professional development opportunity for pre-K–12 educators made possible through a collaboration between Lindblad Expeditions and the National Geographic Society. Through a comprehensive application process, educators are chosen to travel aboard a Lindblad Expeditions' voyage for a life-changing, field-based experience. Grosvenor Teacher Fellows transfer their onboard experience into transformative ways to teach students, engage colleagues, and bring new geographic awareness into their learning environments and communities.Learn about how a land-locked teacher used the experience to bring coral research into her classroom and how to apply for the program.

Dominika Wojcieszek, European Marine Science Educators Association (EMSEA)

[TER] **Advancing Ocean Literacy Through the Network of European Blue Schools.** This session will introduce the Network of European Blue Schools (NEBS), an initiative supported by the European Commission, with over 350 members from EU Member States and associated countries. It will provide insight into NEBS's evolution, highlighting milestones such as curriculum analysis, teacher handbooks, online courses, and funding opportunities within Horizon projects. Additionally, it will explore NEBS's composition in terms of school levels, curriculum connections, and geographic distribution. This presentation offers insights into NEBS's role in promoting ocean literacy through formal education and its contributions to fostering a generation of environmentally conscious citizens. Additional Authors: Evy Copejans, Managing Director, EMSEA

Shadaesha Green, National Oceanic and Atmospheric Administration

[TER] **Empowering youth to take action to build climate resilience through an engaging activity book.** NOAA's Environmental Literacy Program supports formal and informal education projects that teach children, youth, and adults how to help their communities become more resilient to climate change. In 2020 NOAA published its Community Resilience Education Theory of Change which identifies pathways through which environmental literacy leads to resilient communities. To better engage educators and students, a companion activity book was created that provides activities for kids to learn about community resilience and taking action in their community. Co-developed with diverse partners and NOAA grantees, the activity book serves as a helpful learning tool for students. Come discover how you can use this activity book with your audiences. Additional Authors: Maggie Beetstra, Senior Climate; Education Researcher, Nurture Nature Center; Kathryn A. Semmens, Science Director, Nurture Nature Center; Maggie Allen, Climate; Health Program Policy Coordinator, NOAA

Poster Session Descriptions

Posters will be displayed in Metcalf Large on Monday, July 29. Authors will be available for questions from 2:30 - 3:30 pm.

Posters: Monday, July 29 — 2:30 - 3:30 pm

Brianna Andrews

BRACKISH: Biodiversity Relationships and Aquatic Chemistry Knowledge in Saline Habitats. BRACKISH is a three-day place-based education program that helps eighth grade students in coastal Mississippi become more aware, knowledgeable, and appreciative of their environment. Students are given the opportunity to explore their local estuary, utilize scientific instruments to monitor water quality and examine fish populations, participate in student-led discussions directly related to water quality issues, critically think about human impacts on the environment, and encouraged to find solutions to local environmental problems. During this session, I will discuss the program's implementation, lessons learned, and preliminary evaluation results. Additional Authors: Dennis McGrury, Program Development Manager, Grand Bay NERR

Melissa Brodeur; Nicole Palma

NMEA Engagement in a Needs Assessment of the National Ocean Sciences Bowl. The National Ocean Sciences Bowl® (NOSB) is a nationally recognized and acclaimed high school academic competition that provides a forum for interested students to test their knowledge of ocean and freshwater sciences. After 26 years of competition, the NOSB, in partnership with Collaborators Consulting Group, has commenced a programmatic needs assessment to inform a reimagining of the program to ensure it continues to address its goals and the continued gap in environmental and earth sciences in public education. Diverse stakeholder input, via surveys, will be sought from NMEA attendees to better understand the evolving needs of the ocean education community. Additional Authors: Stacey Keston and Leigh Rauk, Collaborators Consulting Group

Emma Ferrante

From Shipwrecks to Sharks: Bridging Marine Science and Maritime History through Community-Focused Education. Join me to explore The Mariners' Museum and Park's interdisciplinary approach to marine education. Discover how we, as a repository of the USS Monitor shipwreck artifacts, utilize a collections-based, community-focused strategy to engage students with our Shipwrecks ROV program. Through our innovative teaching methods, we seamlessly blend marine science and history to captivate learners. See how students explore shipwreck habitats through storytelling with the Museum's collection. We aim to illuminate both historical narratives and marine science concepts to inspire students to pursue careers in both fields. Come celebrate hands-on learning and discovery as we embark on our oceanic odyssey!

