



Participant Code of Conduct & Anti-Harassment Policy

The Consortium for Ocean Leadership and the National Ocean Sciences Bowl are dedicated to providing a harassment-free experience for everyone, regardless of gender identity and expression, age, sexual orientation, disability, physical appearance, body size, race, ethnicity, religion (or lack thereof), or other protected identity. We do not tolerate harassment of participants in any form. NOSB participants violating these rules may be disqualified from competition or expelled from any NOSB events (in-person or virtual) at the discretion of the NOSB national office staff.

Reporting: If you experience or witness disrespectful behavior and are uncomfortable or unable to respond or resolve it respectfully (for any reason), please immediately notify Melissa Brodeur, NOSB Program Manager, at mbrodeur@oceanleadership.org, (603)781-0544, or by private Zoom chat.

Anyone experiencing or witnessing behavior that constitutes an immediate or serious threat to individual or public safety is advised to contact security or local law enforcement.

The full policy document is available [online](#).

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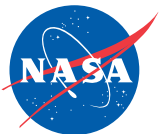
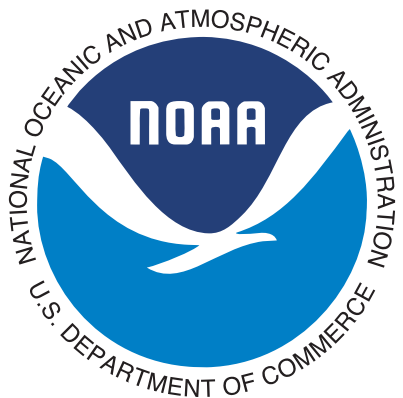
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THANKS TO ALL OF OUR SPONSORS

The NOSB Would Not Be Possible Without Their Generous Support!



THE CURTIS & EDITH MUNSON FOUNDATION





Welcome to the 24th National Ocean Sciences Bowl (NOSB) Finals, our second-ever modified, virtual Finals coming at the end of our first-ever completely virtual competition year. I'm pleased that after living more than a year in these "uncertain times," we could all (remotely) get together again to meet, compete, and celebrate the NOSB. Congratulations to everyone competing this year in Finals: your hard work has paid off!

This year's theme, *Plunging into Our Polar Seas*, is particularly important to me as the Arctic featured heavily throughout my naval and post-naval careers. As an oceanographer, I know well how important the polar regions are to our global ocean, weather, and climate, and as a retired Admiral, I know the complex role the polar regions play on the geopolitical stage. The vast and varied history of scientific exploration and research in the Arctic and Antarctic — including Traditional and Indigenous Knowledge from the Circumpolar peoples who call the Arctic home — paired with the uncertain future of the polar regions make this year's theme a critical topic to dive into *now*.

The Arctic and Antarctic have the pole positions of climate change, meaning that with all NOSB students learned this year, they will be uniquely prepared to help address some of the greatest scientific challenges of our time that pertain to these regions. Even if you're an NOSB student who doesn't (yet) plan on pursuing a career in marine science, understanding and thinking critically about the complex connections between our ocean, climate, economy, society, policies, food supply, human history, and more will help everyone on this ocean planet we call home. The bergy bits of ocean knowledge you acquired this year may well come in handy, even if you did have to put up with a few growlers along the way.

I want to especially congratulate and thank all the NOSB Regional Coordinators, volunteers, coaches, parents, and students for enthusiastically making sure this year's competitions could still happen, and I would like to extend a special commendation to the national office staff for making this year so successful and unique despite the global challenges we faced in the ongoing pandemic. Your steadfast devotion during this challenging period is comparable to that of the sailors on board the *Fram* in days gone by.

Taking part in the NOSB each year has been one of the most rewarding parts of my job as president and CEO of the Consortium for Ocean Leadership for these past six years. I will be officially retiring just after Finals conclude, but like many who get started with the NOSB, I don't plan to leave it totally in my wake. When we get back to in-person events, keep an eye out for an old Navy sailor who loves ocean puns and looks slightly familiar as one of the volunteers.

Congratulations again to every student who competed this year, and good luck to everyone at Finals!

Sincerely,

RADM Jonathan W. White, USN (ret.)
President & CEO, Consortium for Ocean Leadership

Welcome to the 2021 Finals competition of the National Ocean Sciences Bowl!

Your hard work has paid off. Congratulations! I also want to commend your coaches, the regional coordinators, the NOSB national office staff, and the hundreds of volunteers who contribute their time and expertise to this program. They are a testament to the ongoing inspiration the NOSB competition provides to all of us.

As we start the [UN Decade of Ocean Science for Sustainable Development](#), it is fitting that the 2021 NOSB theme focuses on the Arctic and Antarctic — two regions where there is a long history of international scientific cooperation and whose influence on Earth's climate and ecosystems is truly global. NOAA's polar work focuses on both the Antarctic and the Arctic and touches all aspects of NOAA's mission areas, from improved weather forecasts and fisheries management practices to better understanding the rapidly changing conditions of the polar environment and the impact of those changes on ecosystems and coastal communities.

In addition to the critical scientific research, monitoring, and prediction, NOAA also supports the application of that research through education, public engagement, and communication. Our goal is to provide timely and actionable information to decision makers and develop a future workforce to continue to support the needs of NOAA and the nation. This is why, for 24 years, NOAA has supported the NOSB, providing funding, volunteer time, and expertise to engage students, teachers, and parents in learning more about the ocean and ocean-related careers.

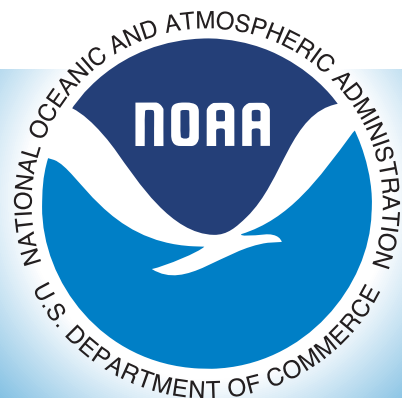
I hope that in preparing for, and participating in, this year's competitions, you gain an appreciation of the fragility of the polar ecosystems and the impact of the polar ocean on weather, climate, ecosystems, and economies. While the pandemic has shown how connected we are globally and where weaknesses in one place can have impacts on the other side of the world, it has also taught us lessons in perseverance and adaptation. These are lessons we will need to apply as we address climate change and its impacts on our communities.

Over the years, I have witnessed the breadth and depth of knowledge and enthusiasm that NOSB contestants demonstrate at both the regional and Finals competitions. Even the ongoing COVID-19 pandemic has not dampened your competitive spirit and for that, I commend all of you. Good luck in this year's competition!



Louisa Koch

Director of Education, NOAA



About NOAA:

NOAA's mission to better understand our natural world and help protect its precious resources extends beyond national borders to monitor global weather and climate, and work with partners around the world. NOAA's dedicated scientists use cutting-edge research and high-tech instrumentation to provide citizens, planners, emergency managers and other decision makers with reliable information they need, when they need it. To learn more about NOAA, visit www.noaa.gov.

