

2020 Scientist Ashore Introduction

Nicole Raineault, Chief Scientist
Lindsay Gee, Manager, Mapping & Science

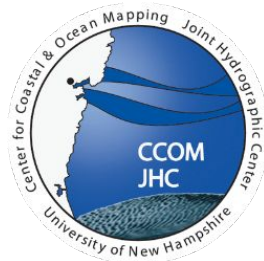
OCEAN EXPL  RATION TRUST



MISSION

Explore the ocean, seeking out new discoveries in the fields of geology, biology, maritime history, and archaeology while pushing the boundaries of **STEM education** and **technological innovation.**

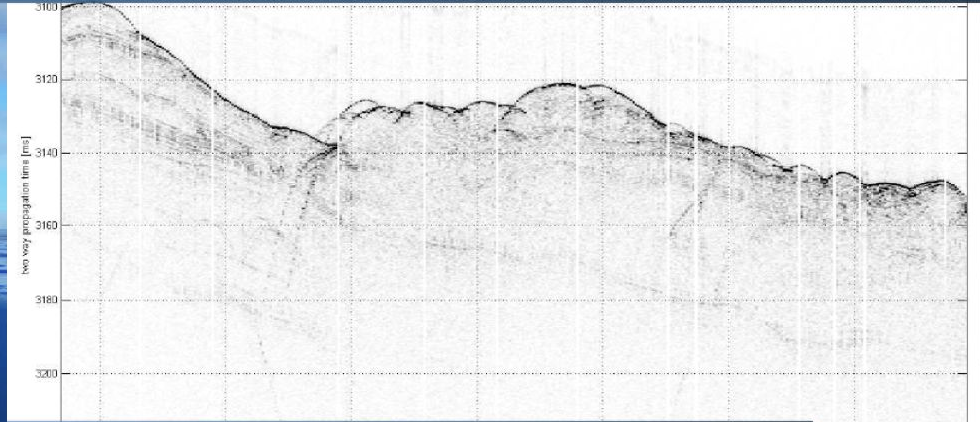
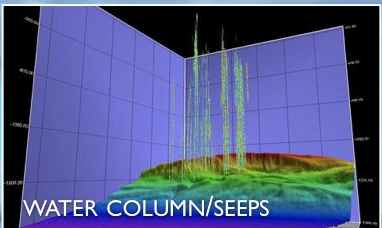
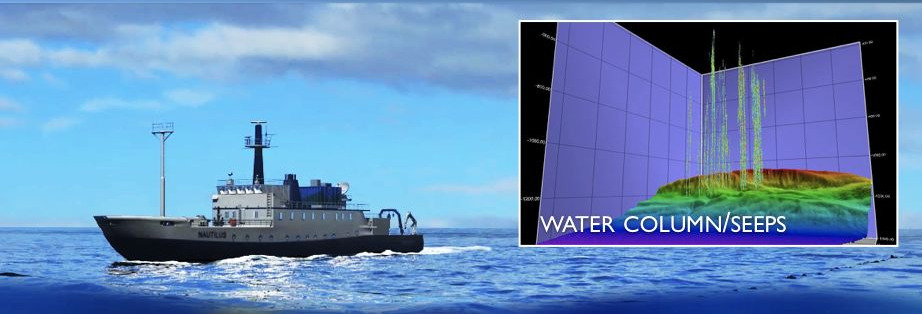
MAJOR PARTNERS & SPONSORS





OPERATIONS & CAPABILITIES: MAPPING

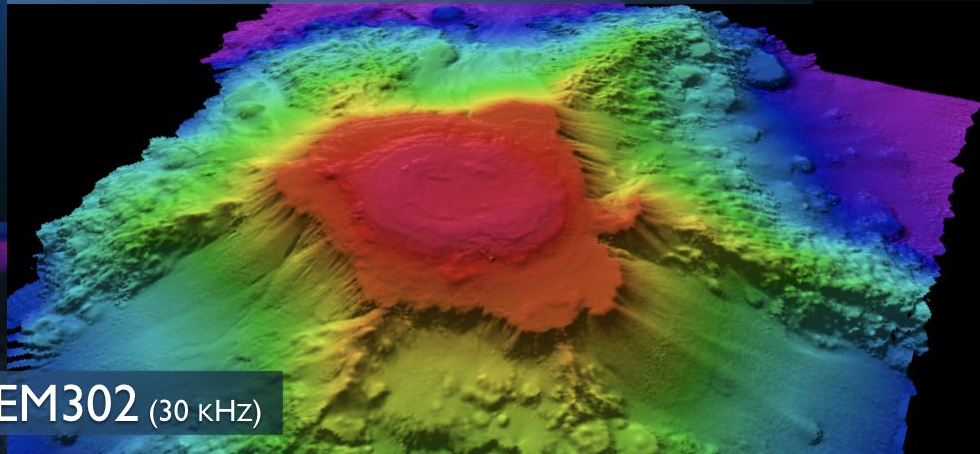
Knudsen - April 2011 - Knudsen SSP
RANGE: 300 m
SWATH: 4
SWATH: analog, only correction



KNUDSEN 3260 SUBBOTTOM (3.5/15 KHZ)

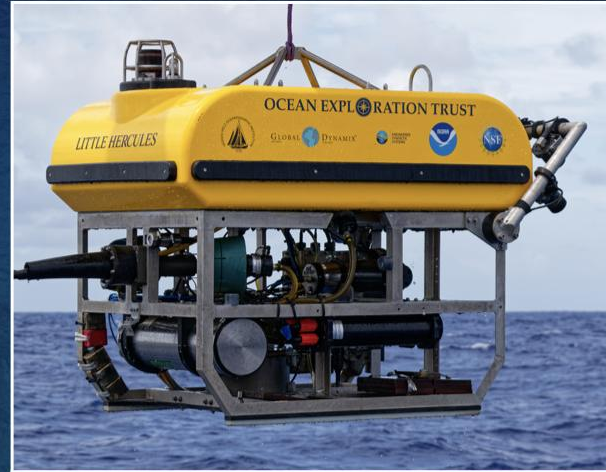
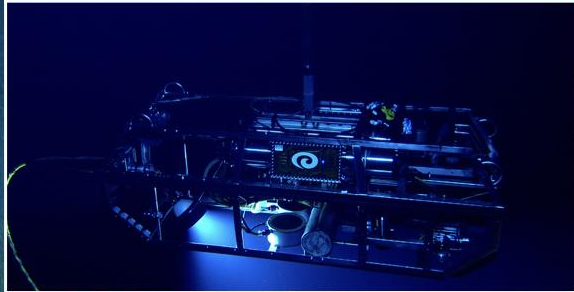


