

# Welcome to *PolarConnect*



## Dry Valley Ecosystems

With PolarTREC Teacher Kevin Dickerson  
& Team Researcher Dr. Byron Adams

**February 6, 2019**

# Getting to Know Adobe Connect

Slides will be shown here

Exit presentation

Mute your speakers

Raise your hand

List of all participants

Follow the chat

Find out more about the presentation

Chat here



# 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

# Questions

## During the Presentation:

- Type your question in the text chat box

## At the End of the Presentation, two options:

1. Type your question in the text chat box, or
  2. Raise your hand with the “hand button”.
- PolarTREC staff will call on you and activate your microphone.
  - Speak loud and clear, directly into the computer microphone or the phone to ask your question.

# 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 K-12 teachers. They are paired with researchers for 2-6 week research experiences in the polar regions.
- Over 150 teachers 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)

# Size and Distance

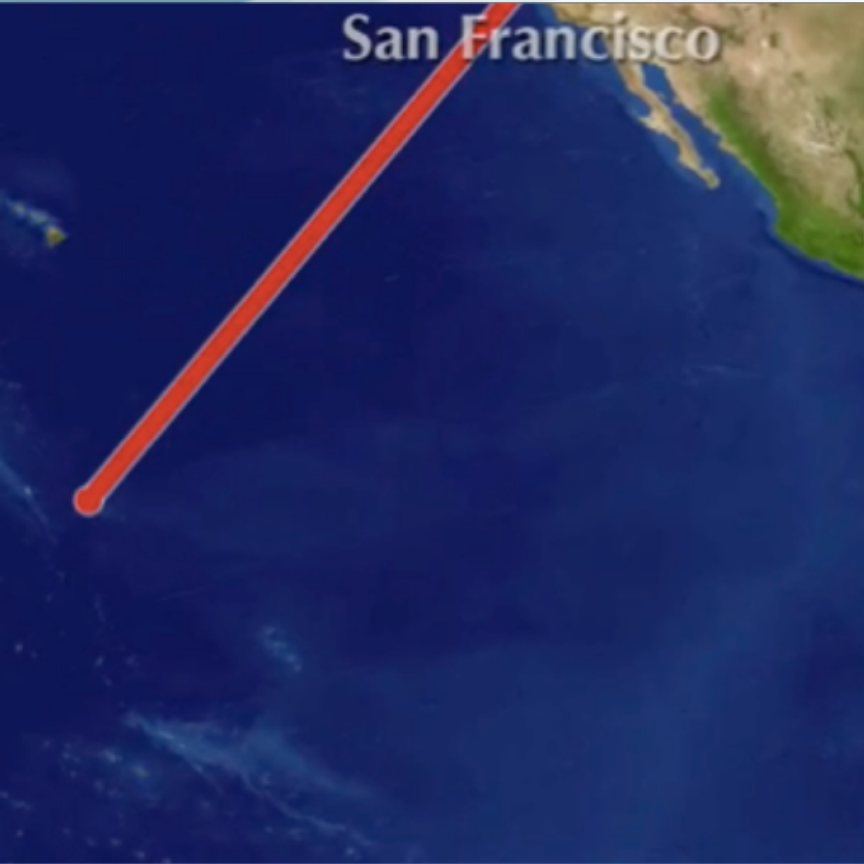


1 ½ times the size  
of the United States

# How Did I Get Here?



# How Did I Get Here?



16 hour flight to  
New Zealand



# How Did I Get Here?



# How Did I Get Here?



It took two attempts to make this flight.

We got **boomeranged** the first time.

Weather was not good to land at McMurdo so boomeranged back to New Zealand.

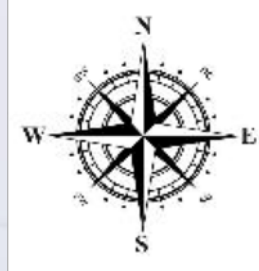


# How Did I Get Here?









**Temporary sea ice**

ROSS ISLAND



**Mt. Erebus**

**McMurdo Station**



**Permanent ice**



# McMurdo Station





# Crary Lab



# Crary Lab



# What is the LTER?

RESEARCHERS  
COLLABORATING

## Long-Term Ecological Research

- Science + Monitoring
- 6-yr grants
- Short and long-term perspectives
- Network → synthesis





What is the LTER?

