

# Welcome to *PolarConnect*



Thermal Sensitivity of Embryos and Larvae of Antarctic Marine Ectotherms  
With PolarTREC Educator Amy Osborne  
& Dr. Amy Moran, Aaron Toh, and Graham Lobert

**22 November 2019**

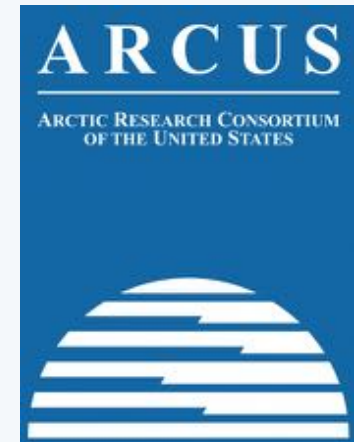
# Participant Introductions

**In the Chat box, please introduce yourself  
by typing in your:**

- ✓ Name
- ✓ School or Institution
- ✓ The number of students and adults participating with you in the same location

# What is PolarTREC?

- Since 2004, the Arctic Research Consortium of the United States (ARCUS), a non-profit organization, has been administering the PolarTREC Program.
- PolarTREC is professional development for U.S. middle and high school teachers and informal STEM educators. They are paired with researchers for 3-6 week research experiences in the polar regions.
- Over 180 educators from around the United States have joined scientists in the Arctic and Antarctica to learn about science, the polar regions, and to share what they have learned with their students and communities.



*25 Years of Connecting Arctic Research*  
[www.arcus.org](http://www.arcus.org)

# Questions

## During the Presentation:

- Type your question into the text chat box and we will insert your question when the right opportunity arises.
- Don't worry! If we haven't been able to ask your question during the presentation, we will save it for the end.
- At the end of the presentation, we often open the webinar up to family and friends who want to say "Hello" or have any last minute questions for the presenters.

# Where We Are - Antarctica!



Polar Bear Photo by Sandra Thornton (PolarTREC 2016), Courtesy of ARCUS

Penguin Photo by Timothy R. Dwyer (PolarTREC 2016), Courtesy of ARCUS

## We are here!

Southern Polar Region (66.5°S latitude and south to pole). Right now it's summer and light all of the time. In June, July, August it will be winter and dark all of the time.

