

# DeSSC report July, 2020 UNOLS Meeting

- DeSSC membership
- NDSF vehicle updates
- Other activities



# DeSSC Membership

## Current members

Roxanne Beinart (*URI*)

David Caress (*MBARI*)

Amanda Demopoulos (*USGS*) , Vice Chair DeSSC

Brian Glazer (*Univ. Hawaii*)

Leila Hamdan ( *Univ S Miss*)

Anna-Louise Reysenbach, Chair (*Portland State U*)

Andrew Thurber (*OSU*)

Dorsey Wanless (*Boise State U*)

Scott White (*Univ, SC*)

Peter Girguis, (*ex-officio, Harvard*)

Rob Munier (*ex-officio, WHOI*)

Tim Shank (*ex-officio, WHOI*)

Adam Soule (*ex-officio, WHOI*)

# ROV Jason

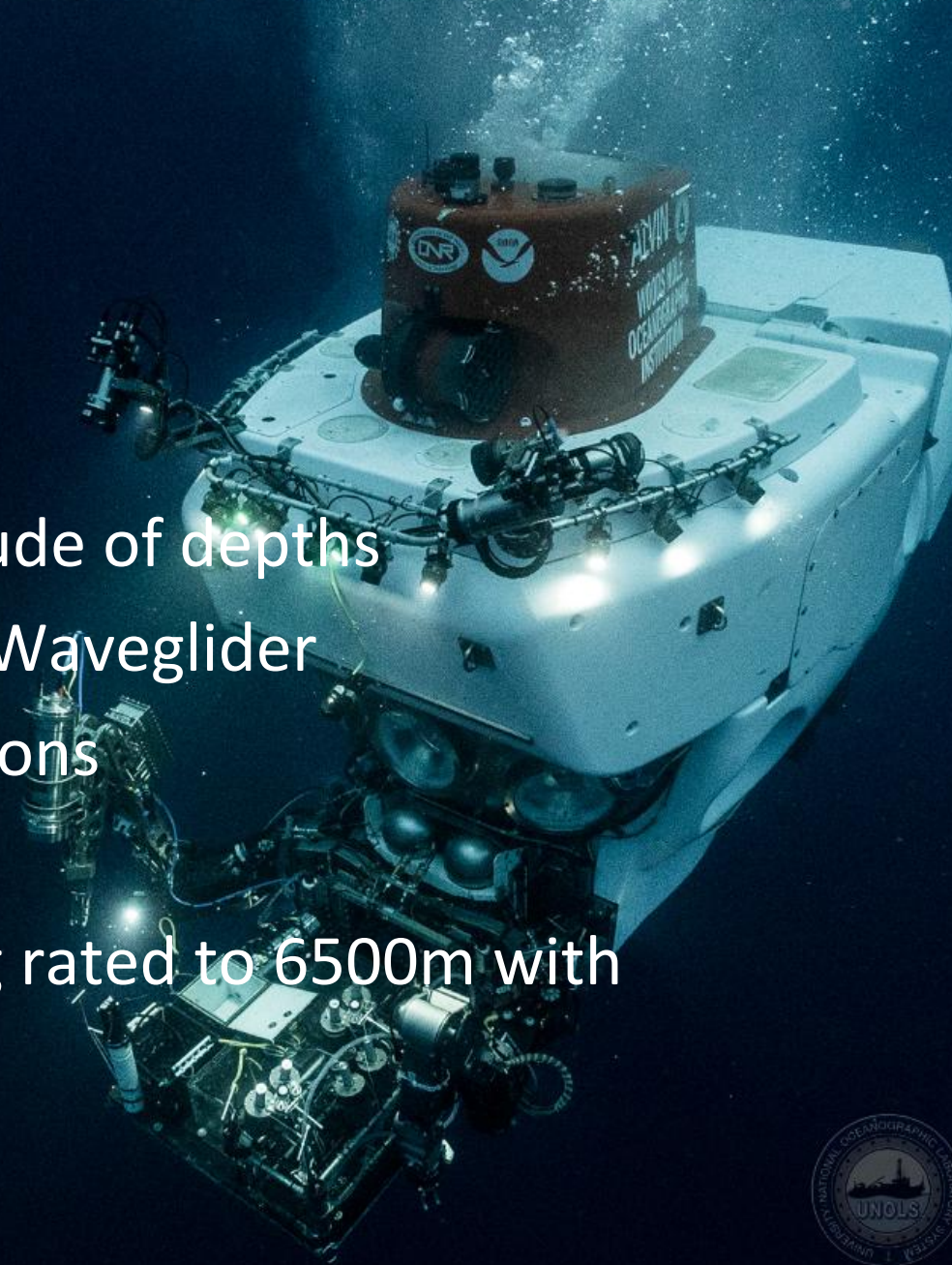
- One Cruise
- 24 days 11 dives
- 3 cruises deferred due to COVID-19
- back to work
- New 4k camera improved
- Sea log tested and operating well
  