# MCM LTER

Long Term Ecological Research

**Glaciers**  
C-504



**Streams**  
C-507  
C-509

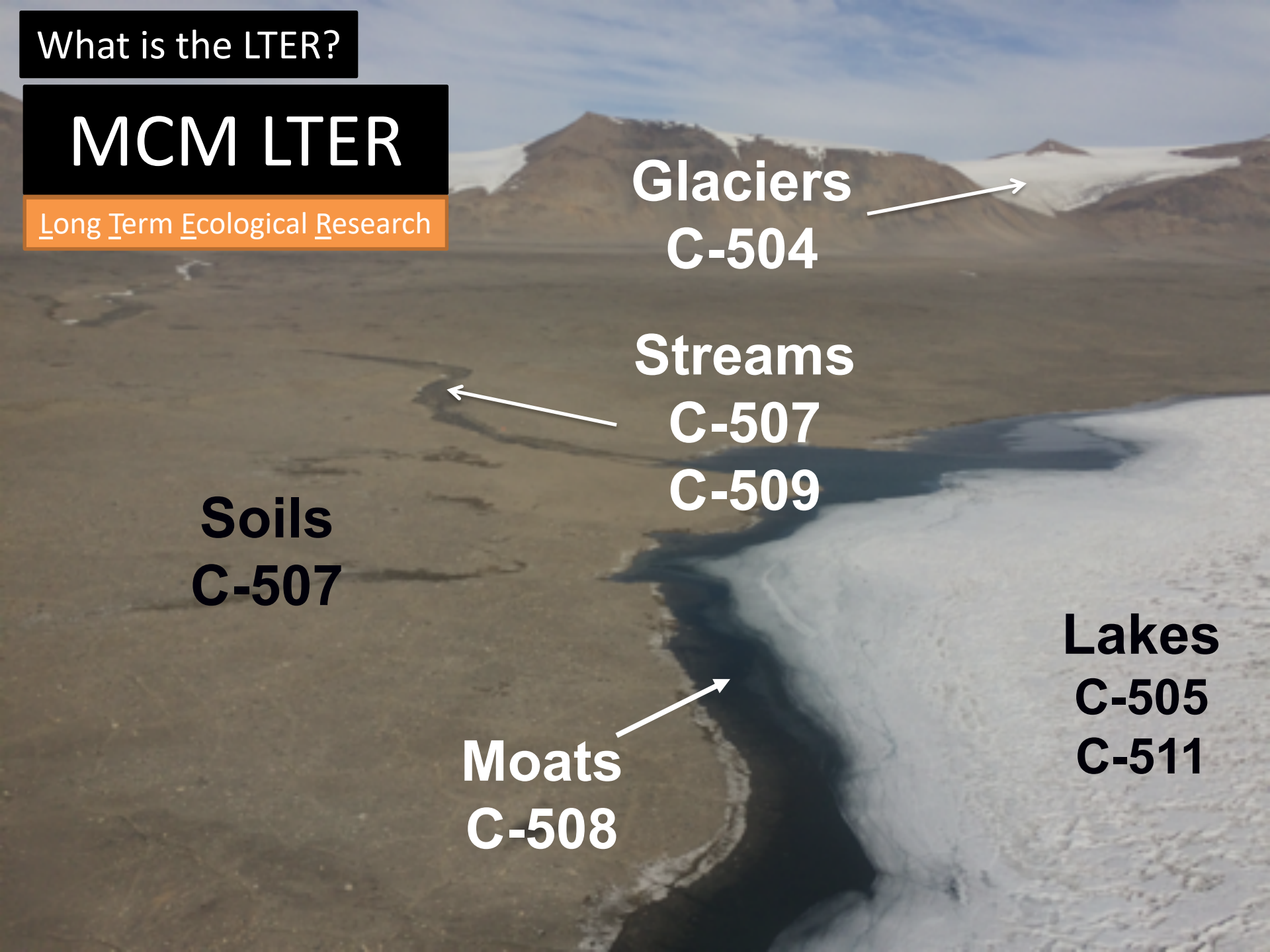


**Soils**  
C-507

**Moats**  
C-508



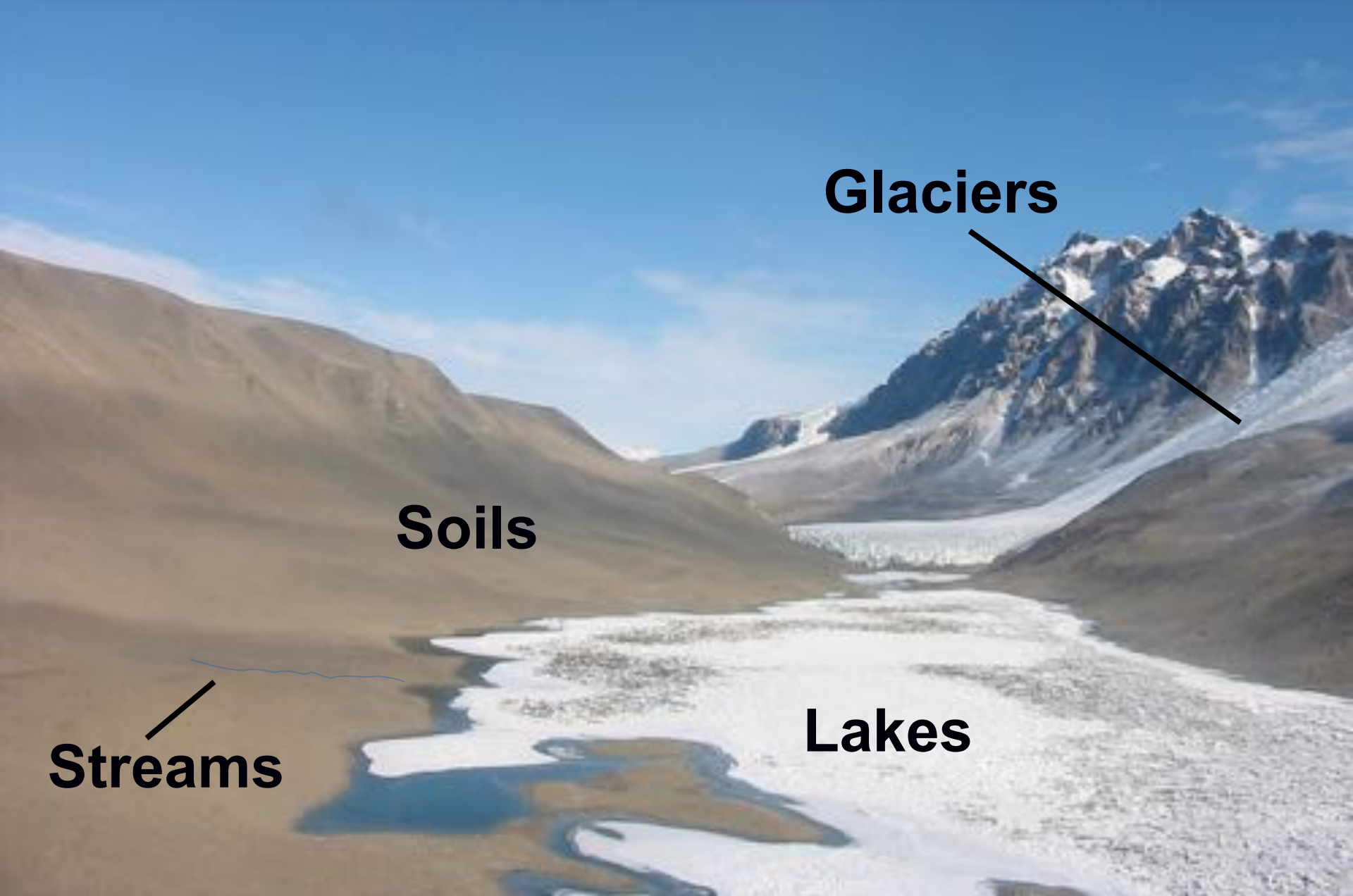
**Lakes**  
C-505  
C-511



**New Harbor / Explorer's Cove**



# The Dry