KONGSBERG EM302 (30 KHZ)





**ROVs Hercules
& Argus (4000-m, 6000-m)**



**ROVs Little Hercules
& Atalanta (6000-m)**





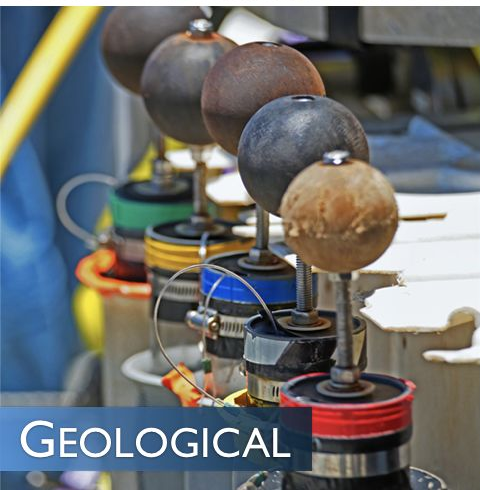
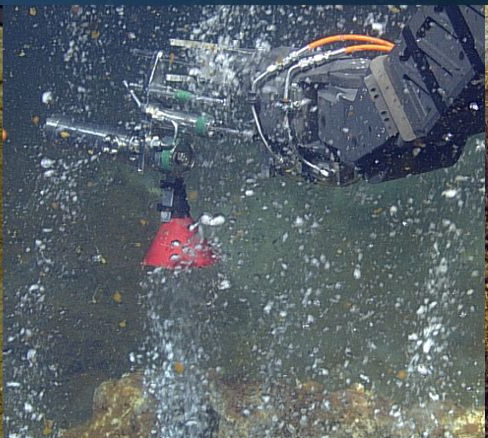
ROV SAMPLING CAPABILITIES



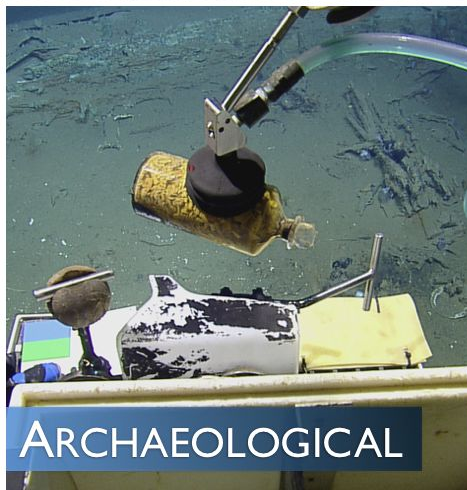
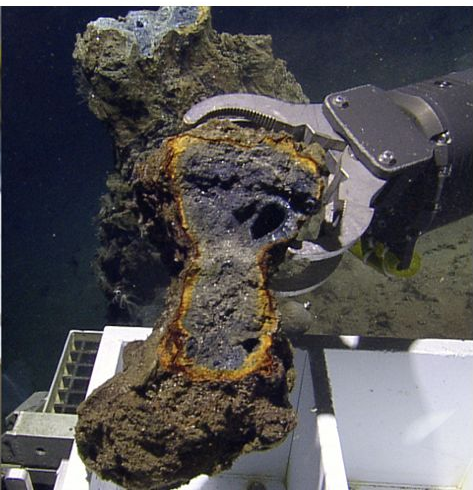
BIOLOGICAL



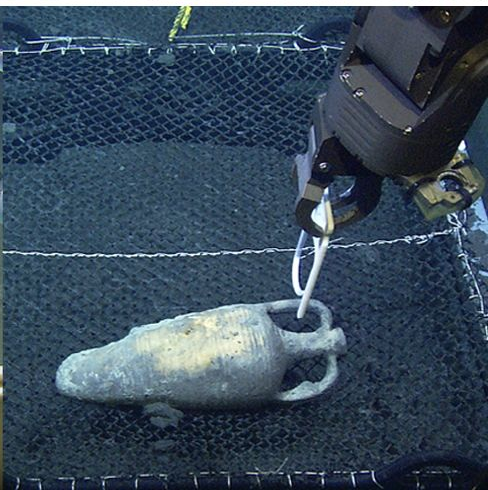
WATER & GAS



GEOLOGICAL



ARCHAEOLOGICAL





Wet Lab



2019 TECH COLLABORATIONS

Applied Marine Sciences | **PCB pump**

Coda Octopus Group | **Echoscope sonar**

National Geographic Society | **Deep ocean drop cameras & Aerial drones**

Scripps Institution of Oceanography | **Wave buoys**

Pacific Marine Environmental Lab | **MAPRs**

SoFar Ocean Technologies | **Spotter buoys**

University of New Hampshire CCOM | **ASV & Aerial drones**

University of Rhode Island | **Laser mapping system & Norbit multibeam sonar**

University of Texas Rio Grande Valley | **Suspended particulate rosette (SUPR)**

Woods Hole Oceanographic Institution | **MISO GoPro, IGTs**

SHIP UPGRADES

2019 (COMPLETED)

