

Arctic Biodiversity Congress 2018

Rovaniemi, Finland



# MAINSTREAMING BIODIVERSITY THROUGH PARTNERSHIP: ARCTIC EXPEDITION CRUISE TOURISM AND CITIZEN SCIENCE

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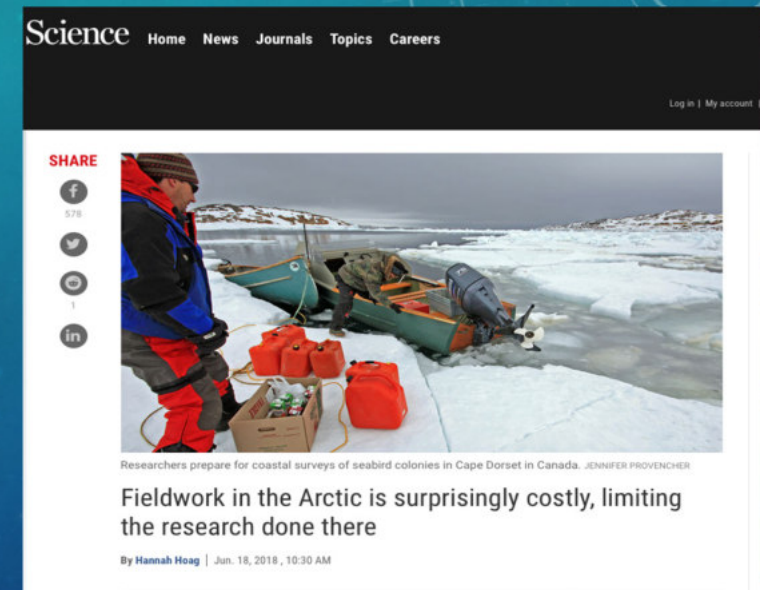
# In-situ Arctic monitoring data needed



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## Arctic Observing Networks report sparse in-situ data relative to satellite-derived data

- Cost of getting scientists to Arctic is high and increasing
  - Recent article in *Arctic Science*: >\$70K for 1 month to study seabird breeding ecology
- Funding for sustained on the ground monitoring efforts has not been consistent or unified



Mallory et al. 2018. *Arctic Science*,  
<https://doi.org/10.1139/AS-2017-0019>



# In-situ Arctic monitoring data needed



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Biodiversity data from the Arctic particularly challenging to collect on large scale

- Marine mammals
- Seabirds, shorebirds, waterfowl
- Lower trophic levels
- Evidence of human activities that could affect biodiversity
  - Commercial fishing
  - Commercial shipping
  - Tourism



# Polar tourism



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- 40% increase in Polar Tourism expected over next decade
- Expanding voyage offerings as new areas become ice-free: i.e., Crystal Serenity through NW Passage in 2017
- Expedition cruise ships are now going to places that formerly only scientists, military, or local residents accessed
- Impact or opportunity?





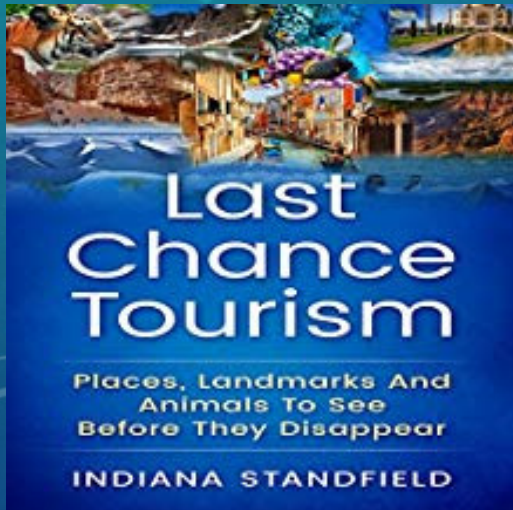
# Polar tourism: motivations



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## Goals of the expedition-traveler:

- An adventure
- “Last chance” visits
- “First ever” visits
- “Wet landings” preferred over “dry landings”



# Polar tourism: motivations



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- The “typical” passenger on a expedition ship:
  - Educated, >50, high paying-power
  - Curious, showing interest in the environment and culture of areas they are traveling to
  - Wanting a learning experience that goes above and beyond leisure cruising
  - Likely to engage in onboard education programming





# Embedding education into polar tourism



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Manley, Elliot & Jacobs, 2017

- “[u]nlike mainstream cruisers, expedition cruisers are motivated by opportunities for novel experience and for learning. Subsequently, the educational programming offered by expedition cruise companies is an important component of the cruise experience.
- [t]his programming has positively impacted cruiser attitudes, behaviours, and knowledge post-cruise.