VIRTUAL COMPETITION ITINERARY



Friday, May 7:

Opening Ceremony, 8pm – 9:30pm

Featured speakers: Dr. Huw Griffiths (British Antarctic Survey) and Dr. Matthew Shupe (Cooperative Institute for Research in Environmental Sciences at the University of Colorado Boulder and NOAA Earth System Research Laboratories)

Saturday, May 8:

SEB oral presentations, 10:30am – 5:30pm

Team time slots will be assigned, time zone will be taken into consideration.

Monday, May 10:

Interactive field trip with GeoCollaborate, 8pm – 9pm

Tuesday, May 11:

Career Mentoring Event, 7pm – 8:30pm

Thursday, May 13:

Interactive field trip with the Schmidt Ocean Institute, 8pm – 9pm

Saturday, May 15:

Modified, virtual competition, 9am – 6pm

Preliminary rounds. Team time slots will be assigned, time zone will be taken into consideration. Tiebreakers, if needed, at 6pm.

Team 'hangout' and announcement of elimination round teams, 6:30pm – 7:30pm

Sunday, May 16:

Modified, virtual competition, 11am – 6pm

Elimination rounds. Team time slots will be assigned, time zone will be taken into consideration.

Closing Award Ceremony, 7pm – 8pm

SPEAKERS



Dr. Huw Griffiths

British Antarctic Survey

Growing up on the coast in west Wales, Dr. Huw Griffiths spent most of his childhood playing on the beach and exploring the rock pools. Now he continues to explore everything from rock pools to the deep sea at the ends of the Earth as a marine biogeographer with the British Antarctic Survey (BAS). He has participated in several expeditions to Antarctica investigating benthic biodiversity and biogeography.

Dr. Griffiths studies large-scale biogeographic and ecological patterns in space and time; uses selected groups of animals to investigate trends in distribution in the polar regions; and utilizes large biological and physical databases to understand key processes in the Antarctic, Arctic, and neighboring regions. He also studies the potential effects of marine protected areas, climate change, and plastic pollution on these unique ecosystems.

As a passionate believer in science communication and making science more accessible to the public, policy makers, and government, Dr. Griffiths regularly presents his work to the media and schools and during open days and special events. He has also written two plain language advice documents for the Antarctic Environments Portal on marine biodiversity and plastic pollution.



Dr. Matthew Shupe

Cooperative Institute for
Research in Environmental
Sciences at the University
of Colorado Boulder and
NOAA Earth System Research
Laboratories

Dr. Matthew Shupe is a research scientist with the Cooperative Institute for Research in Environmental Sciences at the University of Colorado Boulder and NOAA Earth System Research Laboratories. His key science focus is atmospheric coupling in the Arctic system, with a specific focus on surface energy budgets, cloud-precipitation-aerosol processes, and their representation in models. Field work has been a major element of his research, including work at numerous Arctic field stations, atop the Greenland Ice Sheet, in mountain environments, and aboard icebreakers in Arctic sea ice.

Dr. Shupe's interest in the Arctic stems from two things: the delicate balance of ice as an integrator of system changes, responding to excesses and/or deficits of energy (in the same way, the phase partitioning of the clouds is in a delicate balance that has dramatic implications for the rest of the system); and the fantastic vistas, unique experiences, amazing wildlife scenes, and more that continue to amaze him.

Dr. Shupe recently served as the co-coordinator of the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC) expedition and is the coordinator of the MOSAiC Atmosphere team, participating in Legs 1 and 4 of the study. His tasks included leadership; designing, specifying, and building instrument systems; data management; field installation and operation; and communications and outreach.



2021 NOSB Theme.

Plunging Into Our Polar Seas

The Earth's polar regions are perhaps our planet's most unique ecosystems – the Arctic dominated by floating sea ice and the Antarctic by ice sheets on the continent. The vast, isolated expanses of snow and ice, and the life which inhabits it, have fascinated mankind for ages. While polar research began in the late 1800's, much of the Arctic and Antarctic remain unexplored. But scientists now know that these regions are amongst the most vulnerable ecosystems in the world and need to be studied extensively as they hold the keys to understanding the Earth's climate.

The North and South Poles play a vital role in regulating climate, acting as our planet's cooling system. The global climate is controlled through a process called thermohaline circulation. As sea ice forms at the poles, the remaining salty, dense water sinks and is replaced by warmer, fresher surface water. This water movement creates the deep-ocean currents that move cold and warm water around the globe.

Unfortunately, the polar regions are currently at-risk due to continually increasing levels of anthropogenic carbon dioxide in the atmosphere. Carbon dioxide raises the global temperature by trapping heat that would otherwise escape directly into space - and the poles are warming at much faster rates than anywhere else on the globe. In the Arctic, sea ice cover is declining. The two lowest years on record (2012, 2020) for Arctic sea ice extent occurred in the past decade, and it's likely that the Arctic may have ice-free summers by the end of the 21st century. In the Antarctic, coastal glaciers are in retreat, land-based ice is shrinking, and ice melt is increasing as the South Pole has faced extreme warming over the last three decades. The increase in carbon dioxide is doing more than just raising temperatures. More carbon dioxide in the ocean causes it to become more acidic, negatively affecting small-shelled creatures, like pteropods, which are an important food source for fish and larger animals.

Scientists are already documenting the consequences of the warming and melting taking place at the poles. In the Arctic, the loss of habitat for polar bears and walrus; new trade routes leading to greater natural resource exploitation; the loss of unique, Indigenous cultural practices; and the eroding shorelines and loss of permafrost will negatively affect the economy and livelihoods of millions of people that live there. In the Antarctic, while there are no Indigenous peoples, there is a complex ecosystem in danger. The introduction of new species and continued ocean acidification will cause widespread damage to a relatively pristine, unique, and fragile ecosystem.

The poles are integral to the entire planet and are rapidly changing, affecting entire ecosystems, forcing plants, animals and humans to adapt. What happens in the polar regions affects the entire world and concerns every citizen. Therefore, the need for ongoing polar research, where scientists from numerous nations work together, has never been greater. Some of the most important questions of our time can only be answered by research in the Arctic and Antarctic.

VIRTUAL GAME SUMMARY

Science Expert Briefing (SEB):

The teams that submit their SEB written testimony by the deadline are eligible to compete in the virtual competition rounds. In a closed session, each team will also present oral testimony to, and answer questions from, a panel of judges. The oral testimony component of the SEB will be conducted prior to the virtual competition rounds. Therefore, the SEB scoring will help determine the top 12 teams moving on to the elimination rounds.

Competition Rounds:

Preliminary Rounds:

Due to the need for a virtual competition, teams will not be playing head-to-head as in traditional round robins. Each team will play individually and have the opportunity to answer the same number of buzzer (toss-up and bonus) and Team Challenge Questions (TCQs). Teams will earn points for correct answers and the interrupt penalty will not apply.