- Traction winch installation below deck
- DP upgrade
- Wet lab renovation

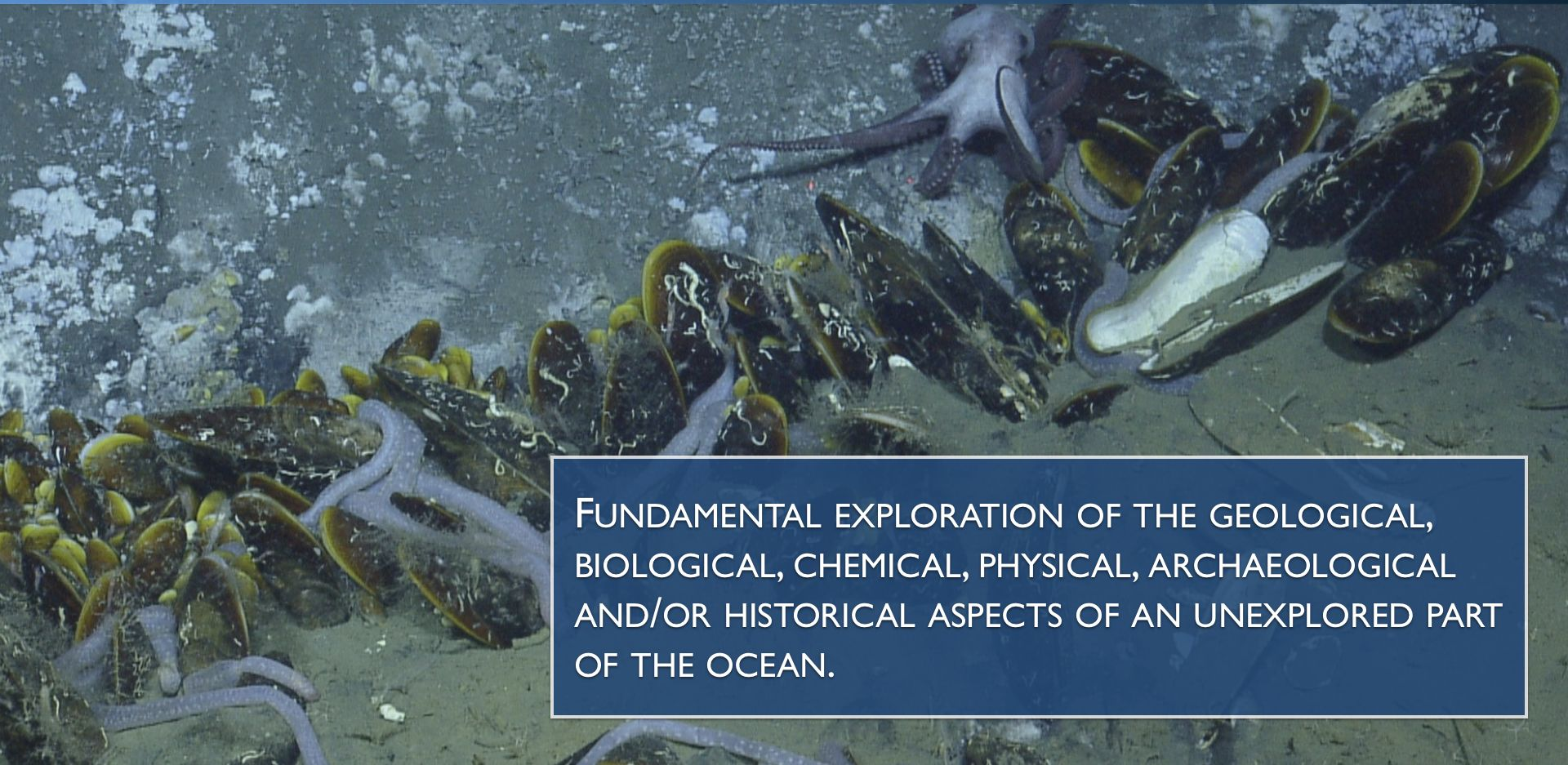
2019/20 (IN PROGRESS)

- Re-engining
- Funnel redesign, and
- Fabrication of configurable 3-van ROV control center





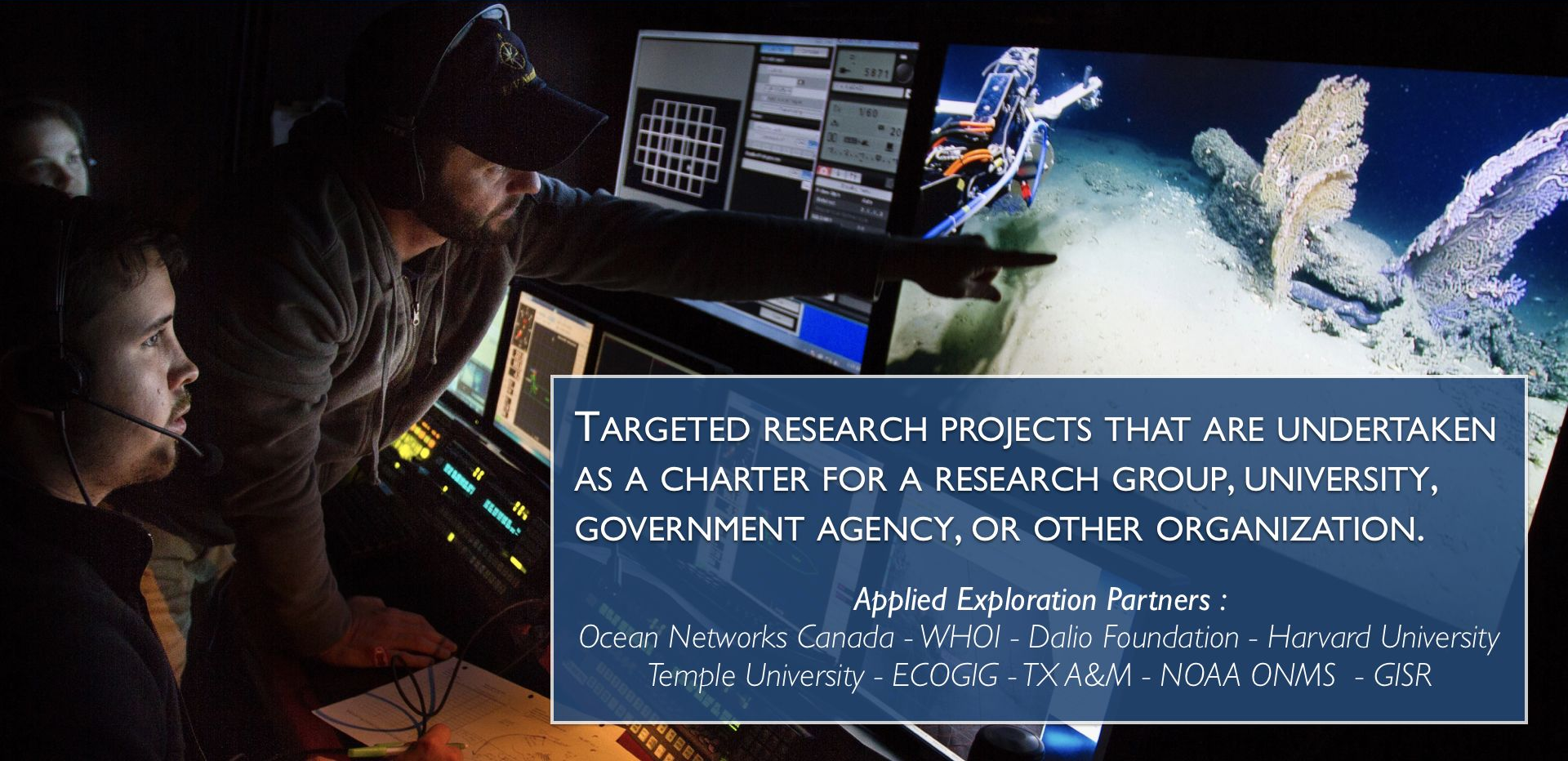
BASIC EXPLORATION



FUNDAMENTAL EXPLORATION OF THE GEOLOGICAL, BIOLOGICAL, CHEMICAL, PHYSICAL, ARCHAEOLOGICAL AND/OR HISTORICAL ASPECTS OF AN UNEXPLORED PART OF THE OCEAN.