Valley Ecosystem



**Glaciers**

**Soils**

**Streams**

**Lakes**









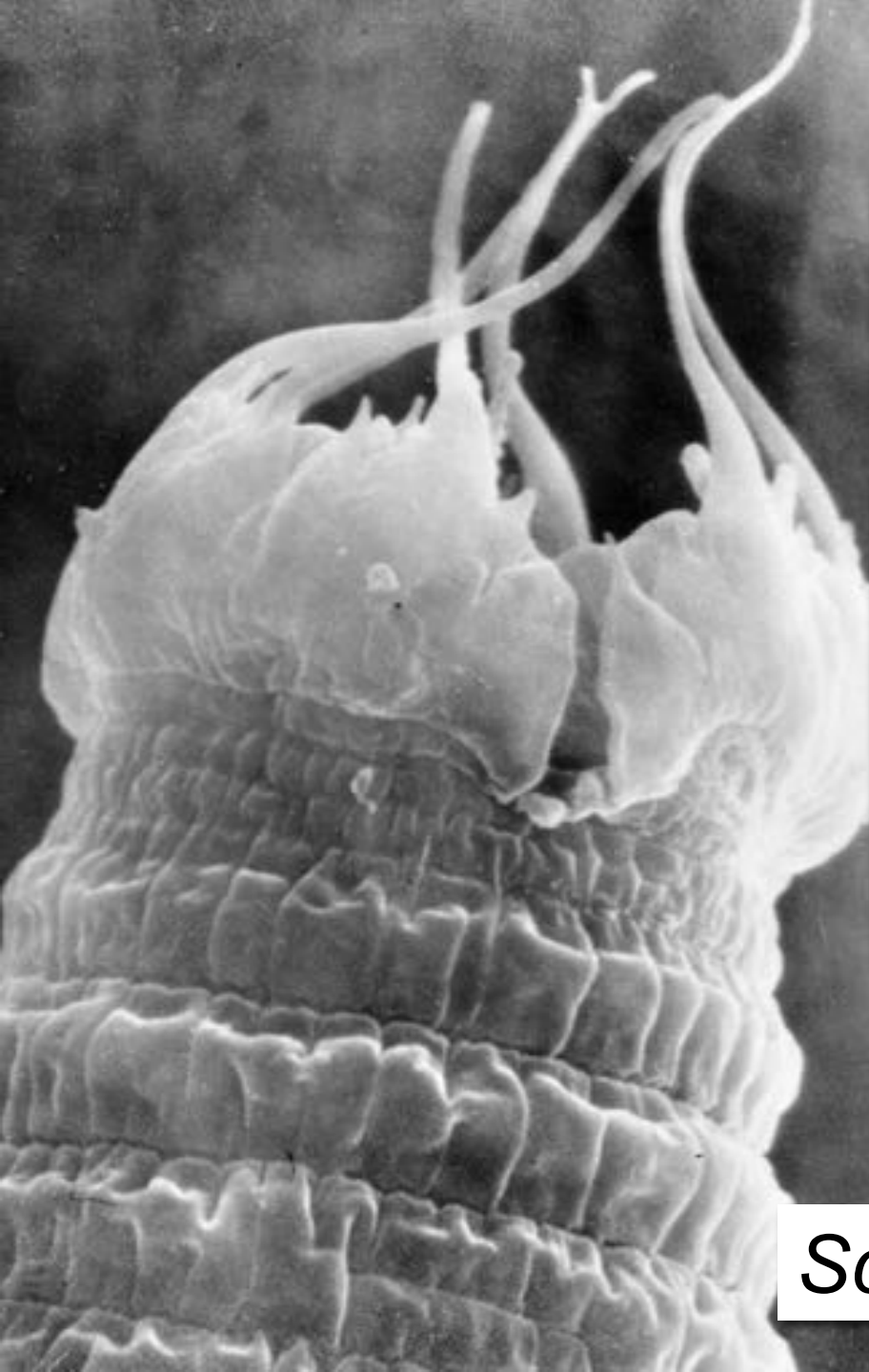


# Animals of the Dry Valleys









- Most abundant and widespread land animal on Antarctica
- Top of the Dry Valleys Food Chain
- Major player in soil nutrient cycling