- Staffing.. nimble





# Alvin:

- Were able to complete all three cruises in 2020
- 85 operating days
- Average bottom time was 5.5 hours at a multitude of depths
- Concurrent operations of Sentry and Alvin and Waveglider
- Fixed focus camera useful for post-dive discussions
- Alvin overhaul which will result in the sub being rated to 6500m with planning for science verification



# Sentry

- 26 operating days
- Successful joint operation with Alvin and Sentry
- Lost 130 operating days due to COVID-19
- Able to try out new Multibeam
- Waveglider..
- Lots of upgrades

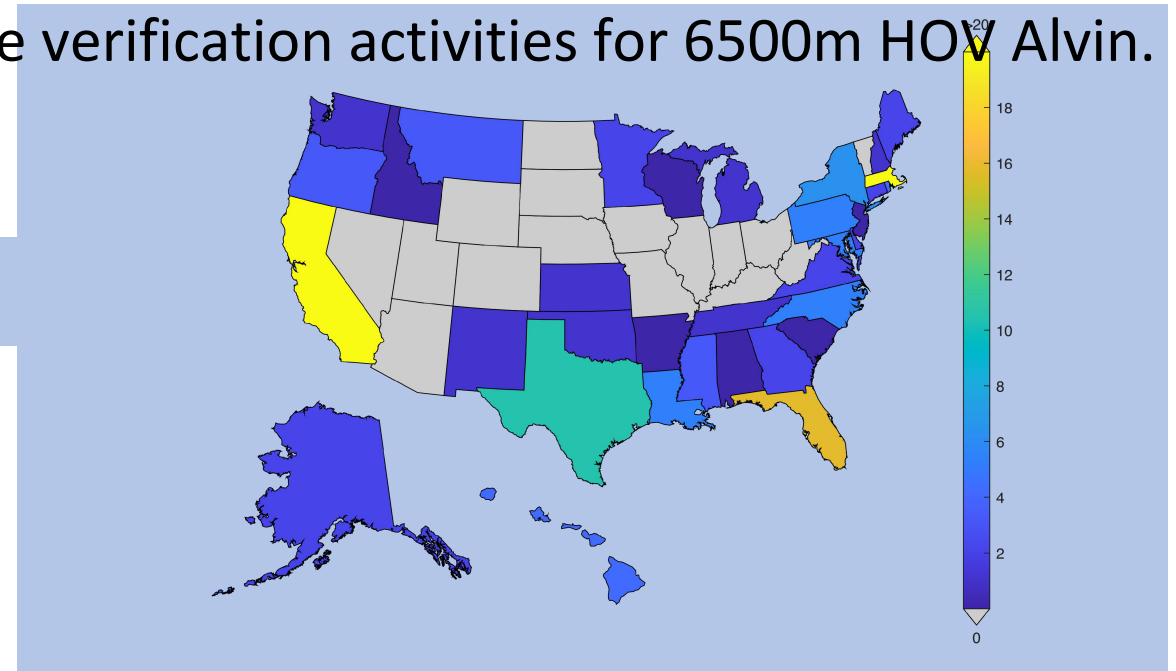


# WORKSHOP OBJECTIVES

- Synthesize community input into a publication describing science priorities at abyssal depths.
- Develop a white paper outlining science verification activities for 6500m HOV Alvin.