APPLIED EXPLORATION



TARGETED RESEARCH PROJECTS THAT ARE UNDERTAKEN AS A CHARTER FOR A RESEARCH GROUP, UNIVERSITY, GOVERNMENT AGENCY, OR OTHER ORGANIZATION.

Applied Exploration Partners :

*Ocean Networks Canada - WHOI - Dalio Foundation - Harvard University
Temple University - ECOGIG - TX A&M - NOAA ONMS - GISR*

Control Van

Science team



Operations team



24-hour operations (ROV or mapping)
3 watch teams (4 hour shifts)

Telepresence Model

High bandwidth satellite connection between ship and shore

Broader participation

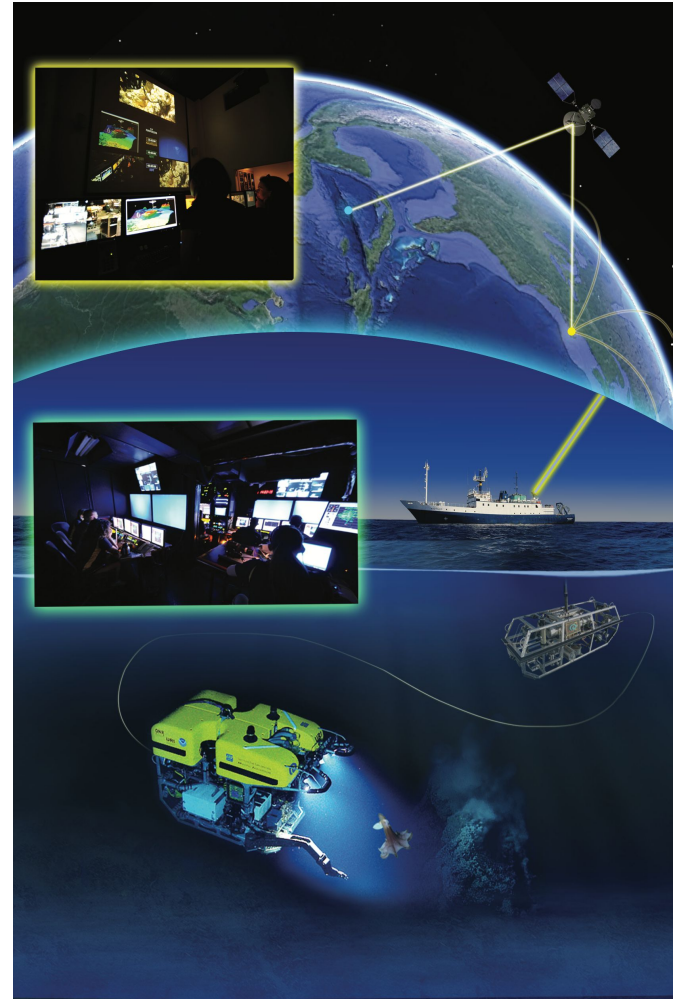
- Low-latency video
- Some data ashore
- Science chat, VOIP, and phone lines

Engagement with public



Who's Who on *Nautilus*

- **Expedition Leader:** organizes the cruise, oversees the cruise activities, and is the nexus of communication between the ship's crew and science and ops teams, and shore
- **Lead Scientist:** senior scientist who fosters collaborations with the scientific community to ensure broad and inclusive objectives are met. Helps write cruise and dive plans. Sails on *Nautilus*
- **Watch Leaders:** on-watch decision-makers who guide the dives and monitor & respond to the Science Chat
- **Lead Scientist Ashore:** scientist with expertise who helps lead dive(s) from shore





Expedition Team:

- 31 Science and Operations
 - 1 Expedition Lead
 - 1-2 Lead Scientists
 - 3-5 Scientists
 - 6 ROV Engineers
 - 3 Data Loggers/Science Managers
 - 3 Navigator/Mappers
 - 3 Video Engineers
 - 3 Sci Comm Fellows
 - 1 Data Engineer
 - 1 Mapping Coordinator
 - 1 Deck Chief
 - 1 Comms Lead
- 17 Professional Crew

Questions on ship capabilities?

2020 E/V Nautilus Schedule



Why the Scientists Ashore Program exists





SCIENTISTS ASHORE PROGRAM

- Network of over 100 scientists
- Provide input for cruise, dive/mapping planning & post-cruise data analysis
- Publish and present findings, conduct follow-up research

Nautilus Science Chat Dashboard - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Nautilus Science Chat D... x Nautilus Dive Summary... x Nautilus Dive Summary... x

https://isc-int-as1.gso.uri.edu/dash-chat-index.html

Nautilus Science Chat Dashboard

questioner is probably referring to pollution

2014/08/12 15:35:28 **JeffBook** You can monitor trace levels of chemicals if you send down a CTD with bottles to collect water. Then you can analyze the chemical composition of the water at various depth levels in the laboratory

2014/08/12 16:35:53 **JeffBook** You can sometimes find tracers of human activity

2014/08/12 16:36:59 **JeffBook** For example you can find the "age" of waters before and after lead was taken out of the gasoline by looking at trace amounts of lead (I think, I am no chemist)

2014/08/12 16:37:43 **JeffBook** I mean you can analyze the lead content and determine if that water was last at the surface before or after lead was banned from gasoline

2014/08/12 16:39:34 **JeffBook** You can also find particular nuclear atmospheric events I think??

2014/08/12 17:30:00 **JeffBook** Signing off

2014/08/13 11:17:26 **RuthBlake** hi Ethan, just sent you an important e-mail request!