*Scotttnema lindsayae*

# Continental Antarctic Beastiary

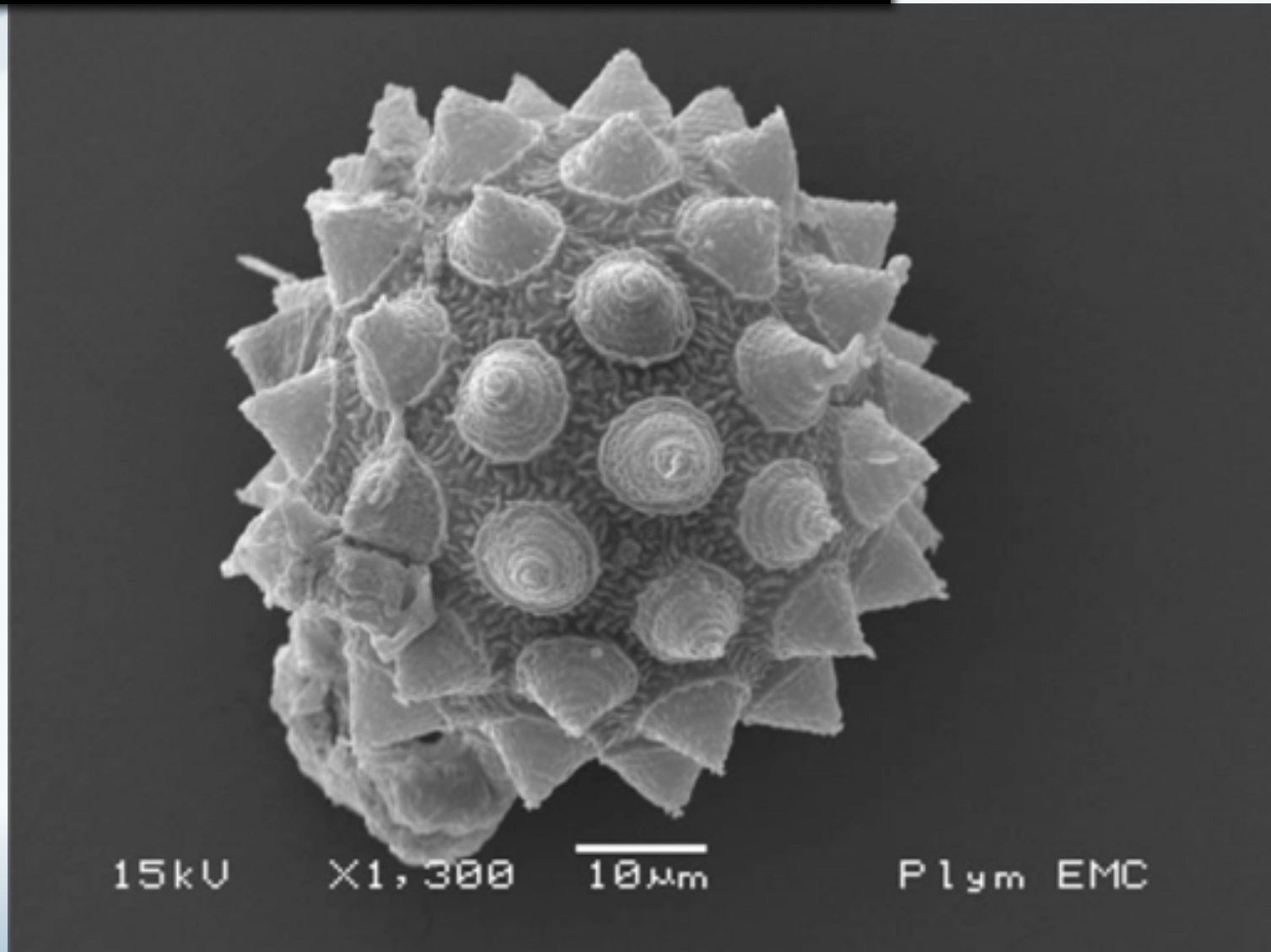


*Acutuncus antarcticus*  
microbe, algal feeder

Acc.V Spot Magn Det WD | 50 µm  
10.00 kV 3.0 497x SE 15.1 last.tif