# Polar tourism: changes



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- However, there are obstacles and changes:
  - Age & mobility challenges of the “typical” expedition traveler
  - Changes in “typical” expedition traveler characteristics
    - Lesser emphasis on knowledge of the area they are visiting
    - More emphasis on ticking off locations and selfie opportunities
    - Closer to mass tourism
- Popular tourism destinations in many places are now heavily impacted and visitors don’t understand impacts of tourism





# Citizen science in the tourism industry



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## Proposal: in-situ monitoring data could be collected along expedition cruise ship routes in the Arctic via onboard citizen science programs

- Citizen science can aid in collecting data from hard to reach locations AND provide awareness of conservation issues and a sense of “science identity” to passengers
- Could address several of the ABA Policy Recommendations:
  - Mainstreaming Biodiversity (tourism sector)
  - Improving Knowledge and Public Awareness
- Supported by the International Polar Tourism Research Network
  - De la Barre et al. (2016) Tourism and Arctic Observation Systems: exploring the relationships. Polar Research, 35:1, 24980, DOI: 10.3402/polar.v35.24980



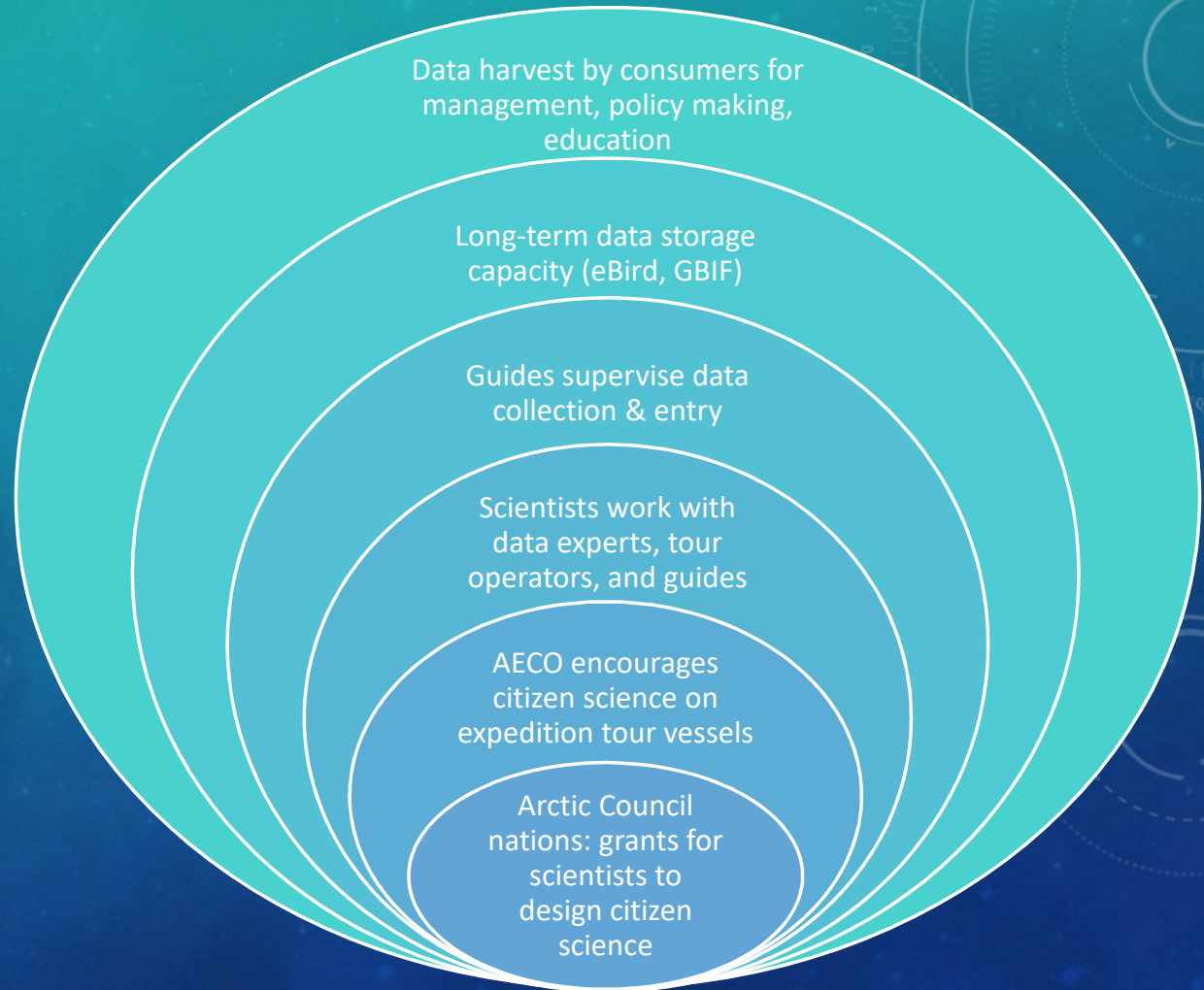
# What would this look like?



