

PolarTREC Program

Challenge: Reframing, communicating, and finding relevance
 Solution: Teachers on the research team

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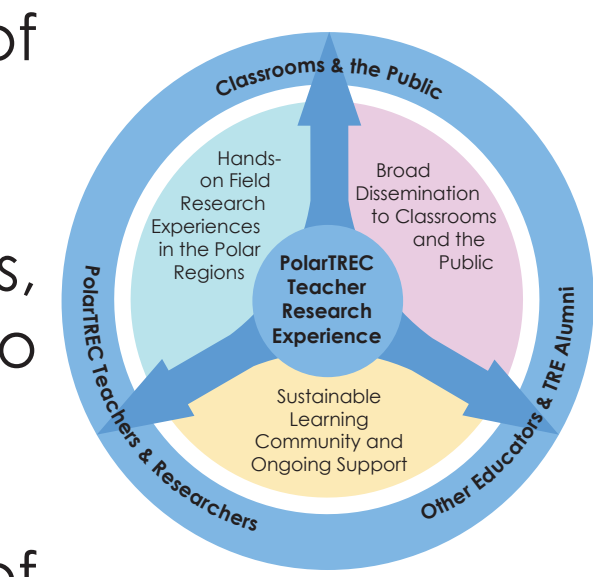


This program is supported by the National Science Foundation under award 0956825. Any opinions, findings, and conclusions or recommendations expressed by this program are those of the PI and coordinating team and do not necessarily reflect the views of the National Science Foundation.

Program Description & Objectives

PolarTREC (*Teachers and Researchers Exploring and Collaborating*) is a multi-year program in which K-12 teachers participate in polar research, working closely with scientists, as a pathway to improving science education through teachers' experiences in scientific inquiry. PolarTREC builds on the outstanding scientific and cultural opportunities in the polar regions and links research and education through intriguing topics that will engage students and the wider public.

- Objective 1**
Improve teacher content knowledge of multidisciplinary polar science.
- Objective 2**
Improve teacher instructional practices, especially the use of inquiry-based learning to translate polar science to the classroom.
- Objective 3**
Improve polar researchers' understanding of and engagement in K-12 education to strengthen and enrich the outreach and dissemination of their research.
- Objective 4**
Increase students' understanding of and engagement in the polar regions and interest in polar science, technology, engineering, or mathematics (STEM) careers.



More information can be found at www.polar trec.com

Synopsis

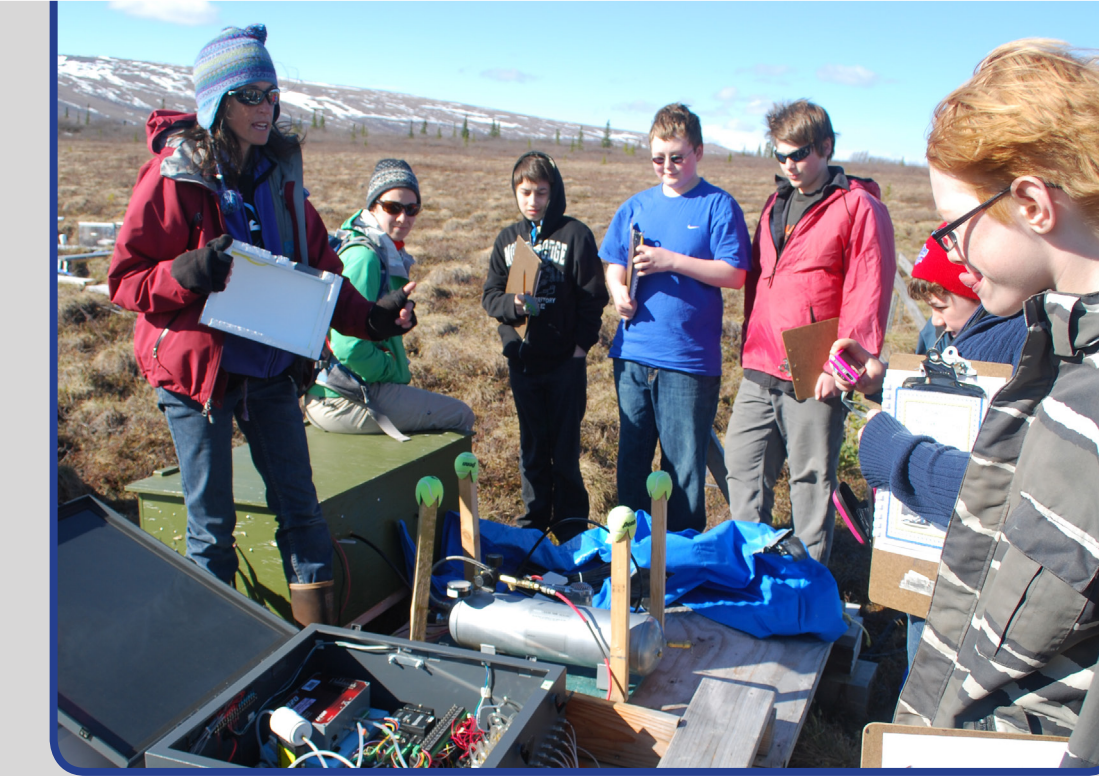
PolarTREC program data illuminates a crucial dynamic that increases the potential for a successful climate change science project. We contend that the inclusion of a teacher into the field research campaign can tackle the following challenges.