Scoring for Advancement:

The top 12 teams with the highest combined SEB (25%) and preliminary rounds (75%) scores will advance to the elimination rounds portion. All of the remaining teams are then eliminated.

Seeding for Elimination:

Seeding for the elimination portion, and final rank for the competition, is based on the game points earned by each team during their SEB and preliminary round. Ties will be resolved with a group of five toss-up questions (no bonuses).

Elimination Rounds:

The elimination rounds involve the top 12 teams, which are seeded based on their results in the SEB and preliminary rounds. After the first series of elimination rounds, the top four teams will compete again, then the top two teams, until one team comes out on top. Ties in the elimination portion will be resolved with a group of five toss-up questions (no bonus) to determine a winner. This procedure will be repeated until there is a winner.

PRIZES AND AWARDS

This year the top four teams at nationals, as well as the top Science Expert Briefing (SEB) team, will have exclusive opportunities to talk to leaders in the ocean science community about ocean issues, their career paths, and more. The one-on-one Zoom meetings will take place in May or June (dates TBD depending on leaders' and participants' schedules).

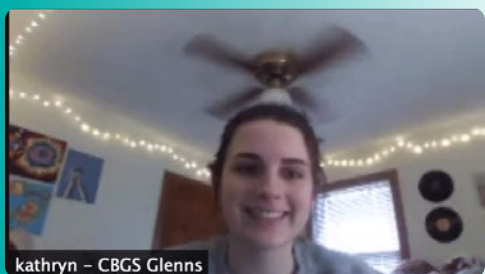
Team members and coaches of the 1st through 8th place teams will receive gift certificates to Amazon. 1st place will receive \$2,000; 2nd place will receive \$1,500; 3rd place will receive \$1,000; 4th place will receive \$750; 5th and 6th place will receive \$500; and 7th and 8th place will each receive \$300.

1st-8th place coaches will receive Marine Technology Society Memberships.

9th through 12th place teams will receive ocean science books.

The top SEB team will receive a \$250 gift certificate to Amazon.





BLUE CRAB BOWL

VIRGINIA INSTITUTE OF MARINE SCIENCE AND OLD DOMINION UNIVERSITY

Regional Coordinators: Ms. Bethany Smith, Mr. William Dunn

CHESAPEAKE BAY GOVERNOR'S SCHOOL - GLENN'S CAMPUS

Sara Chaves Beam has been coach for Chesapeake Bay Governor's School for Marine and Environmental Science - Glenn's Campus' Blue Crab Bowl team for 13 years. Mrs. Beam's senior oceanography and junior estuarine ecology students enjoy the challenge of NOSB because it brings together much of their course learning and even more for competition. Team members Madelyn Junker (Captain), Kathryn Parnell, Dylan White, and Carson Brown have participated for two years, while rookie Austin Crocker brings new energy to this year's team. Next year, Madelyn will be majoring in education, Kathryn in aerospace engineering, and Austin in mathematics, while Dylan and Carson plan to study oceanography and engineering, respectively. The CBGS team enjoys learning science in the field from kayaks and on beaches, being immersed in the marine environment. CBGS-Glenn's are passionate about environmental conservation and enjoy the opportunity to learn more marine science preparing for the NOSB competition!



BLUE HERON BOWL

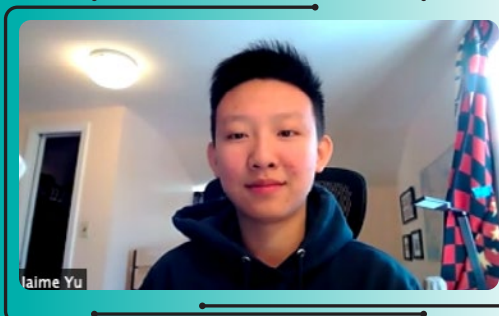
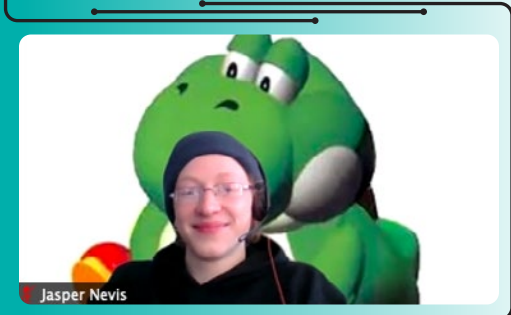
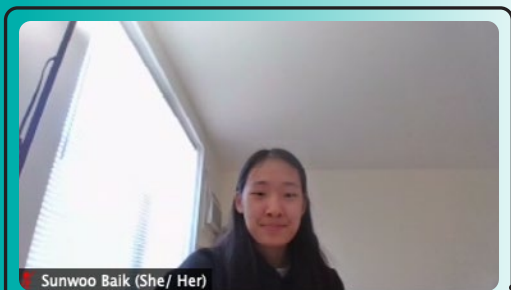
COASTAL STUDIES INSTITUTE, EAST CAROLINA UNIVERSITY

Regional Coordinator: Ms. Parker Kellam

ENLOE HIGH SCHOOL

For their first year of NOSB, founders Rohit “Ocean Man” Hari and his friend Jack searched for the most elite ocean dwellers. Aided by Coach Samantha Chambers, they gathered an unparalleled team, consisting of Raghav “Ocean” Arun, Daniel “Porifer” Li, Vedang “Trilobite” Singhal, and Aadhir “Extremophile” Sandeep. As an extremophile, Aadhir has seen all the extremes of the oceans and has developed a deep understanding of the inhabitants of the sea, now serving as the marine biology expert. Raghav handles physics and has a natural interest in the fluid dynamics of the sea. Vedang is the all-rounder, as he and his fellow trilobites had proliferated throughout Earth and now have an understanding of both the oceans and surrounding lands. Daniel is a sea sponge, and like a sponge absorbed all he could about marine policy. Rohit is the geology expert, as being an ocean man means understanding the sands and the lands.





BLUE LOBSTER BOWL

MASSACHUSETTS INSTITUTE OF TECHNOLOGY SEA GRANT COLLEGE PROGRAM

Regional Coordinators: Ms. Lori Tsuruda, Dr. Thomas Consi

LEXINGTON HIGH SCHOOL

Kari Darling is a chemistry teacher who has been coaching the National Ocean Sciences Bowl team at Lexington High School for three years. The team is a conglomeration of students from Lexington High School who have all tried to learn about the Baikal seal for one to four years. Unlike the Baikal seal, they cannot hold their breath very long and are terrible swimmers. While the team enjoys NOSB, they only learned about the ocean because they hate rivers. As a matter of fact, three out of five of them have not seen the ocean. They prepare for their competitions on prime-numbered days so as to not hurt themselves. Captain Sunwoo likes sponges. Jasper likes cephalopods. Jaime is constantly being cancelled by rocks. Ethan likes to throw plates and competitions. Captain Yul, dababy, likes beeg yoshi. They all enjoy spelling different versions of ghoti.