Andrea Gingras; Mackensie duPont Crowley

Doing a Lot With a Little Boat. Dive deep into how GSO's Miniboat Program creates partnerships and fosters engagement across diverse audiences. GSO Public Engagement leverages content from the program to be shared widely with the community and press, while graduate students hone their leadership and science communication skills. K-12 student learning extends far beyond boat-building and ocean science, as they become ambassadors at local events, forge international connections and present their work at conferences. The data collected from the miniboat is used outside the classroom. This session offers a comprehensive exploration of the program's influence and its broader implications for engaging audiences with K-12 ocean education. Additional Authors: Cassie Stymiest- Director, Educational Passages Peter Hanlon- Director, Public Engagement, URI Graduate School of Oceanography Taylor Rock- 7th grade Educator, Thompson Middle School Gabrielle Armin- PhD Candidate, URI Graduate School of Oceanography Ali Johnson- PhD Candidate, URI Graduate School of Oceanography Sarah Nickford, Alum (PhD '24); Knauss Fellow, US Integrated Ocean Observing System (IOOS) Office

Lila Glansberg

Cultivating Ocean Literacy through Engagement. Here we highlight the Ask A Scientist Exhibit and Marine Science Teaching Boxes of the Natural History Museum at Cal Poly Humboldt. These initiatives aim to foster a deeper connection between the residents of the coastal region of northern California and their neighboring ocean, promoting ocean literacy. These projects stand out for their commitment to inclusivity, welcoming diverse perspectives, and the interplay of both formal and informal educational approaches. By engaging the community in interactive learning experiences, they strive to empower individuals of all backgrounds to become stewards of the ocean and champions for environmental conservation. Authors: Julie Van Sickle, Director, Natural History Museum of Cal Poly Humboldt; Dr. Jeffrey White, Professor of Biological Sciences, Cal Poly Humboldt; Melinda Bailey, Retired Science Teacher and Curriculum Developer

Elizabeth Hoadley; Carmen Player

Ocean Odyssey Grants: Broadening Access to Ocean Education and Workforce Development. In 2021, the National Marine Sanctuary Foundation and NOAA Ocean Exploration, developed the Ocean Odyssey Grants to invest in education initiatives that support diverse learners on their pathway to future ocean exploration careers. In 2024, the Foundation partnered with additional NOAA offices to expand the Ocean Odyssey Grants to include additional ocean science focus areas, funding education programming for diverse youth to learn about the ocean, develop or advance STEM skills, and increase awareness of ocean science careers. Join us to learn more about past projects and upcoming funding opportunities for the 2024 - 2025 school year! Additional Authors: Deanna Balistreri, National Marine Sanctuary Foundation

Julie Huber

Creating Hands-On STEM Modules For 3-12th Graders To Understand the Deep Sea Through Undersea Technologies. The Seafloor Science and Remotely Operated Vehicle Camp in Monterey, CA is a summer day camp that exposes 3-12th graders to deep-sea exploration and technology. We engage students through problem-solving skills and teamwork via hands-on STEM projects. The camp serves as the foundation for new teacher workshops via collaboration with the Crustal Ocean Biosphere Research Accelerator (COBRA), an NSF-funded network-of-networks focused on the deep seafloor. Workshops introduce teachers to seafloor exploration and teachers develop new hands-on modules, which will soon be available to classrooms. Two workshops will also be conducted around Boston this fall. See hands-on modules at our poster! Additional Authors: Geoff Wheat, Research Professor, University of Alaska Fairbanks; Claudia Paul, Research Associate, University of Alaska Fairbanks; Jason Nicholson, Teacher, Monterey High School, Monterey CA; Kelli Ventimilia, Teacher, Marshall Elementary School, Seaside CA