## McMurdo Station, Antarctica!



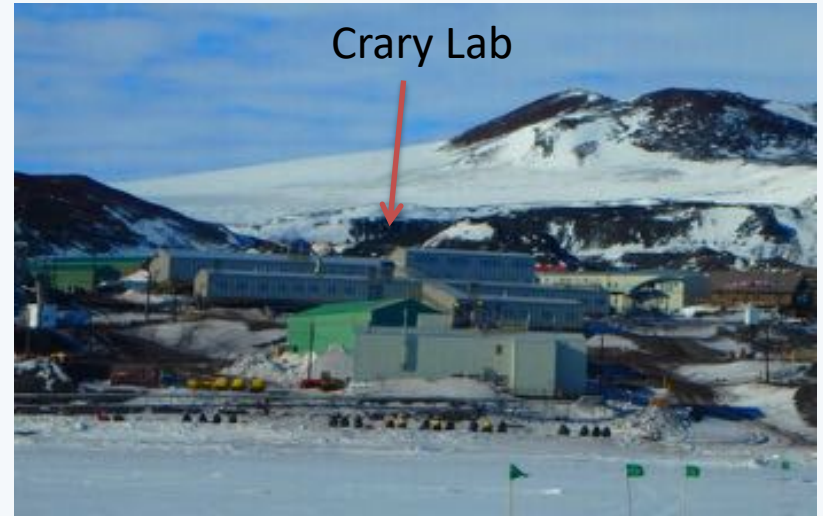


# Where We Are - McMurdo Station

McMurdo Station



Crary Lab



Sea Ice



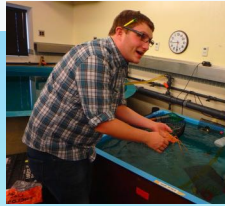
Dive Huts



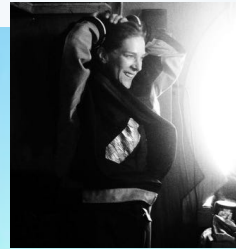
# Who We Are

Meet B-307

Graham Lobert



Dr. Amy Moran,  
Principal Investigator



Aaron Toh



Amy Osborne,  
PolarTREC educator



Photo by Graham Lobert

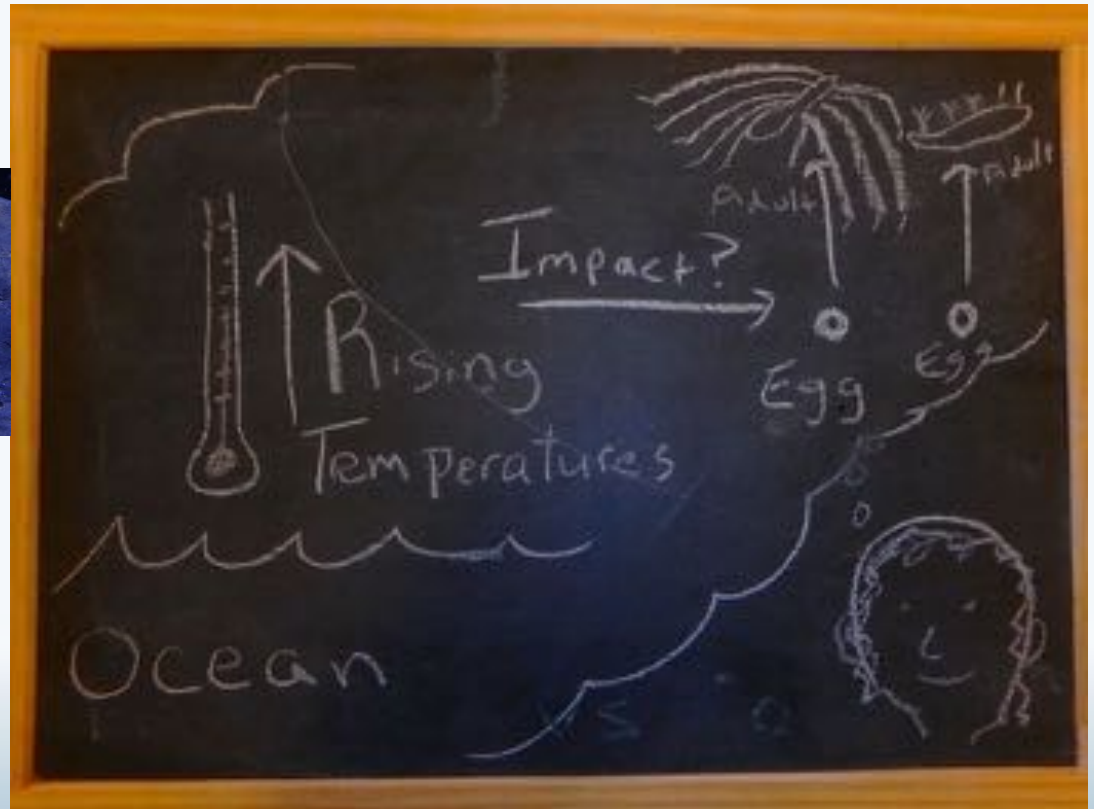
Photo by Rob Robbins

# What We Are Asking

- Will changing ocean temperatures affect the growth and development of marine ectotherms?