CHESAPEAKE BAY BOWL

GEORGE MASON UNIVERSITY

Regional Coordinators: Dr. Tina Bell, Ms. Frannie Dove

THOMAS JEFFERSON HIGH SCHOOL FOR SCIENCE AND TECHNOLOGY

Dr. Shawn Stickler, an esteemed coach, has extensive experience coaching the National Ocean Sciences Bowl team at Thomas Jefferson High School in Fairfax, Virginia. He teaches marine biology and geosystems and is the head of the school oceanography lab. The team members this year are Chris Kan, Isaiah Wang, Edward Lee, Alex Zhang, and Gregory Byun. Chris and Alex have participated for four years, Edward and Isaiah for three years, and Gregory for one. Isaiah plans to continue studying oceanography in college, while the others are looking into biology, economics, and environmental engineering. Although this year has been challenging, the team has skillfully adapted to the new environment and virtual competitions. While preparing to place highly at Finals, they have enjoyed bonding together and cultivating their marine knowledge. The official mascot for the team is Shaggy (from Scooby-Doo), who has served as a light and guided them on their journey to Finals.



DOLPHIN CHALLENGE

TEXAS A&M SEA GRANT COLLEGE PROGRAM

Regional Coordinator: Ms. Julie Massey

OXFORD HIGH SCHOOL

Nicole Roberson has been coaching the National Ocean Sciences Bowl team since 2015. This will be the fifth time she has brought a team to the National competition. Senior captain Edmund's interest in maps and exploration led him to join NOSB. He hopes to study materials science in college and afterwards work in a startup. Anh Thu is a junior at Oxford High School. She aspires to major in environmental engineering in the near future. Senior Fawaz joined the ocean bowl team two years ago, and he has not looked back. He is an avid aviation enthusiast and hopes to study aerospace engineering in the future in order to minimize the environmental impact of airplanes. Kareem is a senior at Oxford High School with an interest in studying computer science and business in college. He hopes to one day found his own business and help build a more sustainable future.



SAN DIEGO

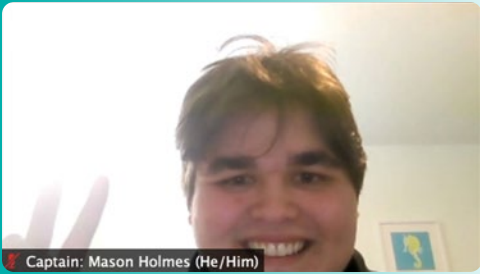
GARIBALDI BOWL

GARIBALDI BOWL

UNIVERSITY OF SAN DIEGO

Regional Coordinators: Dr. Jennifer Prairie, Ms. Darbi Berry

CANYON CREST ACADEMY



Captain: Mason Holmes (He/Him)



Ella Crotty - CCA



Andrew Kuang



Andrew Zhang

The Canyon Crest Academy team's coach is Erinn Eddingfield. She has been coaching the CCA team for a few years now. The team members are Elanor Crotty, Mason Holmes, Andrew Kuang and Andrew Zhang. This is Andrew Z's and Andrew K's first time attending the National Finals competition and Elanor's and Mason's second time. Elanor is the only senior on the team, and she plans on attending Reed College in the fall pursuing environmental science and engineering. Mason and Andrew Z are also interested in environmental science, while Andrew K is passionate about pulmonary medicine, finance and data science. The team's hobbies include hiking, mountain biking, and scuba diving! The team works together to discover the depths of ocean science together!



Maya Prasad (she/her)



Carter Bankowski



Maggie Robbins (she/her)



Jason Hu



TJ Friedholm



GREAT LAKES BOWL

UNIVERSITY OF MICHIGAN, SCHOOL FOR ENVIRONMENT AND SUSTAINABILITY AND MICHIGAN SEA GRANT

Regional Coordinators: Ms. Elyse Larsen, Mr. Kevin Keeler, Ms. Julie Hassen

SALINE HIGH SCHOOL

The first-year Saline High School NOSB team is coached by teachers Jennifer Dodge and Heather Meloche and consists of five members: Carter Bankowski, TJ Friedholm, Jason Hu, Maya Prasad, and Maggie Robbins. All five are high school juniors and look forward to attending a national competition. Between the two of them, Carter and TJ have visited over 100 National Park sites and are planning to go to more over the summer. Maya has been a two-sport varsity athlete since freshman year and loves astrology (she's a Scorpio sun). Jason, the club's founder, likes to play tennis and go hiking, while Maggie's favorite hobby is singing, and she has been in a choir for over 10 years. Our favorite marine animals include sponges, coccolithophores, barracudas, and zooxanthellae. In college, the team plans to study subjects as diverse as environmental science, political science, biology, medicine, and women's studies.



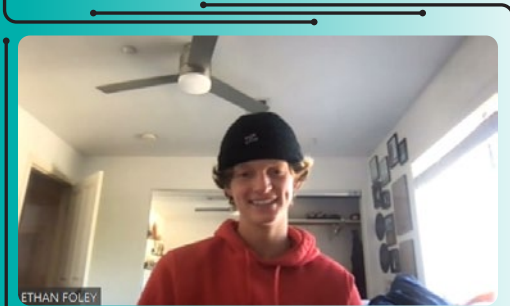
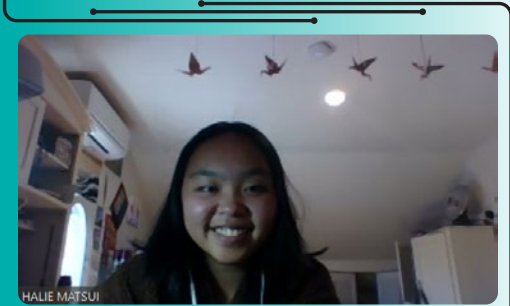
LAKE STURGEON BOWL

UNIVERSITY OF WISCONSIN, MILWAUKEE - SCHOOL OF FRESHWATER SCIENCES

Regional Coordinator: Ms. Elizabeth Sutton

EISENHOWER HIGH SCHOOL

Herman Restrepo has been coaching the Eisenhower Science Team since 2013 and has had a team participating at the Lake Sturgeon Bowl since 2018. Our team is all new to the National Ocean Sciences Bowl this year, and this will be the first year that the Eisenhower team will be participating at NOSB Finals. The Eisenhower team is led by senior Cindy Bian, who is looking to study english and chemistry in college. Eric Oelschalger, also a senior, hopes to study industrial engineering at the University of Wisconsin next year. Max Letellier is a sophomore who is keenly interested in astronomy and Earth science, his favorite sea creature is the sea cucumber. Freshmen Manzoor Mohis and Pranil Panda are excited to be part of the team this year and are looking forward to studying areas of life science as they continue their high school and college careers.