Sofia Ibarrarán Viniegra

Building Bridges to Broaden Participation in the Ocean Sciences: The Center for Chemical Currencies of a Microbial Planet (C-CoMP) Bridge-to-PhD Fellowship Program. The C-CoMP Bridge-to-PhD Fellowship program advances our goal of broadening participation in the ocean sciences by affording diverse cohorts of Fellows opportunities to explore their research interests, gain technical skills, and engage in interdisciplinary, collaborative research before they commit to a graduate program. Fellows work in C-CoMP labs with C-CoMP principal investigators as mentors. These efforts further our mission to bring a diversity of expertise, experiences, and viewpoints to the promotion of a deeper understanding of the chemical and microbial processes that govern ocean ecosystems. The program design, theory of change, Initial outcomes, and future directions will be presented. Additional Authors: Additional Authors are listed in alphabetical order: Eran Agmon, Assistant Professor, Center for Cell Analysis and Modeling, UConn Health; Nicholas R. Bates, Professor, Senior Scientist and Director of Research, ASU Bermuda Institute of Ocean Sciences; Erin L. Dolan, Georgia Athletic Association Professor of Innovative Science Education, Department of Biochemistry & Molecular Biology, University of Georgia; Sonya Dyhrman, Professor, Department of Earth and Environmental Sciences, Lamont-Doherty Earth Observatory; Arthur Edison, Professor and GRA Eminent Scholar, Departments of Biochemistry & Molecular Biology and Genetics, University of Georgia; Heather H. Kim, Assistant Scientist, Department of Marine Chemistry & Geochemistry, Woods Hole Oceanographic Institution; Elizabeth Kujawinski, Senior Scientist, Director, Center for Chemical Currencies of a Microbial Planet (C-CoMP), Woods Hole Oceanographic Institution; Mary Ann Moran, UGA Foundation Distinguished Research Professor, Department of Marine Sciences, University of Georgia; Laura O'Dwyer, Professor, Lynch School of Education and Human Development, Boston College; Mak A. Saito, Senior Scientist, Department of Marine Chemistry & Geochemistry, Woods Hole Oceanographic Institution; Daniel Segrè, Professor of Biology, Bioinformatics, and Biomedical Engineering, Department of Biology, Boston University

Teresa Kennedy

GO-SHIP Evolve: Addressing Ocean Decade Challenges through Repeat Hydrography. GO-SHIP Evolve is an endorsed international initiative of the Ocean Decade conducting comprehensive water column measurements along designated hydrographic transects across the world's oceans to investigate decadal changes in ocean heat content, carbon uptake, acidification, circulation, and other parameters throughout the global ocean. Ten nations contribute ship time to this effort, and 15 nations are represented on the scientific committee. GO-SHIP cruises routinely provide training and capacity building opportunities for students and other early career ocean professionals. Addressing Ocean Decade Challenges 7 and 8, GO-SHIP is contributing to global monitoring, mapping, and identification of observational gaps throughout the global ocean. Additional Authors: N/A

Robin Lea

Middle School Curriculum: Models, Food Webs and a Warming Gulf of Maine. How do scientists use models to understand what is happening in an ecosystem? How is the marine food web changing as a result of warming ocean waters in the Gulf of Maine? Come learn about a new middle school curriculum from the Gulf of Maine Research Institute that asks students to explore some of the potential impacts and consequences that climate change, and specifically warming oceans, will have on marine ecosystems.

Evelyn McQueen

Programmatic Overview of Estuary Education and Student Insights. Overview of Mississippi Sound Estuary Program education opportunities and current data on efforts and student insights to estuary management. Additional Authors: Dr. Eric Sparks, Director, Mississippi Sound Estuary Program/Mississippi State University, Coastal Research and Extension Center/Mississippi-Alabama Sea Grant Consortium ; and Carley Zapfe, Community Engagement Coordinator, Mississippi Sound Estuary Program/Mississippi State University, Coastal Research and Extension Center

Cheryl Milliken

Engage Students with Ocean Drifters. Since 2016, my students have worked with Jim Manning, a physical oceanographer from NOAA Fisheries, to build, launch, and track ocean drifters equipped with satellite transmitters. These drifters report their location via satellite at pre-set intervals. Drifters move as the prevailing ocean currents push their underwater sails. Their tracks, therefore, map currents and involve students in community science. This year, students prepared drifters to analyze currents in Cape Cod Bay in late fall of 2023 to locate cold-stunned turtles in this area. We may also use these drifters to track radioactive water released from Pilgrim Nuclear Station in Plymouth, MA.