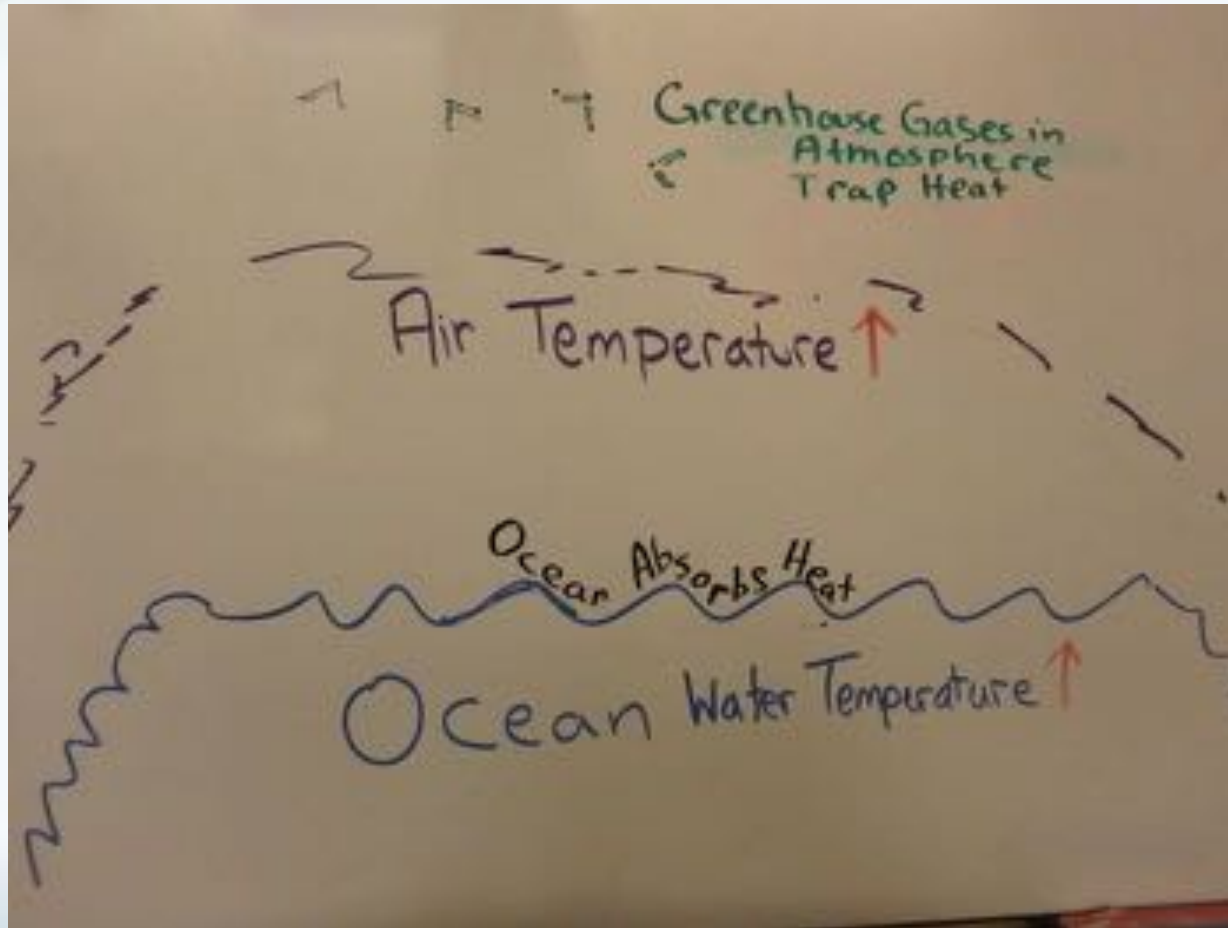


Marine ectotherms, like sea spiders and sea slugs (nudibranchs), rely on their environment for their body temperature. This is also known as being cold-blooded.