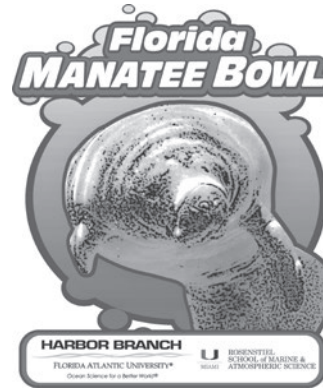
LOS ANGELES SURF BOWL

JET PROPULSION LABORATORY

Regional Coordinator: Ms. Kimberly Lievens

SANTA MONICA HIGH SCHOOL

Ingo Gaida is still coaching NOSB after 20 years, despite his teams causing him to experience several close brushes with Davy Jones' Locker over the years. Team Captain and senior Theodore Berger spends most of his time training in the Great Rift Valley of East Africa. Unfortunately, the lack of sea life there afflicts him with marine biology withdrawal syndrome. Junior Sara Akiba says she'd Ekman spiral out of control without her brother's wise words: "Sara, that's not how you pronounce that." Sara is CURRENTly the baddest beach on the team. Junior Ethan Vasquez Foley is a competitive surfer who is only here to get a leg up on his opponents and plans on using his first-hand experience to get us through competition. Sophomore Halie Matsui only comes around every 75 years, but that's ok because we all have our faults.



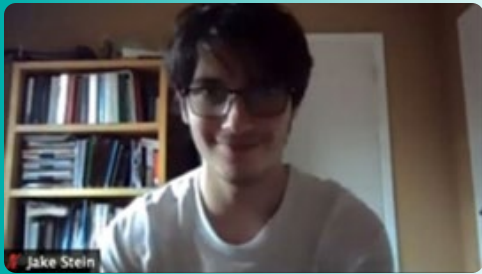
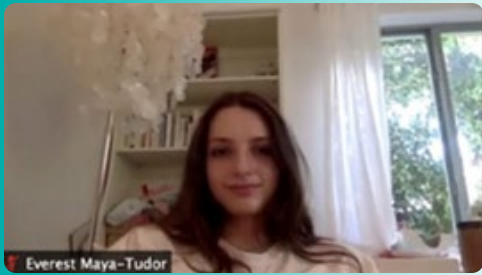
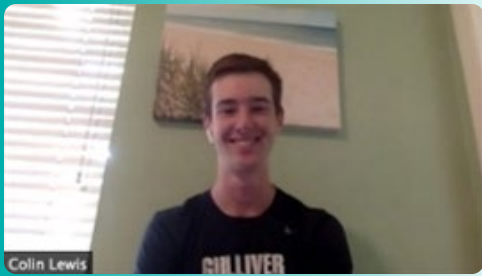
MANATEE BOWL

FLORIDA ATLANTIC UNIVERSITY, HARBOR BRANCH OCEANOGRAPHY INSTITUTE

Regional Coordinator: Dr. Dennis Hanisak

GULLIVER PREP

Mark Tohulka first coached NOSB in 2000 at Miami's MAST Academy, appearing at National Finals several times over the years. Now at Gulliver prep, he has emerged from the depths to coach NOSB again with co-coach Pennie Rotolante, advisor for Gulliver's Environmental and Oceanography club and dedicated ocean person. Gulliver's team is anchored by three veteran seniors, Everest Maya-Tudor, who studies mountains of oceanography materials, baseball great Alex Cunill, who has been known to knock challenging questions out of the park, and physics aficionado Jacob Stein, whose favorite fish are Swedish Fish. The stalwart seniors join junior Colin Lewis, a fan of all things ocean; and sophomore Julia Blas, who has found a new passion in the sea, taking both marine biology and oceanography classes this year. Julia is planning on getting certified in scuba this summer and continuing her oceanic quest. Could they get any wetter!





NOR'EASTER BOWL

UNIVERSITY OF MAINE

Regional Coordinator: Ms. Katie Clegg

YORK HIGH SCHOOL

York Team B made a big splash with their victory over York Team A in the finals of the Nor'easter Bowl. This is the seventh year York teams have participated in NOSB with coach and marine science teacher Mike Masi. The York teams are thrilled to be representing Maine and New Hampshire at national Finals once again after finishing in second place for the past three years. York, Maine, is a coastal town and York High is just a quarter-mile from the ocean. Preparation for NOSB began when members began exploring tidepools shortly after they learned to walk. York Team B consists of Calvin Healey, Tarun Ramgulam, Daphne Stratton-Gignac, Aidan Dowling, and Sylvain MacGovern. Aidan and Sylvain plan to pursue marine science in college, Daphne is likely to focus on environmental policy, Tarun is a chemistry/physics genius, and team captain Calvin is likely to major in business.



ORCA BOWL WASHINGTON SEA GRANT, UNIVERSITY OF WASHINGTON

Regional Coordinator: Ms. Maile Sullivan

TESLA STEM HIGH SCHOOL

Tesla STEM High School's National Ocean Sciences Bowl team was created on a shared love for ocean science (and also on a whim). Its members, Yuchen Li, Maxwell Soh, Atharv Dixit, and Nikhil Mehta enjoy various facets of oceanography: Yuchen is a Secchi disk enthusiast also interested in AMOC, Maxwell enjoys learning about marine biology, Atharv enjoys looking at deep ocean bathymetry, and Nikhil is a particular fan of mid-ocean ridge basalts. All four members aim to study sciences and underwater basket weaving at the Scripps Institution of Oceanography. This year marks Tesla STEM's first of hopefully many years of participation in NOSB. Tesla STEM High School's NOSB team is coached and supervised by Andy Christensen, a computer science teacher with a background in business law and wastewater treatment.





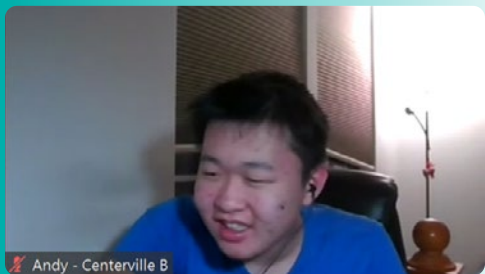
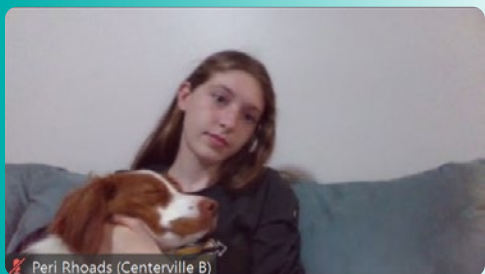
PENGUIN BOWL