Lindsay Mossa

Dive into the Future: Careers in Ocean Science. Participants will be introduced to a new website – the American Geosciences Institute's Career Explorer— developed for middle and high school students to explore careers in the geosciences. The Career Explorer allows students to explore

careers by selecting their interests and the global issues they would most like to address, as defined by the United Nations Sustainable Development Goals. This session will focus on careers that relate to Ocean Literacy Principles and research done by the International Ocean Discovery Program. We will also discuss educator guides and resources that are being developed to aid in the use of this site. Additional Authors: Lauren Brase

Jessica Muhlin

Infusing eDNA principles throughout two Ocean Studies curricula, from guided practice to application . Maine Maritime Academy's Corning School for Ocean Studies established a new undergraduate program, Coastal and Marine Environmental Science (CMES). In the process of developing the new major, courses in CMES, Marine Biology, and Oceanography were revised to create interdisciplinary programs that weave environmental DNA (eDNA) across the curricula. Faculty developed laboratory modules around two projects. The first project was a biosurveillance and community characterization of anadromous fish/river herring on the Bagaduce River, ME using eDNA techniques. The second project was a multidisciplinary laboratory sequence evaluating the microbial communities across the Belfast Bay, ME pockmark fields using an eDNA approach. Additional Authors: Sarah O'Malley, LeAnn Whitney, and Kerry Whittaker, Corning School of Ocean Studies, Maine Maritime Academy

Sierra Muñoz

From Coastal Research to Classroom Resource. Educational outreach programming is braided into the research plan for many of the scientists at Northeastern's Coastal Sustainability Institute and Marine Science Center. We highlight several recent NSF-funded projects which integrated K-12 or community outreach programs and resources, including studies on microplastic pollution in waterways, salt marsh ecology, and genomics, and how the resulting resources can be utilized by educators and the public.

Laura O'Dwyer; Ella Walsh; Daniel Raphael

Measuring Teachers' Prioritization of Ocean Science in Middle and High School Classrooms: Introduction to the MARINEK12 Study. The MARINEK12 2024 study is the first nationally representative study of ocean science coverage in K12 classrooms. In spring 2024, a representative sample of 2,745 middle and high school teachers were invited to complete an online survey that focused on topics including their background in ocean science, practices in teaching ocean science and novel topics, and encouragements and barriers to teaching ocean science. The poster will primarily focus on how the nationally representative sample of science teachers prioritize ocean science in their classrooms but will also present evidence on the psychometric properties of the instrument.

Sachiko Oguma

Regional Ocean Literacy for Classes in Japan. As "Ocean Literacy for All" by UNESCO-IOC indicates "Ocean literacy should be understood as the development of a civic relationship with the ocean," the way we interact with the ocean is likely to differ among countries and even among regions within Japan. Within the Ocean Education Pioneer School Program (PSP), "Regional Ocean Literacy (ROL)" was developed to link learning about the natural environment, cultural history, and industry of the region to understanding of each principle, to acquire a way of thinking to live with the ocean in that region.

Monika Pelz

What DO teachers want? Making the Ocean more accessible for You!. This poster proposes to be a little different than most - rather than sharing our ideas, we will present questions and ask participants to write answers on Post-it notes and cover sheets. These will then be collected and used to write a follow-up article from the conference. Contextual information will be provided to shape and guide responses, but the intention is to learn from the viewers and audience.

Maya Pincus

Open-access ocean science lesson plans: A request for input from educators. The JOIDES Resolution website (joidesresolution.org) hosts free educational materials developed during scientific ocean drilling expeditions over two decades. Resources range from children's books and video games to lesson plans for learners of all ages, addressing topics such as climate change, plate tectonics, paleontology, and more. Given the broad timeline over which these materials were developed, they vary greatly in terms of style and content. As such, we are in the process of revising these 100+ resources for conformity and quality. This poster outlines our current thinking around resource revision, and solicits input for next steps forward. Additional Authors: Sharon Cooper (International Ocean Discovery Program), Ed Robeck (AGI), Lindsay Mossa (AGI), Lauren Brase (AGI), Sequoyah McGee (AGI)

Elizabeth Sargent

ANCHORS: Achieving New Course Heights; Opportunities for Research with Students. Herein we discuss the launch and preliminary assessment of an early research experience program, ANCHORS, on marine science undergraduates. ANCHORS integrates research into the curriculum, focusing on student-led projects within a freshman learning community and runs parallel to the required first year experience course. It aims to build a supportive community, clarify academic pathways, and offer research opportunities. Using a mini-CURE approach, it enhances accessibility to research while reducing faculty time constraints. Changes in self-efficacy, science identity, networking, and STEM persistence are being tracked. Results will guide best practices for student success and retention in Earth and ocean science programs.