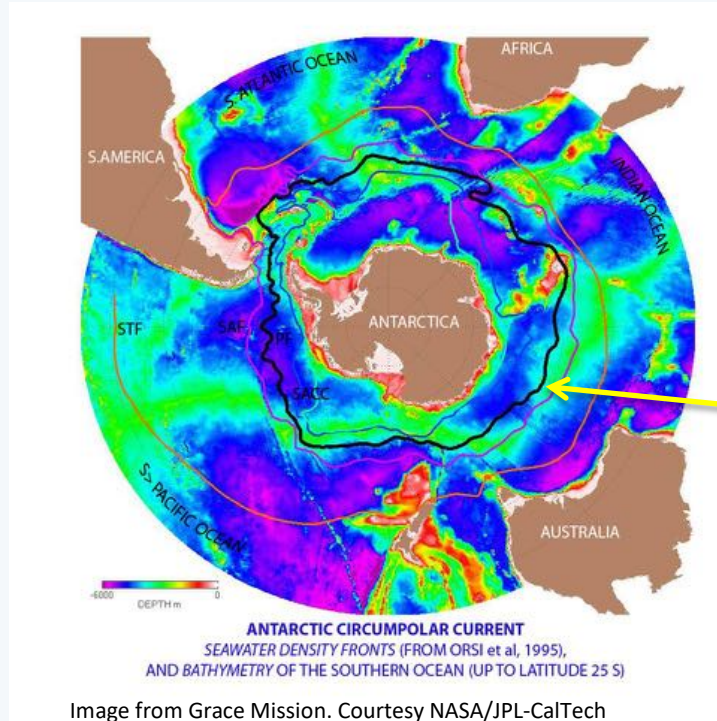
# Why We Are Asking



# Why Antarctica?

- Antarctica's ocean has remained isolated and constant.

The animals that live in the ocean in Antarctica are adapted to the frigid constant  $-1.8^{\circ}\text{C}$  ( $28^{\circ}\text{F}$ ) water temperature.



The Antarctic Circumpolar Current (ACC) is what isolates the ocean around Antarctica

## What will happen to these animals when the ocean temperature rises?

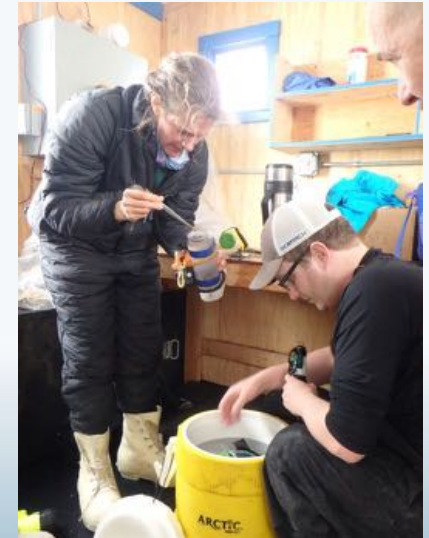
# How We Are Gathering Data - COLLECTING



- Amy and Aaron, along with science divers, are diving under the ice to collect sea spiders and nudibranchs and their eggs.



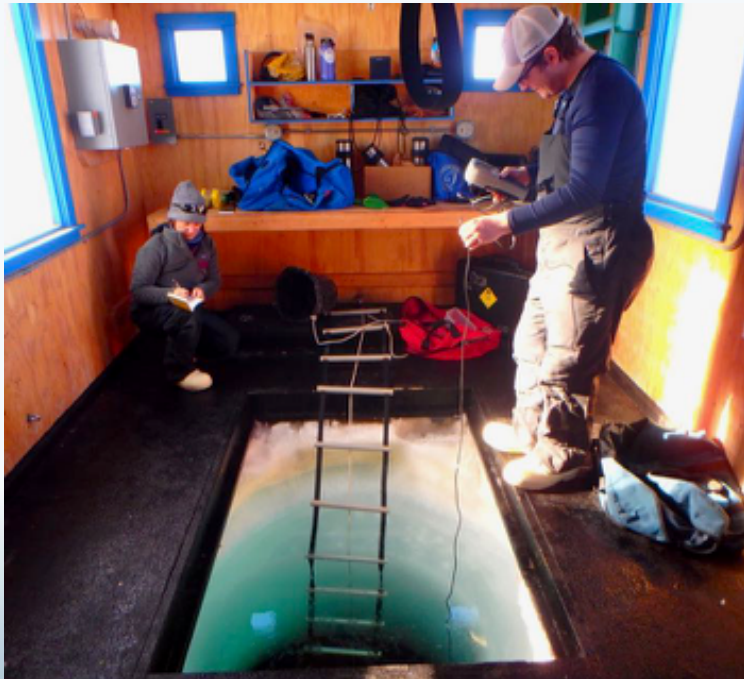
Photo by A. Toh





# How We Are Gathering Data - MEASURING AND RECORDING

While the divers dive, Graham and Amy O collect information about the salinity and temperature of the water and the amount of oxygen in the water.