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Considerations in order to mainstream citizen science as a means to collect biodiversity data:

- Tourists may be better at collecting some kinds of biodiversity data than others
- Projects need to have longevity yet be valued by scientific community
- Guides need to be trained by scientists and be advocates themselves
- Long-term storage and delivery of data to managers/policy makers critical
- Success will depend on buy-in of all levels and top-down support
  - Guides and tourists already on board





# Support for guides/operators



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## Seabird Surveys (Antarctic Site Inventory)

By conducting bird surveys while at sea or on shore, we can help scientists begin to understand meso-scale (within tens of kilometers) seabird distribution patterns and habitat usage in the Southern Ocean.



**A**  
**Expedition**  
**Ship:** **D**  
(Please survey for > 15 min. ≤ 1 hr)  
**Start Time:** **S**  
**End Time:** **E**  
**# of Observers:** **E**  
**Comments:**

Enter # observed or "X" (for  
Gray-headed A  
Black-browed A  
Light-mantled A  
Royal Albatross (I  
Royal Albatross (S  
Wandering Al  
albatross  
Southern Gian  
Northern Gian  
Southern Fl  
Antarctic P  
Cape Pet  
Snow Pet  
Soft-plumaged  
Blue Pet  
White-chinned

**Other Species:**


### SCIENTIFIC PARTNERS

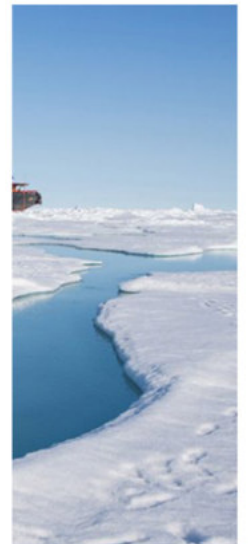
Stony Brook University and eBird

### EQUIPMENT REQUIRED

BLOGS JOBS & RESOURCES

## and Eyes

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e conditions in the

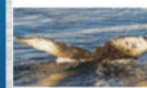
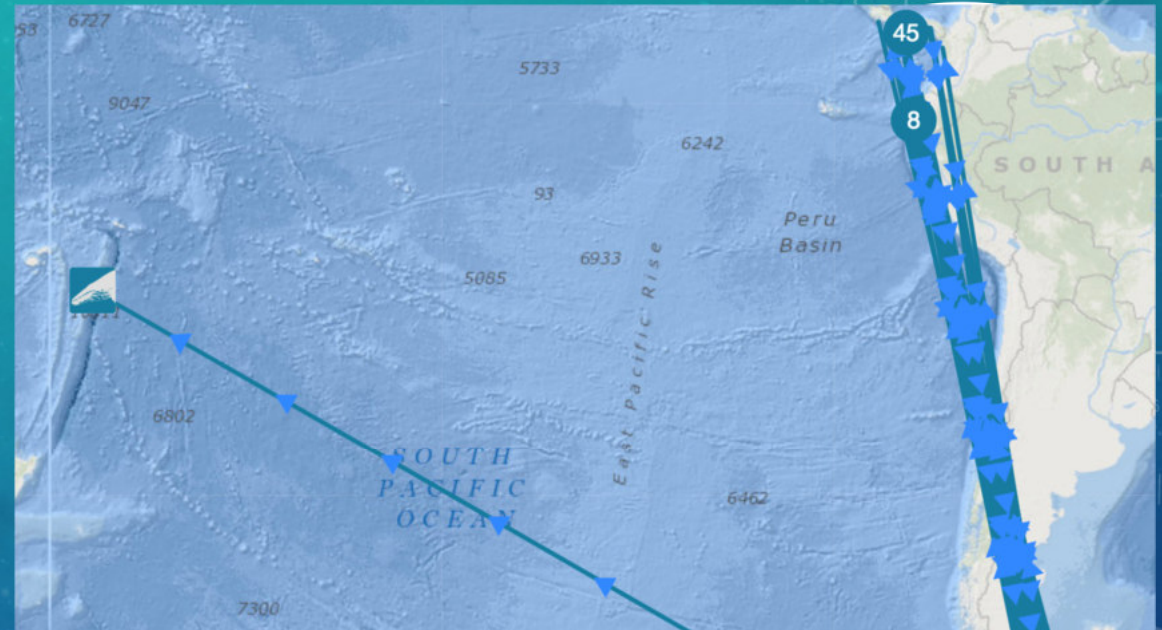