Warren Sevaaetasi; Naomi Galea'i

Building Resilient Communities in American Samoa. The people of American Samoa have always been dependent and reliant on their natural resources for sustenance and livelihood. The Department of Marine and Wildlife Resources promotes management, conservation and sustainable development of American Samoa's Coral Reefs and their supporting ecosystems through programs like the Community-based Fisheries Management Program. A co-managed approach by the department and villages to develop Village Management Plans and designate Marine Protected Areas to help ensure that Village Communities have a sustainable way of protecting and using their resources. Empowering and preserving the "Fa'a Samoa," the process utilizes traditional village council meetings with Matais(Chiefs), Untitled Men, Women and Youth Groups. These meetings identify different resource users, historical village resource profiles, village legends, tales and tapu. Additional Authors: Maria Vaofanua, Division Head, Christina Samau, Education Assistant, Naomi Galea'i, Information Technician, Department of Marine & Wildlife Resources

Miriam Sutton

Creating Broader Impacts during a Research Cruise with a Virtual Experience for Academic and General Audiences. "Virtual Research Cruise" guides students (middle grades/high school/college) and general audiences through the scientific methods and technologies incorporated during a 2-week investigation focused on microbial oceanography. Students can work independently or in teams to complete the activity as a stand-alone lesson or within a marine science curriculum. Photo-journals, videos, and live feeds engage students as they explore the relationship between phytoplankton blooms and ocean upwelling cycles. Students will be able to describe the responses of phytoplankton during various phases of coastal ocean upwelling. A certificate of completion is available for download after completion of the activity.

Miriam Sutton

Using Long-Term Ecological Research (LTER) Data to Assess Penguin Population Dynamics Along the West Antarctic Peninsula. This activity guides students as they explore ecosystem dynamics among three Antarctic penguin species and analyze two Long-Term Ecological Research (LTER) data sets and supporting graphics for cause and effect and feedback relationships driving changes observed in Adelie, Chinstrap, and Gentoo penguins along the West Antarctic Peninsula. The LTER program began in 1974 and has been collecting annual data in this region on a variety of ecological interactions. This session will demonstrate the use of the Student Lab Sheet, Student data sets, Teachers data sets (including answer keys), and Tutorials for accessing and utilizing the LTER database.

Dominika Wojcieszek

Harnessing Sports for Ocean Literacy: Insights from the OSES Project. The "Ocean Sustainability through Education and Sport" (OSES) project aligns with the European Union's Work Plan for Sport, recognizing the potential of sports activities in addressing climate change challenges. It aims to empower sports federations and local stakeholders to foster eco-responsible behaviors in youth. The presentation will share insights from OSES's initial phase, focusing on assessing sports organizations' educational programs and initiatives for ocean preservation. Highlights will include the development of a good practices handbook showcasing successful European projects integrating ocean literacy into water sports, demonstrating the vital role of sports in environmental education and awareness.

Exhibitors

Exhibits will be open in Ziskind Lounge Monday, July 29 from 10:15 am to 5 pm and Tuesday, July 30 from 8 am to 5 pm.
The dedicated Exhibit session is Monday from 2:30 - 3:30 pm.

Aestes Art / Wonderful Whales
Algalita Marine Research and Education
Atlantic White Shark Conservancy
Bermuda Institute of Ocean Sciences
Boston Malacological Club
Boston Sea Rovers
Bow Seat
Educational Passages
GOMMEA
Maine Maritime Academy
Marine Biology Lite
MME
MiniOne Systems
Nature's Classroom
NMEA
NOAA B-WET
NOAA Education
NOAA Fisheries
Ocean River Institute
SAME
Sea Education Association
Stone Living Lab
Tall Ships America
The NEED Project
URI GSO – NOAA OECI
Vineyard Wind
Wade Institute for Science Education
Woods Hole Oceanographic Institution
Woods Hole Sea Grant
World Ocean Observatory

Notes

Certificate of Participation

This is presented to :

for attending the 2024 National Marine Educators Association (NMEA) annual conference held July 28 - August 1 in Boston, MA, co-hosted by Massachusetts Marine Educators (MME). The full conference included over 14 hours of in-person sessions and activities with a focus on marine education.

Lindsay Patterson
President,
National Marine Educators Association

Emily Duwan
President,
Massachusetts Marine Educators

MASSACHUSETTS MARINE EDUCATORS

We are teachers, informal educators, students, and institutions, working to develop a marine literate society and promote awareness of the ocean world.

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