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AISS thoughts on the opportunities and challenges for an AISS program reflecting my interactions with the polar science community and fellow early career scientists.

1) Would AISS be the umbrella program for a majority of interdisciplinary programs acting as a vehicle to help communication, organizations and administration of large-scale projects?

How would individual/new investigators become involved in these large-scale projects or perhaps in obtain data/samples?

2) How would AISS facilitate professional development/service to the scientific community at large?

AISS can help polar scientist learn to speak the language of other disciplines. An option would be to promote this training at the graduate student level (i.e. success of *Geobiology* programs; a graduate student fellowship through AISS). Support a low temperature culture collection.

3) What is the scale of the "system" in AISS?

The continent of Antarctica is dominated by microorganism requiring that we include the scale or "perspective" of the microbe in our study of the system. This approach requires innovation and a multidisciplinary approach to address the challenges of detection limits (low biomass and low activity). Could provide opportunities to exploit/test new approaches to life-detection.

4) Antarctic integrative and system science topics/questions:

A. Modeling ice sheet air/sea/subglacial interactions
How can we best incorporate biological and ecological data into models of ice sheet dynamics and climate change? In turn how can ecologists use climate models to predict and test biological response to change?

B. Exploration of diversity, function and evolution in the subglacial biome
How has isolation and habitat alteration effected metabolic function, diversification/evolution. How will the subglacial ecosystem respond to hydrological change and "resurfacing?"

C. Continental and marine feedbacks
What are the biogeochemical and physical feedbacks between terrestrial and marine ecosystem? On what timescales do these interactions occur? How do we monitor them?

D. Antarctica as an analog
Can Antarctic systems serve as a model for historic climates/ecosystems and extraterrestrial climates/ecosystems?

E. Antarctic biodiversity and society/Outreach
What are the interests for and ethics involved in bioprospecting? What can novel proteins/organisms teach us about energetic efficiency at low temperatures?

5) A focus on synthesis critical for an AISS program!