2014/08/15 14:08:23 **nautiluscience Subject: NAO49**

2014/08/15 20:10:23 **datalogger** datalogger is Mike Brennan

Nautilus-Heading degrees

360
335
270
180
90
0
-45
-90
-135
-180

0 1 2 3 4 5 6 7 8 9

87.11

Nautilus-Course degrees/knots

10
5
0
-5
-10

10 5 0 5 10

84.36,9.3

Wind knots

30
20
10
0
-10
-20
-30

30 20 10 0 10 20 30

128.9,13.0

2014-10-09T01:17:46.235Z OBSERVATIONS:stereo survey 2334 start time:23:38 end time:01:17

2014-10-09T01:26:55.799Z SAMPLEID:NA054-075-ROVg TYPE:ROV_grab (ROVg)

2014-10-09T01:40:29.998Z OBSERVATIONS:valve released on gas/fluid sample

2014-10-09T01:42:13.033Z OBSERVATIONS:Adjusting Scott and Anna's valve to allow for gas expansion

2014-10-09T01:50:33.937Z SAMPLEID:NA054-076-NB TYPE:Niskin Bottle (NB)

2014-10-09T02:05:21.900Z OBSERVATIONS:Shutting Scott/Anna valve

2014-10-09T02:05:23.219Z OBSERVATIONS:shutting valve on fluid/gas sampler

2014-10-09T02:05:34.796Z OBSERVATIONS:finishing ascent

2014-10-09T02:22:16.997Z OBSERVATIONS:power off

2014-10-09T02:22:56.189Z DIVESTATEVENT:ondeck

Science Chat Log & Data Dashboard

The screenshot displays a web browser window with the following content:

- Browser Tabs:** Nautilus Science Chat D..., Nautilus Dive Summary..., Nautilus Dive Summary...
- Address Bar:** <https://isc-int-as1.gso.uri.edu/dash-chat-index.html>
- Chat Log (Left Panel):**
 - 2014/08/12 16:35:28 **JeffBook** questioner is probably referring to pollution
 - 2014/08/12 16:35:28 **JeffBook** You can monitor trace levels of chemicals if you send down a CTD with bottles to collect water. Then you can analyze the chemical composition of the water at various depth levels in the laboratory
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 - 2014/08/13 11:17:26 **RuthBlake** hi Ethan, just sent you an important e-mail request!
 - 2014/08/15 14:08:23 **nautiluscience** Subject: NA049
 - 2014/08/13 20:10:23 **datalogger** datalogger is Mike Brennan
- Data Dashboard (Right Panel):**
 - Nautilus-Heading degrees:** A line graph showing heading in degrees over 9 units. The heading is constant at 87.11.
 - Nautilus-Course degrees/knots:** A polar plot showing course in degrees/knots. The course is 84.36, 9.3.
 - Wind knots:** A polar plot showing wind speed in knots. The wind speed is 128.9, 13.0.

- Science Chat Log Username and password emailed to you by our Data Dept.
- Same for all expeditions
- Reset each year
- Conversation is part of our data archive

Science Chat Log Etiquette

- Watch Leaders are busy....fielding questions, looking at the data and video, making decisions, communicating with the ops team....they may not respond immediately.
- Emojis can help communicate intent 😊
- You may suggest something operationally, but the Watch Lead ultimately makes all decisions
- All entries to the Chat Log are time-stamped and part of the archive
- ALL CAPS AND EXCLAMATION MARKS ARE INTERPRETED AS YELLING!!!!

Improvements for Data Displays Soon!



As a Scientist Ashore You Will Receive:

- Account information for Science Chat Log*
 - Information about the “Science Dashboard”
 - Email invitations to introductory and planning calls
 - Cruise & Dive plans & Situation Reports
-
- *Emailed to you by our Data Engineering Team
 - Latest URL for webpages will be sent prior to cruise(s)
 - Most communication is via email and shared documents

Participating in Cruise Planning

- Pre-cruise planning call
 - Suggest exploratory ROV dive and mapping targets
 - Places that haven't been explored
 - Suggest samples needed for baseline characterization
 - Suggest technologies that might be utilized
- Provide feedback on cruise plan
- Lead Scientist & OET ultimately sets Cruise Plan

Participating During a Cruise

- Add your expertise to guide exploration during the cruise
 - Dive plan suggestions (email Exp Lead or Lead Sci)
 - Read Dive plans and Situation Reports
 - Use Science Chat Log for on-watch guidance and suggestions
- Watch Leader makes decisions on dive operations including sampling



NAUTILUS LIVE

Explore the ocean LIVE with Dr. Robert Ballard and the Corps of Exploration

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MAIN THE EXPEDITION PHOTOS & VIDEOS THE TECH THE SCIENCE THE TEAM LATEST NEWS JOIN US DONATE

SHOW STREAMS

Exploring Now

9:29 AM TUE OCT 12



COMMENT SYSTEM

We are diving on USS Mezon shipwreck site today! First, we map the whole site, which requires methodical lines and rapid fire photography to produce a mosaic. Stay tuned all day! 2 hours 11 min ago

SHOW LOCATION

E Pacific Ocean WATCH LIVE



CAMERAS HIGHLIGHTS

Channel 1

Channel 2

Quad

Send a Question to Our Explorers

OUR TEAM IS IN THE CONTROL ROOM AND READY FOR YOUR QUESTIONS!

Send

Sign up for our newsletter

EMAIL ADDRESS

Signup

Currently on Duty

ON BOARD:

MEET THE TEAM



Chris Gorman
Watch Leader



Avery Kruger
Scientist



Timothy Bragdon
Navigator



Will Sellers
Helicopter Pilot



Wendy Snyder
Argus Pilot



Tom Piarca
Video Engineer



Sarah Burgess
Communications



Anastasia Vallmaki
Data Logger

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Latest Tweets

Tweets by @EVNautilus

Recent Videos

VIEW MORE



Rare Sperm Whale Encounter with ROV
April 12, 2015



Strange Behavior: Crabs Fend Off Cat Shark
1 week 2 hours ago



Squat Lobster Feeding Frenzy
1 week 8 days ago

Recent Photos

VIEW MORE



Diving on the Rosebud Whale Fall
14 photos
2 hours 2 days ago



Colorful Microbial Mats in the California Borderland
12 photos
2 weeks 8 days ago



Life in the Extremes: Tube Worms
11 photos
June 20, 2015

Latest News & Updates

VIEW MORE



High School Students Launch Research Diver from Nautilus



Exploring the Rosebud Whale Fall



Kick 'em Jenny Q&A with Expert Scientist Steve Ceray

Follow NautilusLive on social media for updates (Facebook, Twitter)

Post-Cruise Involvement

- Request data/samples
- Help write Oceanography Supplement summary articles
- Publications & conference presentations
- Propose funding for additional analyses and grants

* Credit Ocean Exploration Trust for data/samples

* Please email citation/award info to: nicole@oceanexplorationtrust.org

Search Layers Help

Use any combination of the provided dropdown lists to define search criteria

Year:

- 2019
- 2018
- 2017
- 2016
- 2015

Ocean Places:

All

Mission Groups:

All

Platforms:

Ship

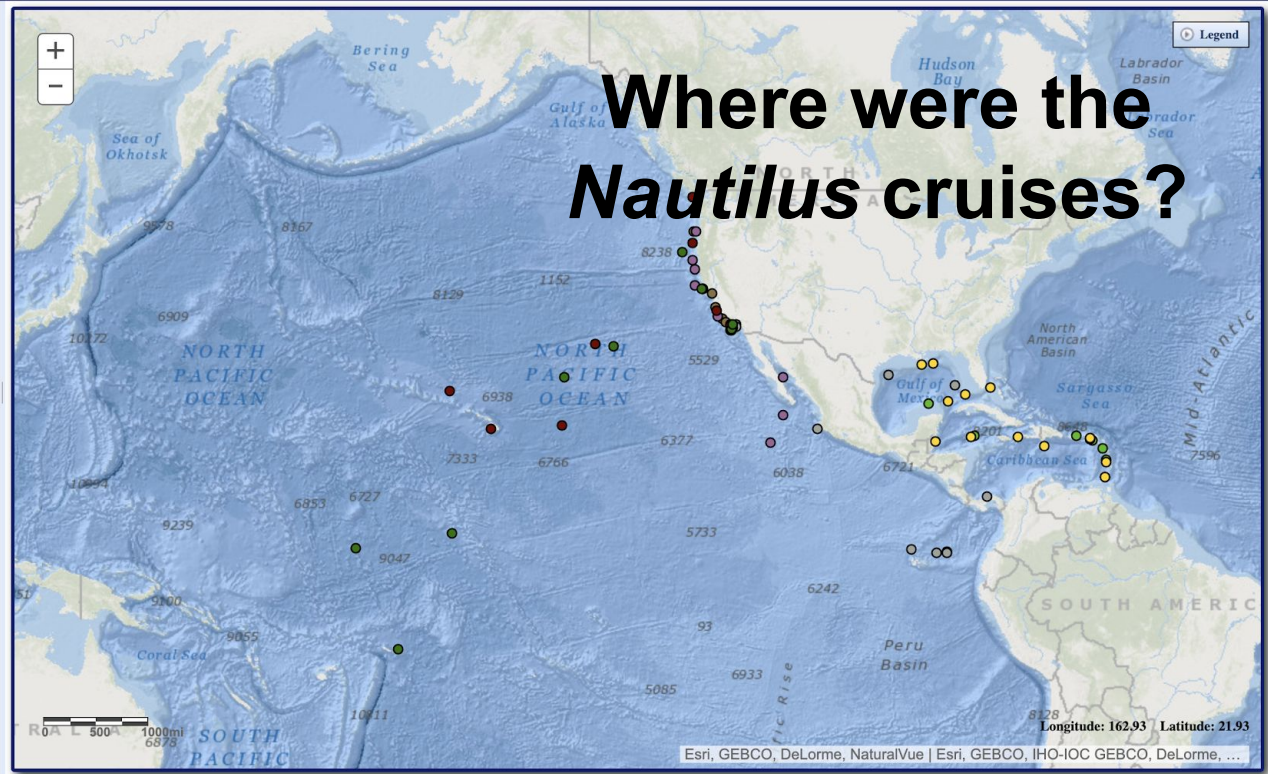
E/V Nautilus

Enter Search Text:

Search

67 Cruises Displayed

Reset Map



- 1) 2019 - Ocean Exploration Trust (OET) Pacific Seamounts and Mobile ROV - 2019 (NA115)
[More Details ...](#)
- 2) 2019 - Ocean Exploration Trust (OET) Baker, Howland, and Johnston Atoll - 2019 (NA114)
[More Details ...](#)
- 3) 2019 - Ocean Exploration Trust (OET) National Marine Sanctuary of American Samoa - 2019 (NA112)
[More Details ...](#)
- 4) 2019 - Ocean Exploration Trust (OET) Kingman Reef, Palmyra Atoll, Jarvis Island - 2019 (NA110)
[More Details ...](#)
- 5) 2019 - Ocean Exploration Trust (OET) Pacific Seamount Mapping - 2019 (NA109)
[More Details ...](#)
- 6) 2019 - Ocean Exploration Trust (OET) Gorda Ridge - 2019 (NA108)
[More Details ...](#)
- 7) 2019 - Ocean Exploration Trust (OET) California Mapping - 2019 (NA107)
[More Details ...](#)
- 8) 2019 - Ocean Exploration Trust (OET) Osborn Bank Expedition - 2019 (NA106)
[More Details ...](#)
- 9) 2019 - Ocean Exploration Trust (OET) Shakedown Cruise - 2019 (NA105)
[More Details ...](#)

Current URL: https://www.ncddc.noaa.gov/website/google_maps/OE/mapsOE.htm

Future URL: <https://www.ncei.noaa.gov/maps/oer-digital-atlas/mapsOE.htm>

NAUTILUS LIVE

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THE EXPEDITION

SHIP LOCATION

San Pedro, USA



2018 Nautilus Expedition



The Ocean Exploration Trust was founded in 2008 by Dr. Robert Ballard—best known for his discovery of RMS *Titanic*'s final resting place and as a National Geographic Explorer in Residence—to engage in pure ocean exploration. Our international programs center on scientific exploration of the seafloor with expeditions launched from Exploration Vessel (E/V) *Nautilus*, a 64-meter research vessel operated by the Ocean Exploration Trust. In addition to conducting scientific research, we offer our expeditions to explorers on shore via live video, audio, and data feeds from the field. We also bring educators and students aboard during E/V *Nautilus* expeditions, offering them hands-on experience in ocean exploration, research, and communications.

The 2018 *Nautilus* Expedition will launch the fourth year of exploration in the Eastern Pacific Ocean, and will be one of the most extensive seasons to date. From June to November, *Nautilus* will document and survey unexplored regions from British Columbia, Canada, along the West Coast of the United States, and for the first time, west to the Hawaiian Islands.