- Teachers on the research team are:**
- Fresh Eyes with a Fresh Perspective: Reframing the science.** Adjusting practices within the science project to actually achieve more scientific success.
 - Being Heard: Effective communication strategies.** Garnering the necessary support for the science project through effective, authentic, and tangible communication efforts to policymakers, funders, students, and the public.
 - Finding relevance in your work.** They understand why your science is important. Future scientists will learn that importance and carry your work into the future. This is your science making an impact.

Teachers on the research team



transforms careers and classrooms.



Challenges for Scientists

During any professional career, we remain hyper-focused on our particular piece of the puzzle, be it cryosphere science, data management, or field logistics, to name just a few. Communications and outreach often fall to the wayside year after year when a researcher is solely responsible for that output, according to Andrews, et al. *Scientists and public outreach: participation, motivations, and impediments*. 2005, the reasons are valid:

- Lack of Time** - Availability is limited by other science project priorities, previous professional obligations, and financial constraints on where time is spent.
- Lack of information on opportunities** - Rarely are opportunities for effective communication made apparent. Scientists often must seek out their own avenues for engagement, which links back to the lack of time for this kind of search.
- Lack of Value or Support** - Departments and funders may not outwardly support effective communication endeavors, nor is exemplary work in this vein rewarded within the profession to a marked degree.

Embrace the Solution

Our study correlates the opportunity for teachers to participate in field research with an increase in student interest and attitude towards science.. This is the future of your discipline and the legacy of your work.

Girls Interest in STEM Careers

% Change in Pre-Post Classroom Surveys

Biologist	2.8%
Mathematician	4.0%
Teacher	2.7%

n = 2,155 pre/post surveys. Data from 2007-2009

Students' Attitudes towards Science

% Change in Pre-Post Classroom Surveys

Exploring more science at school	15.2%
Handling more difficult science	4.4%
Knowing science is important for the future	4.9%

n = 2,155 pre/post surveys. Data from 2007-2009

Teachers Contribute to Scientific Success

In the final report for the 2007-2009 grant, researchers reported that their work benefited from the inclusion of a teacher on their team. Teachers can explain the science and data collection that was occurring and "boil it down to the raw essence." This interaction helped the research teams see how their work fits into the bigger world picture. Teachers are a benefit to the scientific process and essential to outreach activity for the research project.

"I think the scientific process itself benefits enormously from having a high school teacher embedded in there..." PolarTREC Researcher

"...We would explain what we are doing and that would actually help us structure things a lot better..." PolarTREC Researcher

In an interim report released in 2012 for the 2010-2013 grant, researchers again were positive (83%) about working with teachers through PolarTREC. Teachers became the main public relations and outreach coordinator for a science project and again are cited as making a strong impact on the science project itself.

"The best aspect was having an intelligent and receptive participant but not a practiced scientist. This forced us to think through and explain...always a good discipline for scientists." - PolarTREC Researcher

"[Our teacher] was an invaluable part of my research team [and] the outreach component of my research has been strongly bolstered by his work." - PolarTREC Researcher



Data on students from the 2007-2009 report shows:

- A significant increase in girls interested in STEM careers
- Significant change in student attitudes towards science
- A significant increase in student knowledge in most of the science areas listed in survey.