



INNOVATIONS FOR CLIMATE RESILIENCE AT THE NATIONAL SCIENCE FOUNDATION

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Innovations in Climate Resilience Conference (ICR23)

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What is the National Science Foundation?

- Independent Executive Branch Agency
- Established in 1950 by Congress



Funds ~12,000 competitive awards for research, education and training annually



Supports ~2000 colleges, universities and other institutions annually



Supports ~318,000 researchers, entrepreneurs, students and teachers annually



NSF's Mission

Promote the progress of science

Advance the national health, prosperity and welfare



Secure the national defense



Addressing Climate Resilience at NSF



Research and Innovation in Climate and Clean Energy



Cutting-edge and Resilient Infrastructure



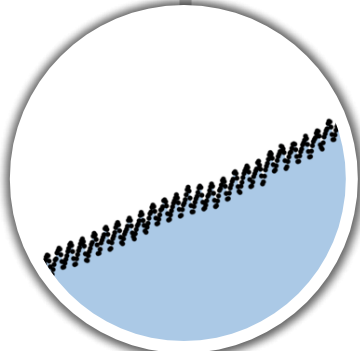
Education and Inclusive Participation



Investments: Climate Mitigation and Adaptation

**NSF
INVESTMENTS**

**1950s:
INTERNATIONAL
GEOPHYSICAL YEAR**



KEELING CURVE

**1950s:
ANTARCTIC RESEARCH
PROGRAM**



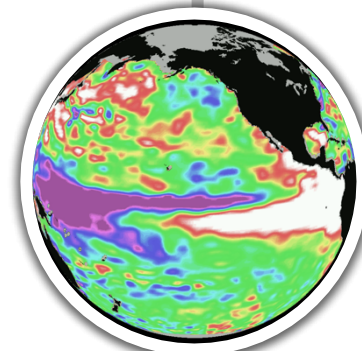
**UNDERSTANDING
GLOBAL CLIMATE**

**1970s:
THE INTERNATIONAL DECADE
OF OCEAN EXPLORATION**



**LARGE SCALE OCEAN
COLLABORATION**

**1980s-1990s:
THE TROPICAL OCEAN
GLOBAL ATMOSPHERE**



SEASONAL FORECASTS



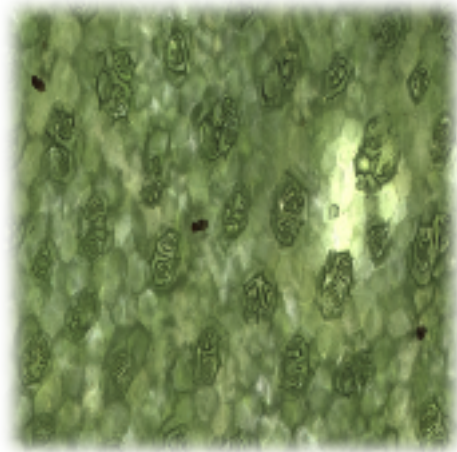
Implementation



RECENT RESEARCH HIGHLIGHTS



Research on and under Thwaites Glacier reveals a rapidly changing ice-ocean system.



NSF-funded research discovers mechanism for plant stomata control.



Model predicts seasonal variability of solar and wind power “droughts” and “floods”.

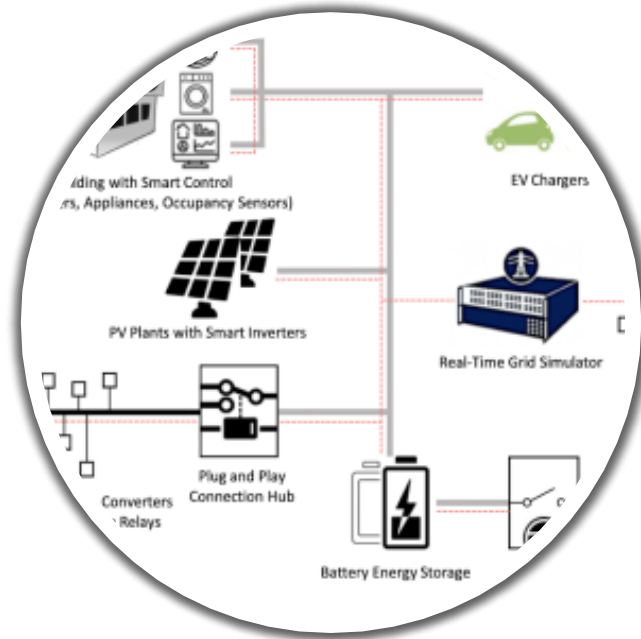


Recycled EV batteries could be used to store renewable energy.

Infrastructure for Research



National Ecological Observatory Network (NEON)



Grid-Connected Testing Infrastructure for Networked Control of Distributed Energy Resources (DER-Connect)



Global Ocean Biogeochemistry (GO-BGC) Array

Research Infrastructure as Exemplars of Resilience



Credit: Laser Interferometer Gravitational-wave Observatory

LIGO: Forward-thinking construction



Credit: International Gemini Observatory/NOIRLab/NSF/AURA/M. Paredes

Gemini Observatory – Carbon neutral operations

International Collaboration

Understanding and mitigating climate change is inherently a global problem that requires a global effort.



MOSAIC: Credit: Alfred-Wegener-Institut / Esther Horvath (CC-BY 4.0)



Education and Inclusive Participation



SOARS Program



**Civic Innovation
Challenge**



**Geoscience
Opportunities for
Leadership in Diversity**

FY 2024 – Building a Resilient Planet Theme

Will bring expertise from all disciplines to take on the challenges of:

- Predicting the response of Earth's systems to a changing climate and how natural and built systems respond to environmental variability;
- Improving adaptation and resilience to maximize resource utilization and sustainability within the food-energy-water system;
- Innovating in clean energy technologies, and associated infrastructure that can adapt to a changing planet;
- Developing nature-based solutions to combat climate change; and
- Enhancing national efforts in greenhouse gas measurement, monitoring, and verification of emissions and removal from the atmosphere.



Select FY 2024 Activities

- **National Resilience Network** - improving disaster resilience in communities; developing technologies to advance resilience research; studying the effectiveness of climate interventions; researching the health implications of climate change.
- **Clean Energy Convergent Coordination Hubs** - collaborations for convergent projects connecting existing investments and including stakeholders, testbed access, training and inclusion of diverse institutions.
- **Climate Equity Fellowships** – training for students and researchers that integrates deliberate consideration of disparate impacts of climate change into design of research projects.
- **Design for Extreme Environments** - extreme design to meet the challenges of the changing climate.
- **Biofoundries** - research and translation to mitigate climate change, develop sustainable energy and manufacturing processes, and support food security.