MENU

2018 EXPEDITION

- [Southern California Mapping](#)
- [Cascadia Margin](#)
- [Cascadia Margin & Washington Mapping](#)
- [Northeast Pacific Seamounts](#)
- [Ocean Networks Canada](#)
- [Pacific Seamounts](#)
- [Lō'īhi Seamount](#)
- [Papahānaumokuākea Marine National Monument](#)
- [Clarion-Clipperton Fracture Zone](#)
- [Monterey Bay National Marine Sanctuary](#)
- [Submerged Shorelines of California Borderland](#)

2017 EXPEDITION

2016 EXPEDITION

2015 EXPEDITION

2014 EXPEDITION

Meet the Team



Dive Recordings: YouTube



EVNautilus

266K subscribers

SUBSCRIBED

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VIDEOS

PLAYLISTS

COMMUNITY

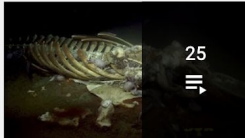
CHANNELS

ABOUT



All playlists ▾

Created playlists

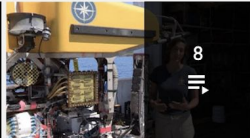


25



2019 Nautilus Expedition

[VIEW FULL PLAYLIST](#)

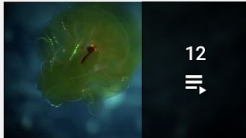


8



Meet the Nautilus Team: STEM Career Profiles

[VIEW FULL PLAYLIST](#)



12



Highlights: Jellies, Siphonophores, Ctenophores

[VIEW FULL PLAYLIST](#)



15



Deep Sea Shark Sightings

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3



2018 Nautilus Live Streams

[VIEW FULL PLAYLIST](#)



32

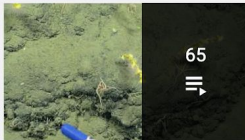


2018 Nautilus Expedition

[VIEW FULL PLAYLIST](#)



Nautilus Live Dive Recordings



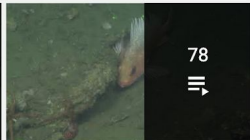
65



NA117-Full ROV Hercules Dives

Nautilus Live Dive Recordings

[VIEW FULL PLAYLIST](#)



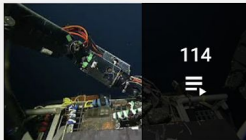
78



NA116-Full ROV Hercules Dives

Nautilus Live Dive Recordings

[VIEW FULL PLAYLIST](#)



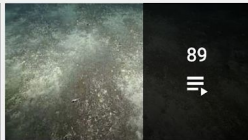
114



NA114-Full ROV Hercules Dives

Nautilus Live Dive Recordings

[VIEW FULL PLAYLIST](#)



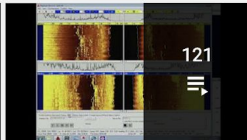
89



NA112-Full ROV Hercules Dives

Nautilus Live Dive Recordings

[VIEW FULL PLAYLIST](#)



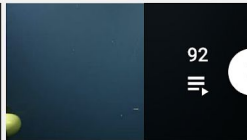
121



NA111-Full ROV Argus Dives

Nautilus Live Dive Recordings

[VIEW FULL PLAYLIST](#)



92



NA110-Full ROV Hercules Dives

Nautilus Live Dive Recordings

[VIEW FULL PLAYLIST](#)



Dive Annotations: Ocean Video Lab

NIRain My Profile

Explorer Interface Public Beta

Science Expert Interface →

My Stats

Total Time Logged	00:04:54
Total Missions Completed	1
Total Tags Provided	4

Current Mission



Hercules

Cruise: NA110 Dive: H1759

2019-07-01 23:39:02

5 5

Biology **Geology** Other

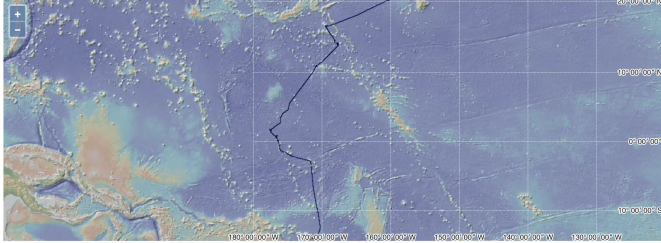
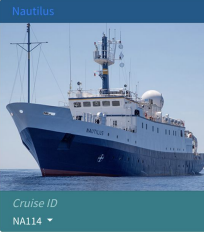
My Stats For This Video
Tags Submitted: 1
Elapsed Time: 00:01:02

Open Access Data & Samples


R2R Repository: Locate & ID

Nautilus Home / Search / Nautilus / NA114

Operator: Ocean Exploration Trust Cruise DOI: [10.7284/908302](#)



CRUISE ID	SUMMARY	START DATE	START PORT	END DATE	END PORT
NA114	Project: Baker/Howland/Johnston Chief: OET Data Manager	2019-08-25	Pago Pago, American Samoa	2019-09-16	Honolulu, Hawaii

R2R POST-FIELD PROCESSED PRODUCTS	DATA TYPE	DEVICE TYPE(S)	FORMAT	DATA
	Navigation	ins (Kongsberg Seapath 330+)	r2mav_geocsv	

2017-2019 data
<https://www.rvdata.us/search/vessel/Nautilus>

OET Video & Data Request Form

Use this form to request copies of cruise video or access to data products. As a general rule, our data products are available for only the cost of reproduction. However, certain contractual or security agreements may prevent us from sharing specific data sets. Non-video data is typically provided via a URL or other online service. 'HIGH' and 'LOW' resolution video encodings are provided via webserver when available. FULL quality encodings require a RAID sized for the purpose, and may cost as much as \$5000 for public data sets, depending on the hardware and technician time required to produce the copy, as well as shipping and handling. Private clients' data reproduction costs will be estimated separately.