# Continental Antarctic Beastiary



*Egg; Macrobotus sp.*



Photo credit: Alan Tunnacliffe

*Philodina* sp.  
microbe, algal feeder



# Why Should I Care?

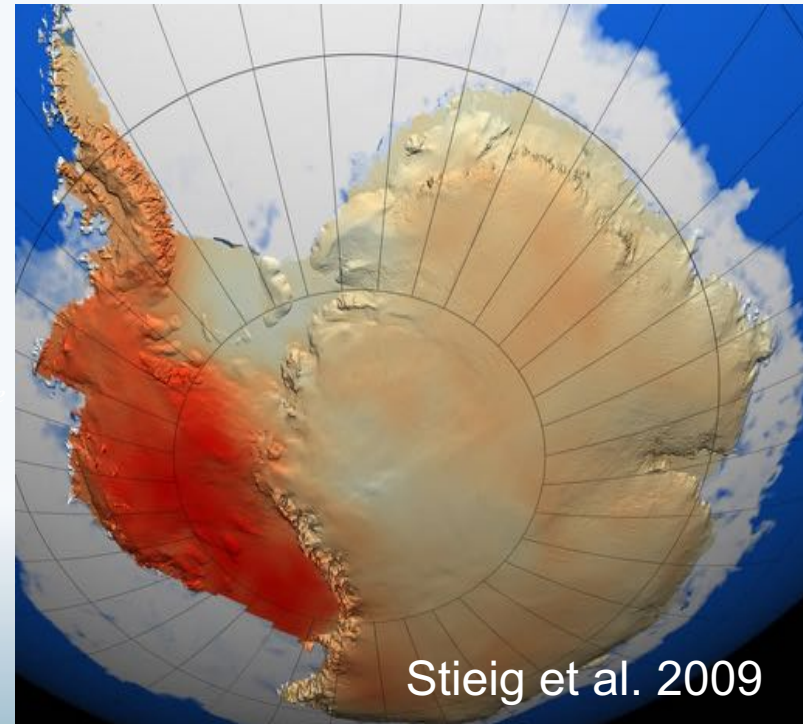
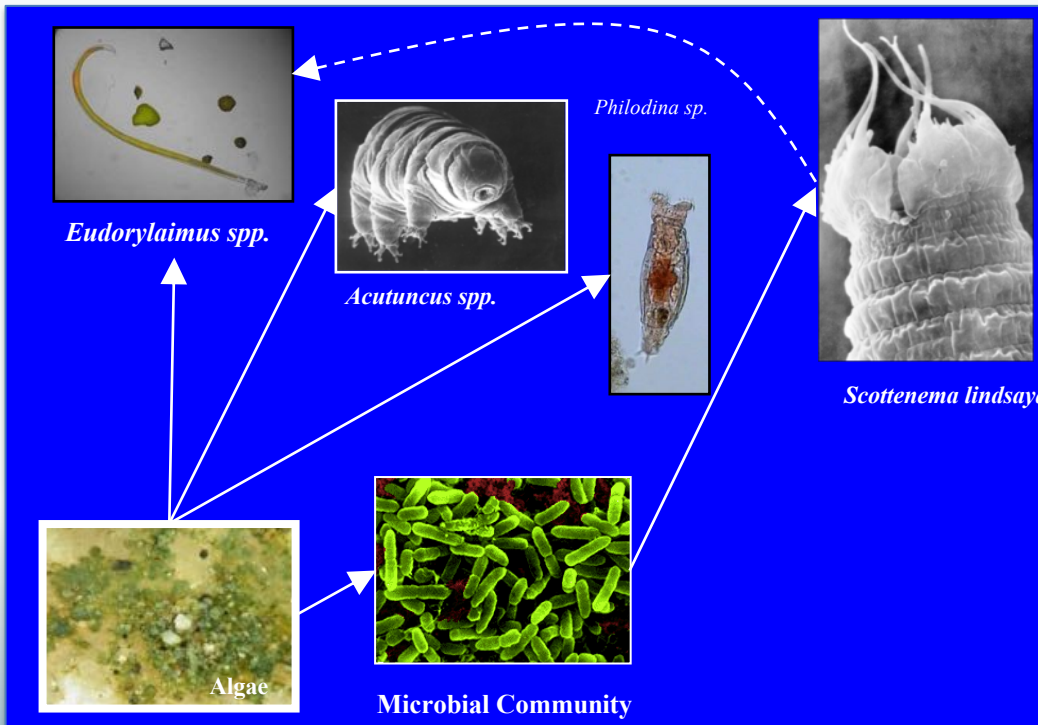
Ecosystems provide essential services