## COMMUNITY INPUT

- Online survey
- Subject-matter expert presentations
- Online community discussion



*188 resp. from 34 states + International*

**Committee:** Adam Soule, AL Reysenbach, Tim Shank, Jeff Marlow, Andreas Teske, Dorsey Wanless, Jeff Seewald, Bruce Strickrott, Rika Anderson



# WORKSHOP- 'minilabs'

- Initially three online sessions. Participants watch pre-recorded presentations and spend 90 minutes in breakout group discussion on a common set of questions.

## **Abyssal Plains & Seamounts**

17 June (10am EDT, 2pm PDT)

- Peter Auster, U Conn
- Jill McDermott, Lehigh U
- Steve D'Hondt, GSO URI
- Jasper Konter, SOEST U Hawaii

## **Trenches & Transforms**

30 June (10am EDT, 2pm PDT)

- Chris German, WHOI
- Karyn Rogers, RPI
- Patty Fryer, SOEST U Hawaii
- Jeff Drazen, SOEST U Hawaii

## **Technology & Societal Relevance**

07 July (10am EDT, 2pm PDT)

- Bruce Strickrott, WHOI
- Pete Girguis, Harvard U
- Beth Orcutt, Bigelow
- Diva Amon, NHM London

>150 registered

# Pre-Workshop Materials

Peter Auster, UConn

**Seamounts ... where are they?**

Total Seamounts = 100,000+  
50,000+ are >1000 m, many more <1000 m  
Area < 2000 m is < 10% of all High Seas Region

17:05

Steve D'Hondt, GSO URI

**Sedimentary microbes are abundant**

- Roughly equal to total numbers in seawater &
- <1% of Earth's total biomass

(subseafloor cells are tiny)

Cell Count ( $\log_{10}$  cells  $\text{km}^{-2}$ )

Total =  $2.9 \times 10^{29}$  cells

Abundant in anoxic sediment. Sparse in oxic sediment.

16:13

Jasper Konter, SOEST UH

Science in the Abyss Workshop Jasper Konter #AbyssalScience Hotspot

**Construction in Stages**

Volcanic islands: map 3D structure  
 ⇒ Seamount structure: need geochemistry & geophysics  
 ⇒ Find stages with variations in magmatic and source processes and compositions  
 ⇒ Sampling needed from seafloor to summit

19:41

Jill McDermott, Lehigh Univ

Science in the Abyss Workshop McDermott #Abyss

**Ashadze-1, Aurora, and Piccard; slow to ultra-slow mid-ocean ridges**

Abyssal site: 4950 m Piccard vent field; German et al., 2010; Connelly et al., 2011; McDermott et al., 2018

Description: Black smoker field hosted in basalt flows, 398°C

Select scientific discoveries:

- Newly discovered alvinocaridid shrimp species, *Rimicaris hybisae* (Nye et al., 2012)
- Biomass pyrolysis origin of methanethiol (Reeves et al., 2014)
- Although the measured maximum temperature of 398°C is below the two-phase boundary of seawater at seafloor conditions, several lines of evidence suggest that these fluids cooled from much higher temperatures at depth, >500°C (McDermott et al., 2018)
- Those high temperatures of formation produce very high aqueous  $\text{H}_2$  contents that exceed those at many ultramafic fields (McDermott et al., 2018)