We also dive  
tend! →



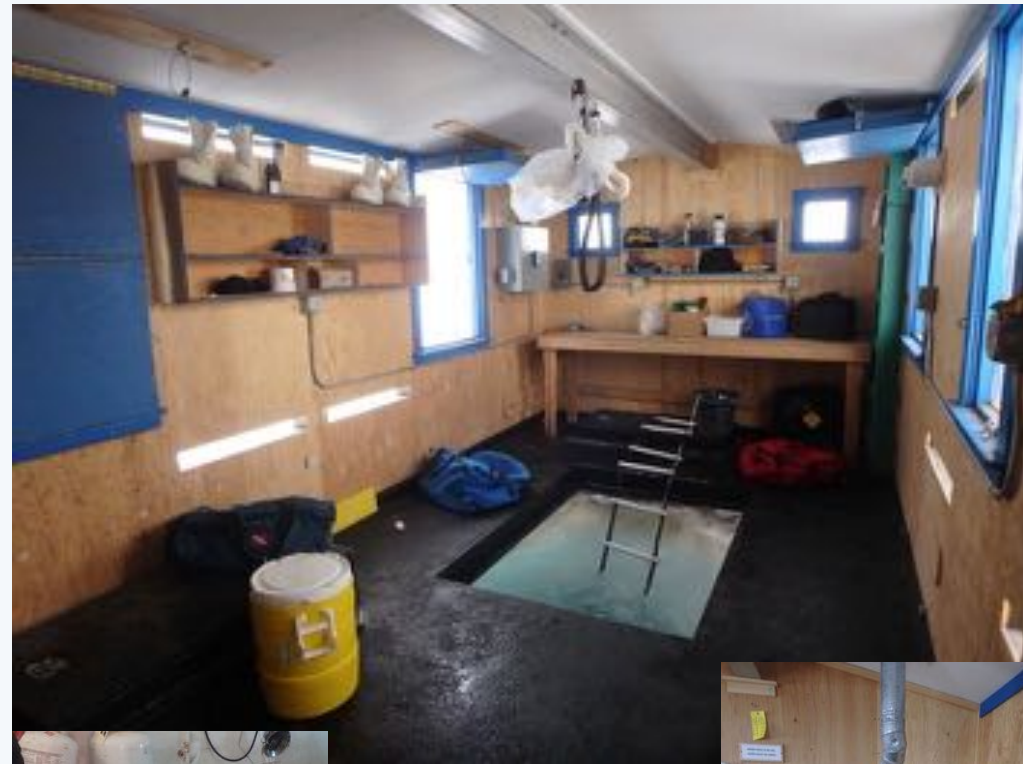


# Cool Tools - for the field

DIVE HUT



Pisten  
Bully to  
get  
across  
sea ice



Collecting  
container  
and  
flashlight  
for divers



Kuma Stove  
→  
←  
SCUBA tanks for  
divers



# How We Are Gathering Data - OBSERVING

- The specimens are brought back to lab. The eggs and larvae are exposed to different temperatures.



Photo courtesy of A. Toh

Sea spider early stage of development



Photo courtesy of A. Toh

Nudibranch late stage of development

Each week the team observes the eggs and larvae and writes down the stage of development for each specimen.



# Cool Tools - for the lab

Making observations and  
identifying



Changing temperature



Finding organic weight of eggs



# What the data are telling us

Larvae are really sensitive to warmer temperatures!  
They develop a lot faster when the water is a little warmer than usual.



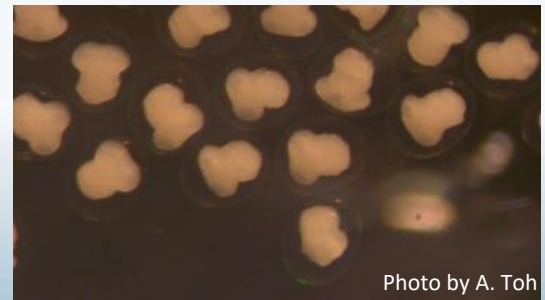
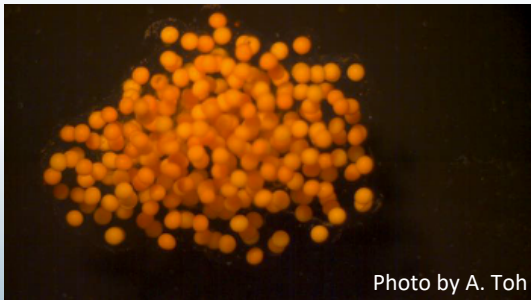
Faster



Ocean Temperature



Faster





# Next Steps

The team has only been here since September and has started some long-term experiments.