- Clean water
- Fertile soils
- Biological control
- Carbon storage
- Decomposition
- Nutrient cycling



# Meh. I have worms in my backyard. Why go to Antarctica?

- Simple biotic communities
- Sensitivity to climate variation
- Relatively undisturbed and unchanged for millennia



# Jenga: Analog for Biodiversity and Ecosystem Functioning



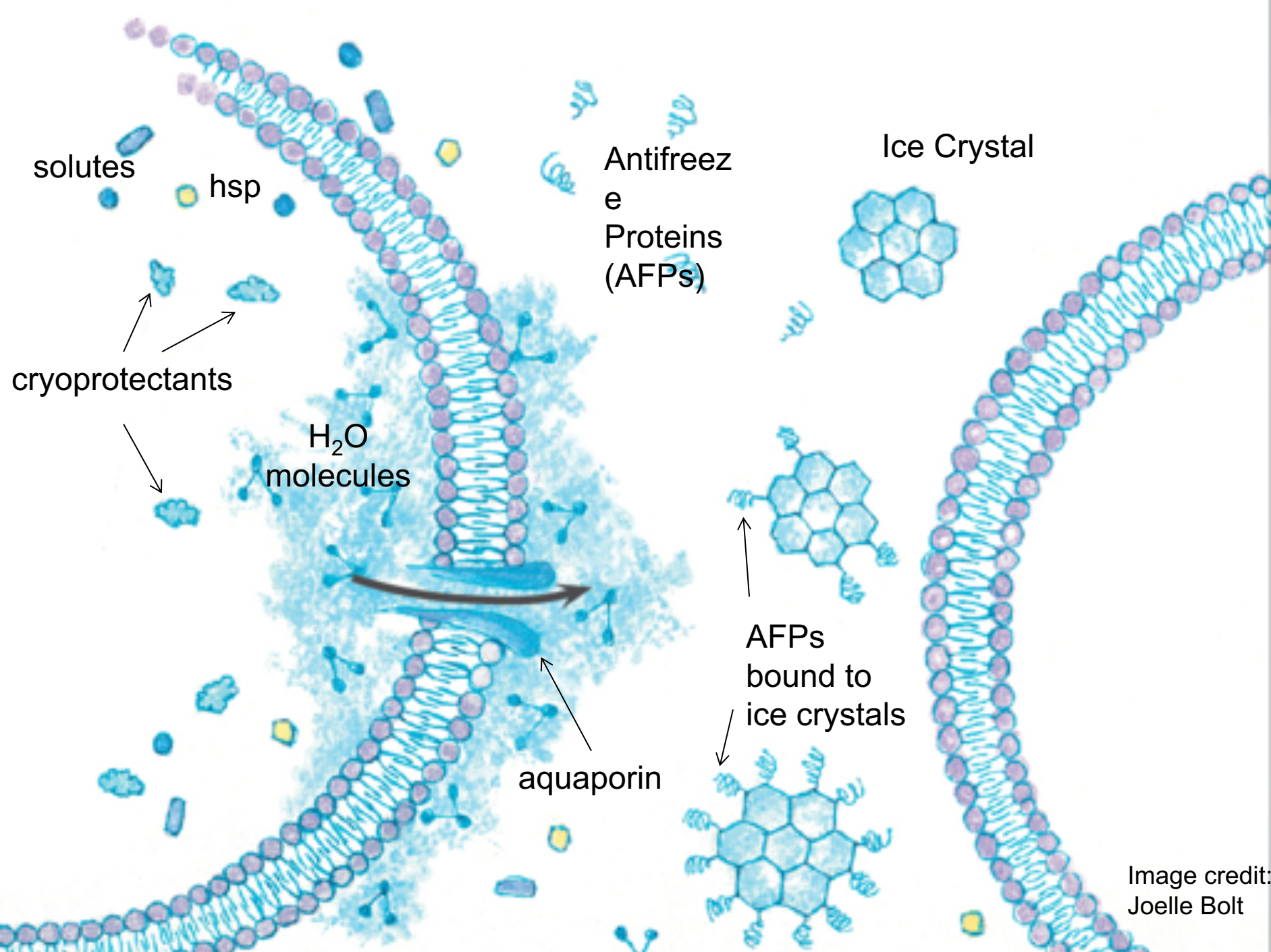
# Why should I care about Antarctic soil?