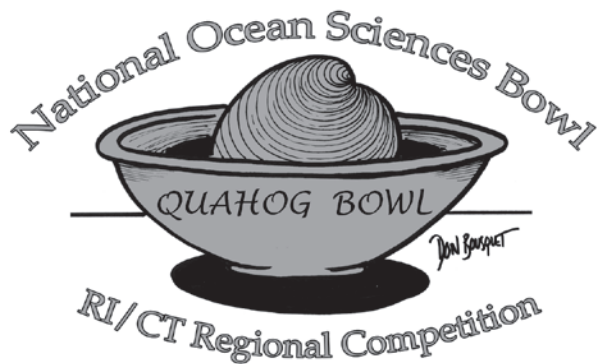
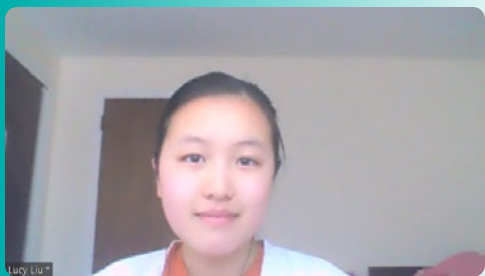
YOUNGSTOWN STATE UNIVERSITY AND PITTSBURGH ZOO & AQUARIUM

Regional Coordinators: Dr. Felicia Armstrong, Ms. Margie Marks

CENTERVILLE HIGH SCHOOL

The Centerville High School Siliceous Oozes are excited to participate in the 2021 NOSB National Tournament! They practice under the guidance of Mr. Jim Simpson, Mrs. Penny Manfredi, and Mrs. Beth Cahill. Hailing from Centerville, Ohio, is a team of five ambitious ocean lovers. Coming up first is Riya who is the mad scientist of the group and focuses on marine chemistry and biology. Next up is Enjie who is interested in geology and is a wizard with marine acronyms. Peri is the go-to person to ask about marine policy and even studies during her cross country runs. Nathan is the history and geography buff — There ain't no land that was conquered out of his watch. Andy is our resident freshman and is a god when it comes to Earth science and marine biology. When you unite these five determined oceanography enthusiasts, you get the ultimate marine squad.





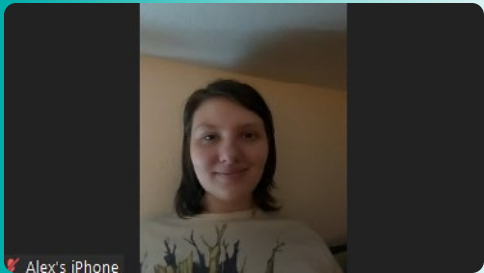
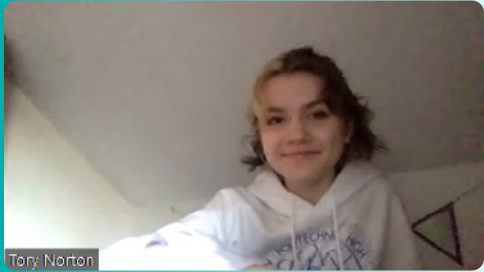
QUAHOG BOWL

PEOPLE MAKING A DIFFERENCE THROUGH COMMUNITY SERVICE, INC.

Regional Coordinator: Ms. Lori Tsuruda

EO SMITH HIGH SCHOOL

Cheryl Granger has coached a National Ocean Sciences Bowl team from EO Smith High School in Storrs, Connecticut, for several years. Two team members, Mateu Healey-Parera and Leonard Schweitzer, have competed in NOSB before and always look forward to the interesting topics that come up at competitions. The other team members, Lucy Liu, Jordan Lefkowitz, and Kanishk Tihaiya, are new to the NOSB but did enjoy this year's competition - especially the part about pirates! Everyone is excited to attend their first National Finals Competition. While preparing for the competition, the entire team liked studying different aspects of the marine sciences including ocean history, biology, and chemistry. Their favorite topics included waves, ocean chemistry, and learning about the team mascot - the sea sheep! Although the team is not sure what they will study in college, it will most likely involve science, math, or engineering.



SALMON BOWL

OREGON STATE UNIVERSITY

Regional Coordinators: Ms. Toby Harbison, Ms. Rhianna Thurber

BENSON POLYTECHNIC HIGH SCHOOL

Benson Sea Shanty (To the tune of The Wellerman)

There once was a team that put to sea
The name of the team was the Benson Team
Their scores went up, the clock ticked down
O go, my Benson Team, go
Soon may the Salmon Bowl come
To bring much knowledge and wit and fun
One day, when the bowlin' is done
They'll take their win and go
Agatha had not been two weeks from shore
When down on her an Alex whale bore
The captain Henry called on Tory and swore
Gabe'd take that whale in tow
Soon may the Salmon Bowl come
To bring much knowledge and wit and fun
One day, when the bowlin' is done
They'll take there win and go



SEA LION BOWL CALIFORNIA STATE UNIVERSITY, MONTEREY BAY

Regional Coordinators: Dr. Corey Garza, Dr. Laura Good

DOUGHERTY VALLEY HIGH SCHOOL

The Dougherty Valley High School team, consisting of captain Venkat Ranjan, Daniel Zhu, Harish Balasubramanian, Bryan Yan, and Prayrak Bajaj, is coached by Karen Dennis. This is their second time attending National Finals, and they are excited to learn more about oceanography through participating in this competition! Venkat enjoys studying geology and chemistry. His favorite marine phenomenon is Langmuir circulation. Although Daniel hopes to pursue a career in biomedicine, he is certain that his interest in marine biology will be long-lasting. Harish is interested in biology and the medical sciences and looks for ways to solve issues in the medical sciences using technology and computer science. This is Bryan Yan's first year participating in NOSB and his favorite marine organism is the blue-ringed octopus. He hopes to study astrobiology in college. Prayrak Bajaj, an avid Boy Scout and third-degree Taekwondo instructor, enjoys studying biology and chemistry topics.



SHORE BOWL

RUTGERS UNIVERSITY, INSTITUTE OF MARINE AND COASTAL SCIENCE

Regional Coordinator: Ms. Rachael Saccatelli

WEST WINDSOR-PLAINSBORO HIGH SCHOOL NORTH

This is West Windsor-Plainsboro High School North's second year qualifying for the NOSB Finals! The team includes Vivek Vajipey, Keshav Ratra, Shreyash Singh, Olivia Tang and Larry Xue. Coached by Kerry Pross, they are ecstatic to compete at a higher level and meet like-minded ocean science enthusiasts at NOSB 2021. The team captain, Vivek, loves Earth sciences, especially geology and astronomy, and enjoys collecting various rocks, minerals and fossils. Shreyash, a sophomore, enjoys learning about meteorology. Keshav, a senior, loves ingratiating himself with marine organisms, specifically those of the phylum Echinodermata. Olivia, a sophomore, is a big fan of studying genetics, anatomy, and epidemiology. Larry, a sophomore, is a fossils and cybersecurity expert. The team is excited to have learned so much about ocean science by preparing for and participating in the NOSB tournaments.