They will be in Antarctica for two seasons doing their research.

They will take some of their specimens back to Hawaii and run more tests in the lab there.



# Life on the Ice

Cold and Dry

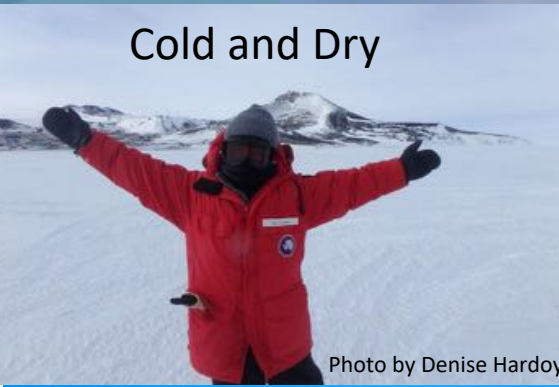


Photo by Denise Hardoy

Penguins



Divers



Driving



Seals



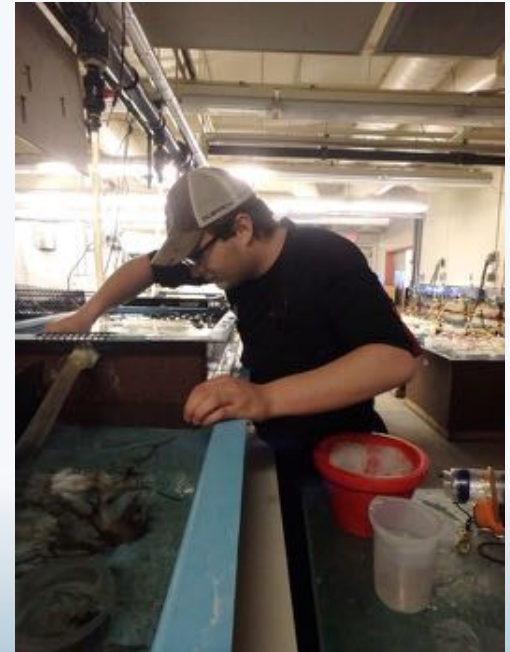
Photo by Denise Hardoy



# Life at McMurdo



We hang up our Extreme Cold Weather gear



We continue  
to work



Photo by Denise Hardoy

# Life at McMurdo - The Basics



We clean our dorm



Photo by Macayla Sparks



We  
eat!





# Life at McMurdo



A haircut



Seals!

Desalinization



Photo by Anna Bates

Sea Ice training



Photo by Nick Bakkedahl

We meet new people, explore, and continue to learn new things

Waste Water



Photo by Graham Lobert

LiDAR-Light Detection and Ranging



Weather Balloons



Photo by Kevin Dennert

History and Huts



Photo by Denise Hardoy

Stay curious, my friends!

# Thank you!!!

- National Science Foundation
- The research team (Amy, Aaron, Graham)
- The divers (Rob Robbins and Steve Rupp)
- Elaine Hood
- Crary Lab team including Robyn Thomas and Allison Barden
- Everyone who works at McMurdo!
- PolarTREC - Janet and Judy, Zeb and Ronnie
- Fellow PolarTREC educators - Bridget and Denise
- NatureBridge
- Family and friends!!!



Photo by Dave Meyer

# Join PolarTREC!

[www.polartrac.com/about/join](http://www.polartrac.com/about/join)

Everyone can participate in different ways:

- **Follow Expeditions**
- **Participate in PolarConnect Events**
- **Join the Polar Education Email List**
- **Check out the great resources**
- **Become a PolarTREC Teacher or Researcher**
- **Become a member of ARCUS**



# Thank You!

*An archive of the event will be available shortly.*

<http://www.polartrec.com/polar-connect/archive>



*25 Years of Connecting Arctic Research*  
[www.arcus.org](http://www.arcus.org)