15:41

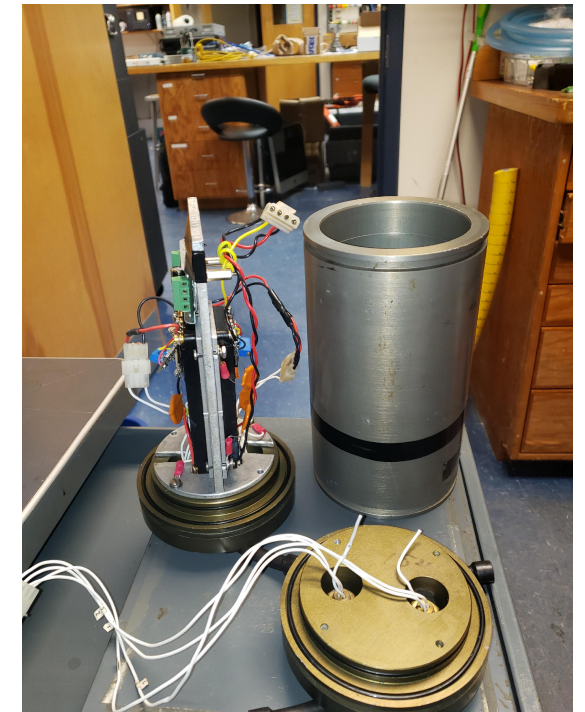
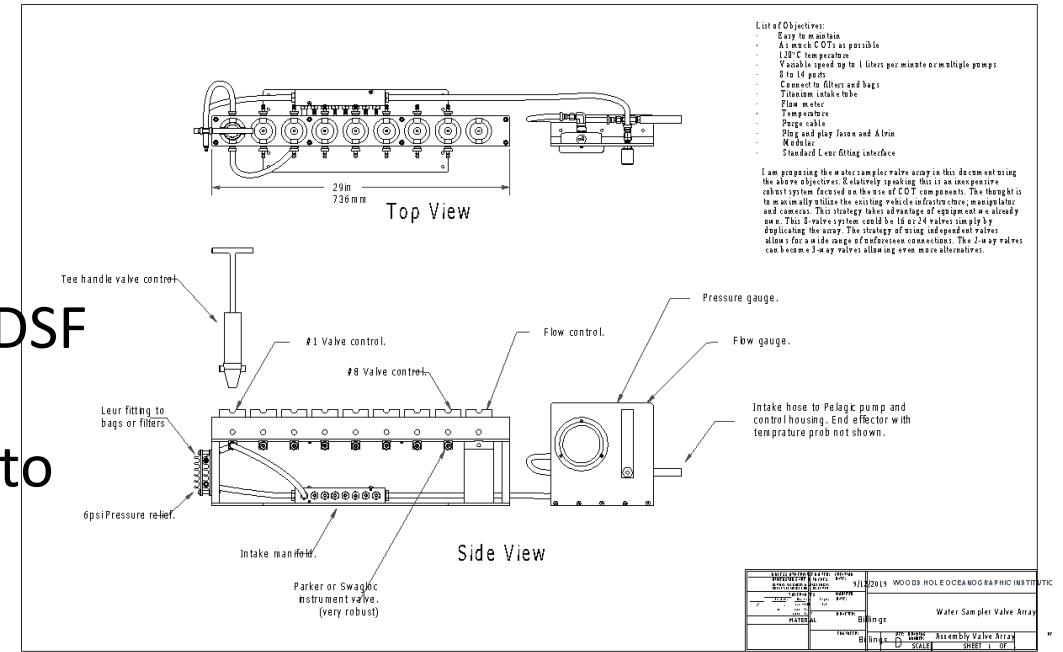


# Workshop 4: DIVERSITY, EQUITY, AND INCLUSION

- The nationwide protests have illuminated the challenges we face in science with DEI. We reserved a portion of our discussion time in the workshop session focused on ‘Societal Relevance’ for this topic.
- However, because of the complexity of the issue, we added a fourth session to the workshop that deals exclusively with racism in the sciences and approaches to address diversity, equity, and inclusion within our community. KnowInnovation, who is facilitating the digital side of the workshop offered to support this fourth workshop *pro bono*.
- This workshop will be held next Tues.
- <https://ndsf.who.edu/alvin/workshop-alvin-in-the-abyss/>

# Other activities:

- microbial-biogeochemistry manifold sampler
  - Goal: Develop a community fluid sampler with NDSF engineers to meet community needs for fluid sampling, while remaining simple and adaptable to prevent a high maintenance burden
- New users request: Rika Andersen, Elizabeth Trembath-Reichert
  - 10L/sample
  - Adjustable flow rate
  - 10-12 ports
  - Temp probe, flow meter, modularity etc.
- Andy Billings designed and built
- Tested on Cayman expedition 4950m depth (Piccard hydrothermal field, Mid-Cayman Rise)





# Other activities:

- Imagery workshop (s) in collaboration with NDSF (Carl, Andy Bowen)
  - 3 day class .. Curriculum development
    - underwater videography and still imaging fundamentals
    - underwater lighting fundamentals
    - The anatomy of creating a “shot”
    - common situations, different image needs
  - Short “how to” videos for science
  - Once course materials developed, can plan science workshops
- RCN proposal (Mandy Joye) , Townhall meeting at Ocean Sciences in San Diego in Feb.
- DeSSC Dec 2020 and New User meeting (TBD)
- Thanks!