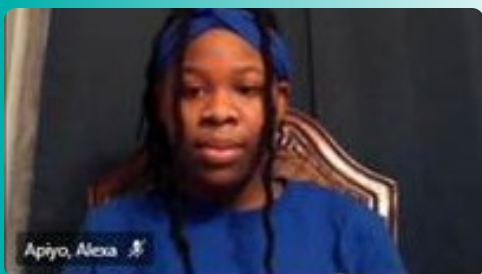
SOUTHERN STINGRAY BOWL

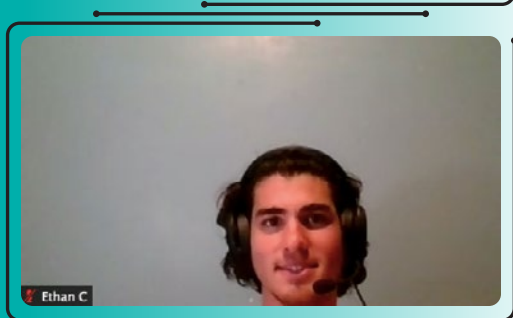
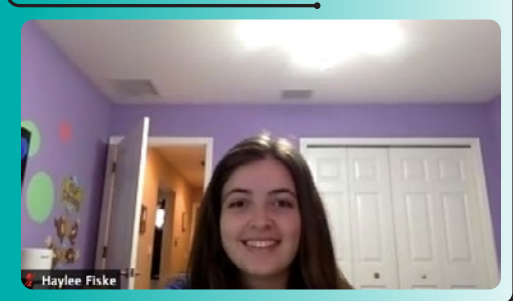
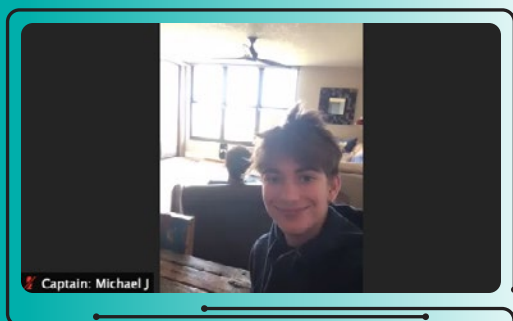
SAVANNAH STATE UNIVERSITY

Regional Coordinators: Dr. Dionne Hoskins-Brown, Dr. Victoria Young

ROCKDALE MAGNET SCHOOL FOR SCIENCE AND TECHNOLOGY

Diana Kennen has coached our National Ocean Sciences Bowl Team at Rockdale Magnet School for the past nine years. She has a deep appreciation for the ocean and teaching oceanography. Our coach is assisted by biology teacher Tiffany Jones. Our current team members are: captain Courtney Melvin, Duc Le, Ava Bailey, Kayla Holland, and Alexa Apiyo. Courtney has participated in NOSB for four years. Duc and Ava have participated for two years. For our freshmen, Alexa and Kayla, this is their first time competing. To prepare for NOSB, we go to the coast of Savannah to study marine organisms and to collect water samples. Courtney enjoys collecting seashells, and Duc's favorite ocean animal is the harp seal. Through consistency, cooperation, and hard work, we succeeded at the Southern Stingray Bowl. We are thrilled to take part in our first National Finals and will not be an easy team to beat.





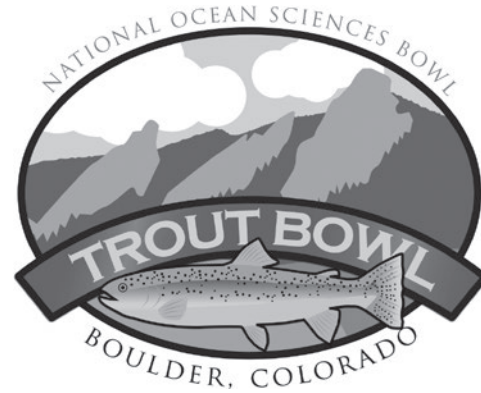
SPOONBILL BOWL

UNIVERSITY OF SOUTH FLORIDA, COLLEGE OF MARINE SCIENCE

Regional Coordinator: Dr. Teresa Greely

GAINESVILLE 4-H

Ethan is extremely passionate about the six major ions in seawater and upon acquaintance, unprompted, will recite the entire Wilson Cycle. Furthermore, he would like the rest of the competitors to hear a few words of wisdom: "Four score and seven years ago our fathers brought forth on this continent a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal." Team Captain Michael is an Iron Chef candidate for his spicy fried chicken sandwiches. His hobbies include crab larvae and he believes the Golf GTI is the best car ever made. Haylee enjoys sugar-free brownies and is excited to decimate the competition. Coaches Emily and Alex are former competitors on the Eastside High School NOSB team and started this team three years ago. Coach Thomas is an aspiring lobster doctor. In loving memory of Bill and Vishnu.



TROUT BOWL

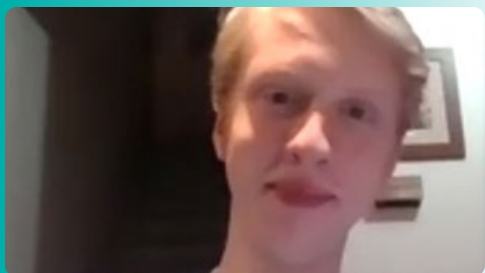
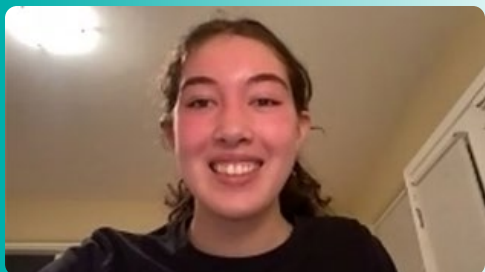
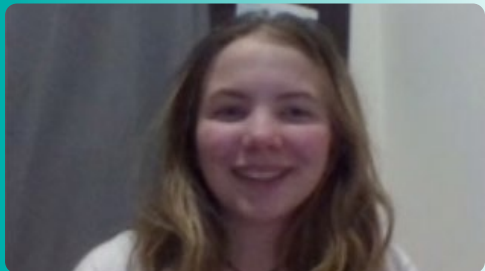
UNIVERSITY OF COLORADO, BOULDER

Regional Coordinator: Ms. Amanda Morton

THUNDER BASIN HIGH SCHOOL



Thunder Basin is the proud winner of the Trout Bowl. In a move that no one on the team — composed of Josh, Aidan, Danielle, Chandler, and Luke — believed was possible, we have managed to bamboozle our way into National Finals. In Wyoming we have -0.5 oceans thanks to the lack of humidity or any bodies of water that are not infested with bears, moose, wolves, or tourists; all of which we avoid. In our free time most of us have gone fishing about once to never. What led us here is our commitment to the polar bear picture we were promised. While we don't have the foundation that the other teams that got here have, we have made up for it by studying for three whole hours. We all enjoy being pessimistic about our odds as Josh cheers for victory and the rest for going home early. Watch out world here comes Wyoming.