# Case study: Happywhale



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- Central platform for marine mammal photographs
- Data distribution to scientists
- Delivers feedback to guests
- 3000 registered users
- >120,000 submitted photographs
- >16,500 individual whales identified



An individual you photographed on Sunday December 13, 2015 in Antarctica with [Polar Latitudes](#) was determined to be new to science to the best of our knowledge! Our identification experts assigned a new ID to this encounter of [Unnamed Humpback Whale AHCW-7475](#). This individual has been added to [your catalog](#).



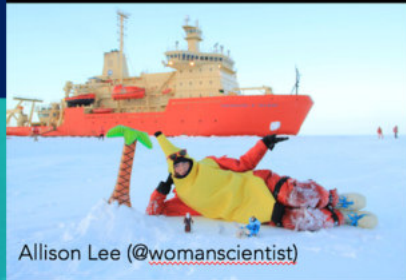
[Unnamed Humpback Whale PAN-1500](#) was identified in an encounter on Saturday March 10, 2018 in Antarctica! You [last encountered](#) this individual on Sunday March 11, 2018 in Antarctica with [G Adventures](#).



WEDNESDAY MAY 02, 2018



# Case study:



Allison Lee (@womanscientist)

## FjordPhyto

Understanding Antarctic phytoplankton through citizen science



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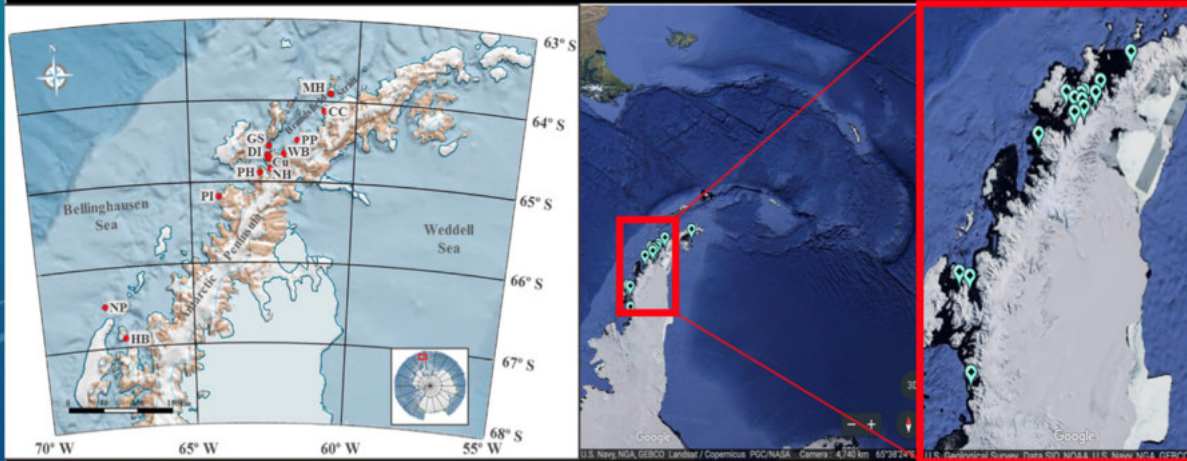


2016-2017

2017-2018

2 companies  
12 fjords sampled  
41 samples taken  
Microscopy

6 companies  
16 fjords sampled  
72 samples taken  
Microscopy & Genetics



Photos/slides courtesy of Allison Lee Cusick

# Data warehousing and provenance



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- Needs to be addressed carefully so data are available for:
  - Realtime feedback to tourists after collection
  - Other scientists to use for answering research questions
    - Data interoperability
    - Metadata
  - Managers and policy-makers to access for decision making
    - Maps & data visualization tools
- Use existing platforms to maximize availability
  - Individual data collection app/eBird/iNaturalist → GBIF/OBIS/GEO BON → Arctic SDI?