*** Required**

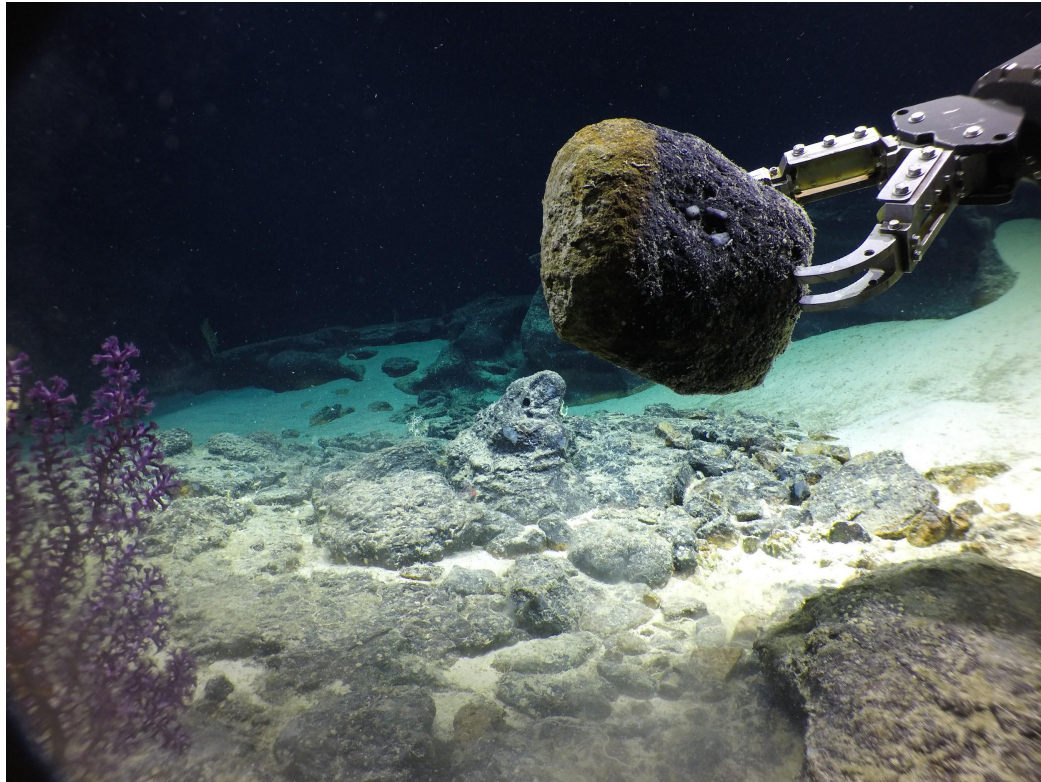
Cruise *
From which cruise are you requesting data? E.g. 'NA032'

<https://www.oceanexplorationtrust.org/data-request>

Geological Samples

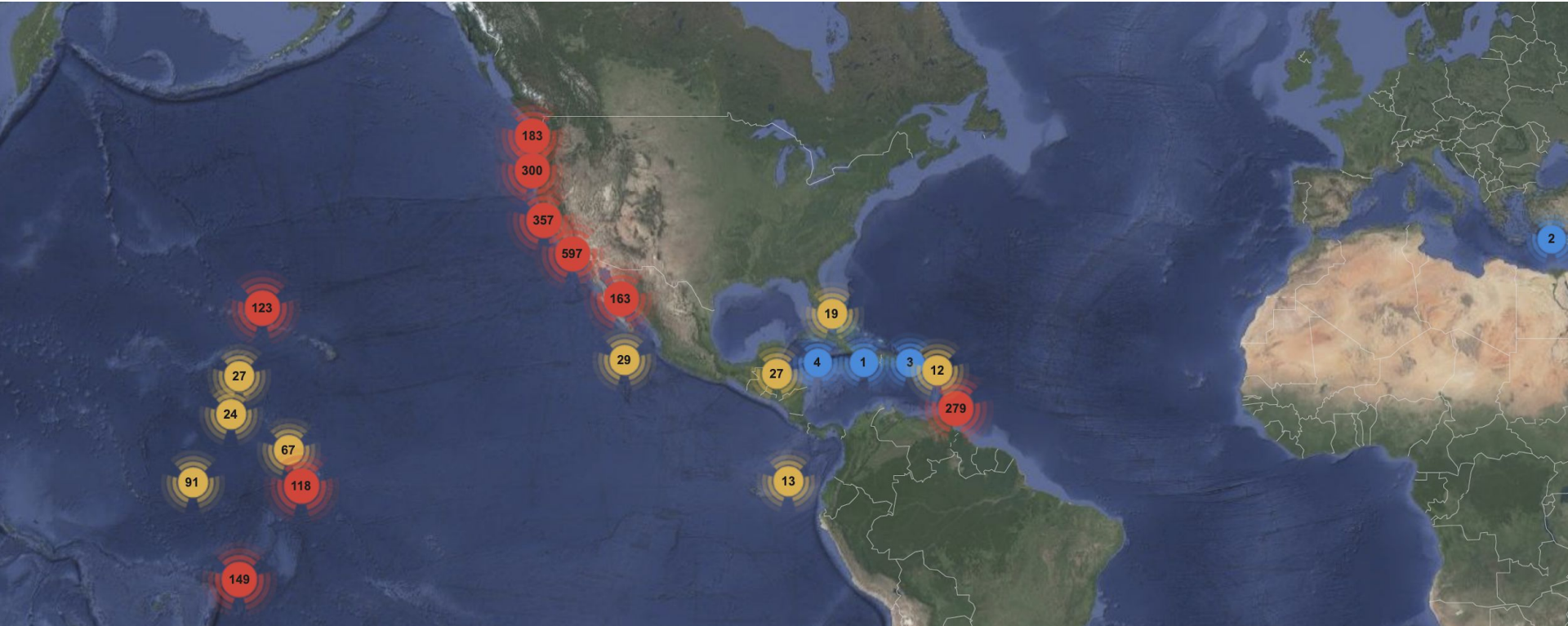
Find rocks and short cores:

<http://www.geosamples.org/catalogsearch>



Request rocks/cores: <https://web.uri.edu/gso/research/research-facilities/marine-geological-samples-laboratory/mgsl-sample-request-form/>

Biological Samples: Museum of Comparative Zoology



New in 2020

- Scientist Expertise List: help us connect you to discoveries in your area
- Requesting all scientists to improve the archives by reporting sample IDs to repositories
- Soon: New and improved data graphics for shoreside scientists
- New & merged OET/NautilusLive website

2020 Timeline

Spring/Summer: Scientist Ashore Community Expedition Calls

April 15th: Expedition Overviews Released

- Summary of cruise objectives
- Dates of cruises

1 month prior to start of cruise: Cruise Plan released

Always keen to get your input and feedback!

Email nicole@oet.org with suggestions or questions

OET Employment Opportunity

Director of Data Engineering

The Ocean Exploration Trust (OET) is seeking an experienced and flexible generalist systems engineer who can manage junior data engineers and contractors to support shoreside and shipboard oceanographic scientific, engineering, and outreach operations. The Director of Data Engineering will lead the team in on-shore development of new software and systems, and the design and stewardship of the OET science and outreach infrastructure. The position includes responsibilities at all levels from physical networking to complex system design.

This position is based in Narragansett, RI, with travel to E/V *Nautilus* and other platforms as required.

Applications will be accepted until March 30, 2020

[Job Description & Application Instructions](#)

<https://www.oceanexplorationtrust.org/director-data-engineering>

Questions?