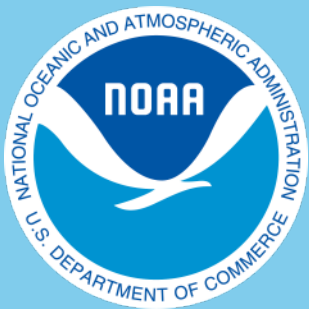


TSUNAMI BOWL UNIVERSITY OF ALASKA FAIRBANKS

Regional coordinators: Ms. Jennifer Elhard, Ms. Gillian Braver

JUNEAU-DOUGLAS HIGH SCHOOL

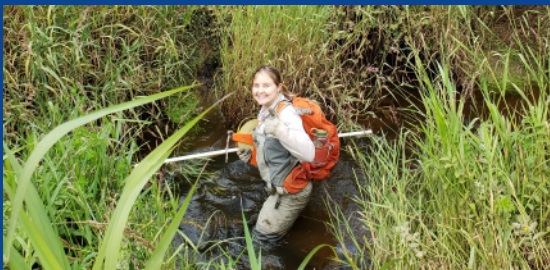
The New Squids on the Dock are proud to represent Alaska in the 2021 NOSB National Finals competition. Juneau-Douglas High School, home of the Crimson Bears, is located in the country's most beautiful capital city and overlooks Alaska's Inside Passage, where the team occasionally watches killer whales swim by during NOSB practice. The New Squids are all juniors and are attending Nationals for the first time. The team consists of Captain Tias Carney (whose favorite marine organism is a green sea turtle), Elin Antaya (diatom), Addy Mallot (jellyfish), Jack Marx (orca), and Adrian Whitney (dumbo octopus). Their coach, Shannon Easterly (humpback whale), has been part of NOSB for three years and only wishes that NOSB had been an option in her high school; she is an environmental educator and protected species observer. Best of luck to all!



The National Oceanic and Atmospheric Administration (NOAA) congratulates all of the 2021 National Ocean Sciences Bowl competitors!



Interested in a future ocean science career at NOAA? NOAA invites all NOSB competitors to check out our student opportunities at noaa.gov/students.



**Be sure to apply for our flagship two-year undergraduate scholarships during your sophomore year of college!
Find out more at noaa.gov/oed-scholarships.**



**Explore even more student and teacher opportunities at noaa.gov/education.
Follow us on social media!    @NOAAeducation**

CONGRATULATIONS TO ALL THE TEAMS IN THE NATIONAL OCEAN SCIENCES BOWL

WHAT FUTURE WILL YOU CREATE?



The Gulf Research Program (GRP) is putting science into action to enhance offshore energy safety, environment protection, and community health and resilience in the Gulf of Mexico and other U.S. coastal regions. Much of our work relies on advancing the scientific understanding of the ocean both now and into the future. By using science to address real-world problems, you can help create a secure future for the Gulf region.

LEARN MORE ABOUT OUR PROGRAMS AND GET INVOLVED:
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OUR PLANET'S
OCEAN UNDERSTOOD
THROUGH
TECHNOLOGICAL
ADVANCEMENT,
INTELLIGENT
OBSERVATION
AND OPEN SHARING
OF INFORMATION

CONGRATULATIONS
TO ALL THE 2021
NATIONAL OCEAN
SCIENCE BOWL
PARTICIPANTS

schmidtocean.org

One ocean, poles apart



NASA brings them together



Good luck to all the teams!



THANK YOU TO OUR ARCTIC FRIENDS!

The NOSB National Office thanks our partners at the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder (CU) (home of our Trout Bowl) for assisting us with our 2021 theme, “Plunging Into Our Polar Seas.” They were instrumental in connecting us to scientists associated with the Multidisciplinary drifting Observatory for the Study of Arctic Climate, or MOSAiC, project, and helping us bring attention to the importance of polar research.

Scientists with CIRES, along with hundreds of other team members from more than 20 different countries, participated in this unprecedented expedition. Following in the footsteps of Fridtjof Nansen’s groundbreaking expedition with his wooden sailing ship *Fram* in 1893-1896, the 2019-2020 MOSAiC expedition aimed to better understand the changing Arctic climate system by freezing a ship (*Polarstern*) in sea ice and drifting with the ice across the Arctic for an entire year studying ocean, atmosphere, and sea ice processes. The MOSAiC scientists’ return from the Arctic marked the end of the field portion of the expedition and the beginning of the next chapter, which involves analyzing this treasure trove of Arctic climate data.

We appreciate the numerous MOSAiC scientists who brought their engaging and important Arctic research to our 2021 competition year as webinar presenters, speakers, and career mentors.



THANK YOU!

The NOSB would like to give a BIG ‘THANK YOU’ to all of our National Finals Competition question reviewers for their time, effort, and dedication to high-quality NOSB questions.

Dara Cadden Naval Oceanographic Office
Alex Draper Georgia Institute of Technology
Carol Hopper-Brill . . . Virginia Institute of Marine Science (retired)
Evan Howard Massachusetts Institute of Technology / Woods Hole Oceanographic Institution
Abigail Johnson Georgia Institute of Technology
Jim Kremer University of Southern California & University of Connecticut (retired)
Jim Lubner University of Wisconsin Sea Grant
Charna Meth Scripps Institution of Oceanography
George Sharman National Oceanic and Atmospheric Administration (retired)
Ned Smith Florida Atlantic University Harbor Branch Oceanographic Institution (retired)
Wayne Sternberger . . . Johns Hopkins University, Applied Physics Laboratory
Britta Voss Washington State Department of Ecology
Jonathan Whitefield . . Oregon State University
Gene Williamson Teacher (retired)
Cassandra Wilson Consortium for Ocean Leadership
Bill Wise New York Sea Grant (retired)

We also need to extend a ‘THANK YOU’ to the many volunteer reviewers at the regional level who assist us each and every year!



The Consortium for Ocean Leadership (COL) is a Washington, D.C. nonprofit organization that represents the leading public and private ocean research education institutions, aquaria, and industry with the mission to shape the future of ocean science and technology. In addition to its advocacy role as the voice of the ocean research and technology community, COL manages a variety of community-wide research and education programs in areas of ocean observing, ocean exploration, and ocean partnerships.

Ocean Leadership's Mission

Ocean Leadership shapes the future of ocean science and technology through discovery, understanding and action.

Ocean Leadership's Vision

Our vision is a global society that views its own well-being as intimately connected to the ocean.

www.oceanleadership.org



NOSB's Mission

Inspiring Tomorrow's Ocean Leaders. The mission of the National Ocean Sciences Bowl® (NOSB) is to prepare the next generation of students for careers in ocean science by providing an educational forum for students to excel in math and science, as well as receive national recognition for their diligence and talents. NOSB has proven that it can generate student interest and excitement about science and the ocean, giving young people a chance to examine the marine sciences as an in-depth area of study and as a possible career.

Science • Competition • Stewardship

www.nosb.org