# Local/global efforts and encouragement

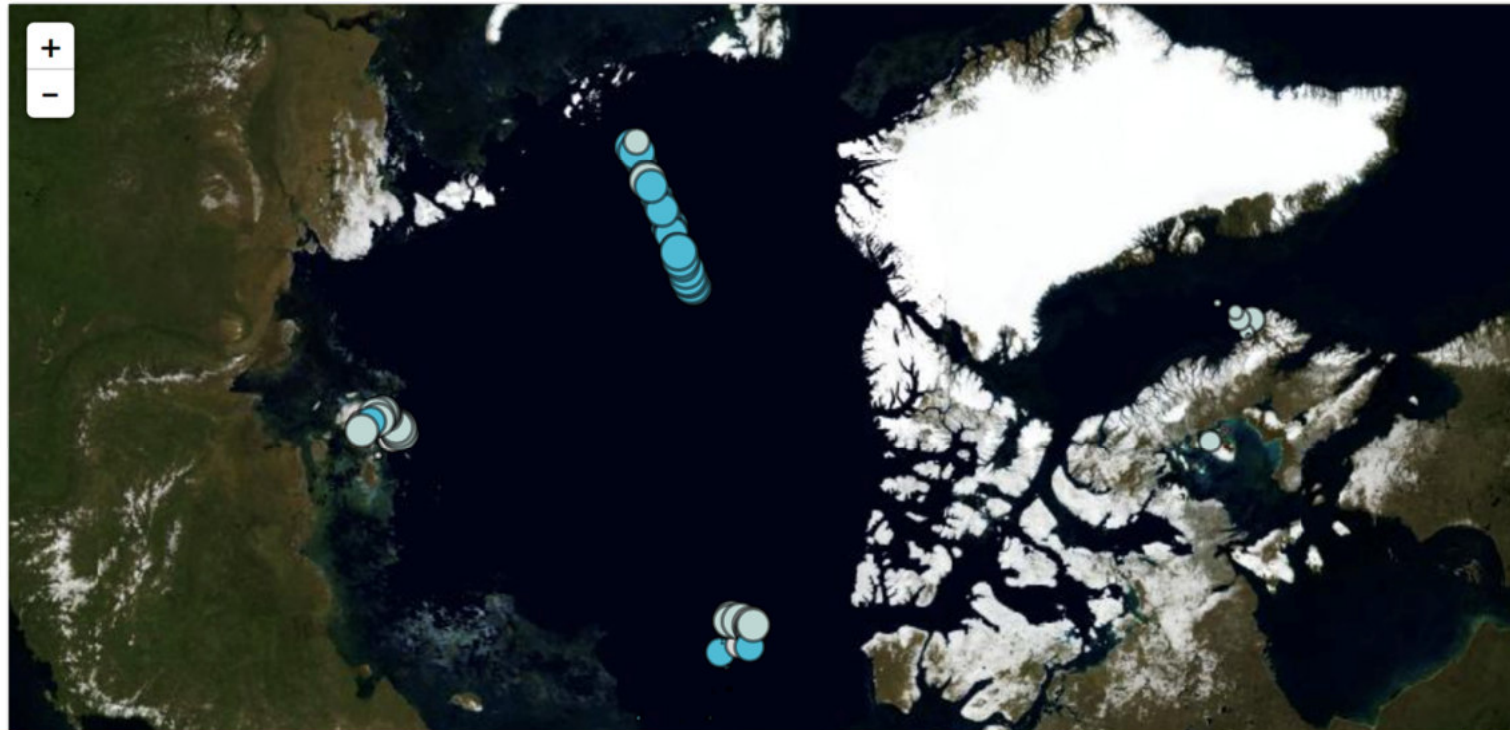


[Guide to collecting and uploading data](#)

[Download ASSIST](#)

## 2018 Cruises

USCGC Healy Sep 14 to Oct 19	64
Polarstern PS115.2 Sep 05 to Oct 16	0
50 let Pobedy Jul 31 to Aug 11	17
50 let Peabody Jul 23 to Jul 27	15
CCGS Amundsen Jul 13 to Jul 25	10
50 let Pobedy Jul 12 to Jul 17	18



# Conclusions



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- Citizen science implemented via expedition tourism platform in the Arctic could:
  1. Provide repeated in-situ biodiversity monitoring data from hard to reach locales
  2. Address increasing lack of awareness of geography and environmental issues on the part of tourists
  3. Increase partnership capacity between scientific community, industry, and the public
- We need to encourage :
  - Education programming mandates for the tourism industry that could be fulfilled with citizen science
    - IAATO already does this for Antarctic; AECO is getting on board
  - Scientists to work with tour operators and guides to develop citizen science programs
  - Scientific community to recognize value of partnering with non-scientists





# Questions?



Proposal is outgrowth of a session at POLAR2018 chaired by A. Taylor, Janet Warburton (ARCUS), Amanda Lynnes (IAATO), and Edda Falk (AECO)

- “Polar research and citizen science: exploring new platforms and opportunities”
- Also thanks to Damon Stanwell-Smith (IAATO) & the Polar Citizen Science Collective for inspiration