- If we know how soil ecosystems responded to climate warming in the past, we can better predict how they will respond in the future
- We still don't know how Antarctic soil ecosystems came to be structured the way they are (***this is a very complicated case ... – a lotta ins, lotta outs, lotta what-have-you's ...***)

# Adaptive Strategies Mechanisms

- Two Biggest Challenges Involving Water
  - Freeze-Thaw cycling
  - Desiccation
- Solution:
  - Antifreeze Proteins
  - Cryoprotectants
  - Aquaporins
- Freezedrying





solutes

hsp

cryoprotectants

H<sub>2</sub>O molecules

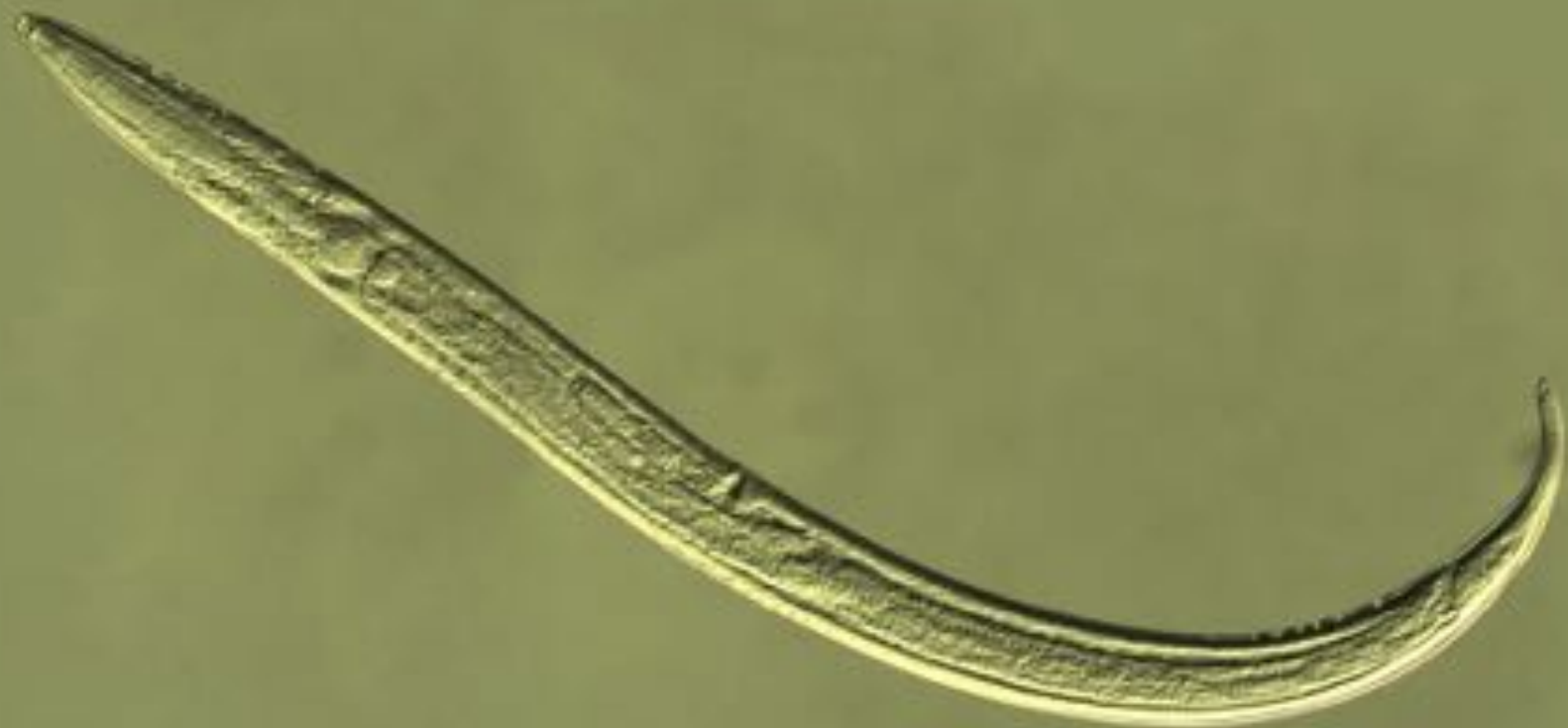
aquaporin

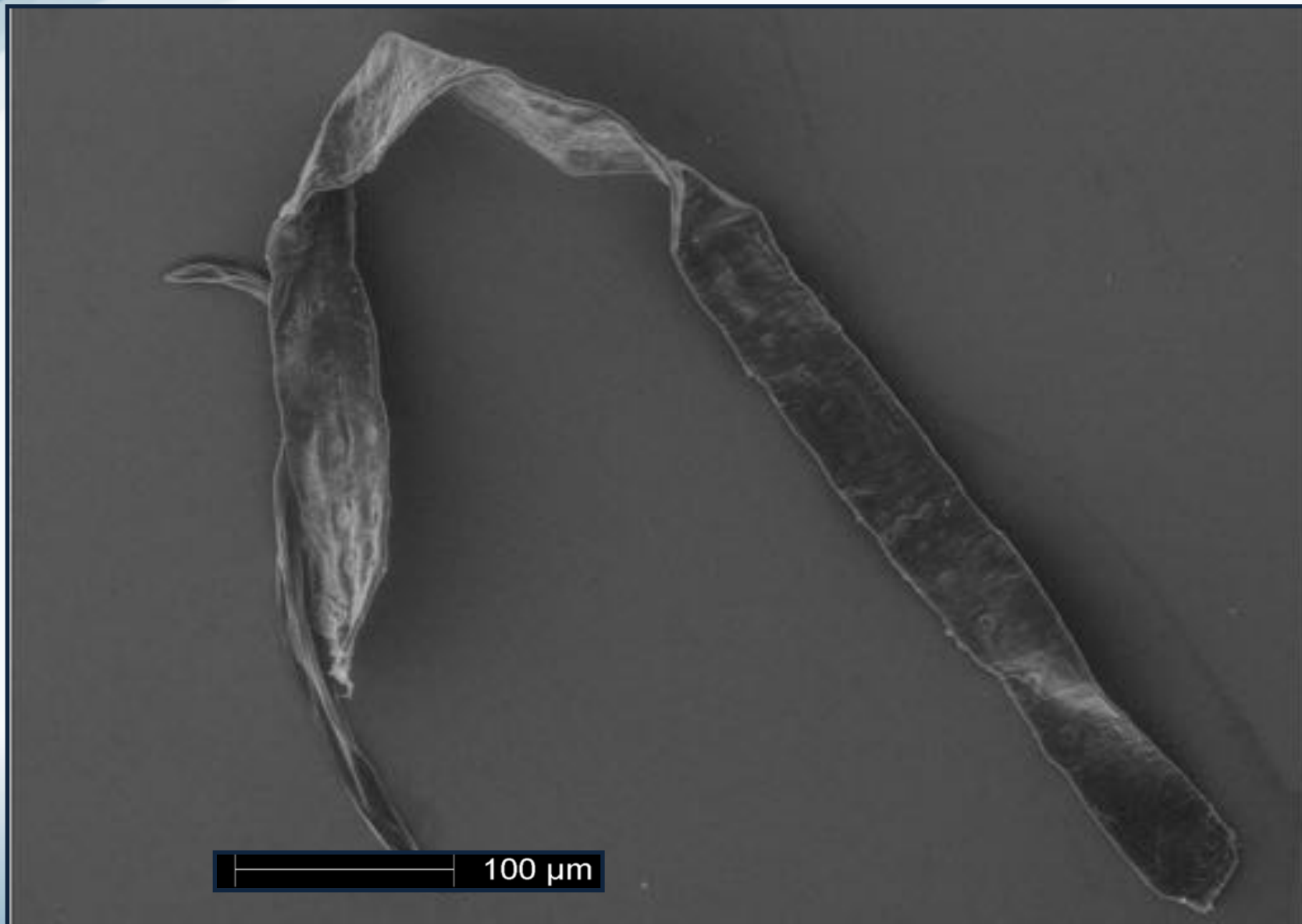
Antifreeze Proteins (AFPs)

Ice Crystal

AFPs bound to ice crystals

Image credit: Joelle Bolt







TEACHERS AND RESEARCHERS  
EXPLORING AND COLLABORATING

# Questions?



# 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)**