

Project Summary

Overview

Unidata is a community data facility for the Earth Systems Sciences (ESS), established in 1984 by U.S. universities with sponsorship from the National Science Foundation. Unidata exists to engage and serve researchers and educators who are advancing the frontiers of their fields; we support their efforts by creating opportunities for community members from many backgrounds and disciplines to share data, knowledge, methods, and expertise. As part of this effort, we strive to provide well-integrated data services and software tools that address the entire geoscientific data lifecycle, from locating and retrieving useful data, through the process of analyzing and visualizing data either locally or remotely, to curating and sharing the results. Unidata currently serves more than 480 U.S. universities and colleges, which form the core of a member community spanning thousands of educational, government, and research institutions worldwide that rely on Unidata technologies.

Intellectual Merit

Dramatic changes in the technological, scientific, educational, and public policy landscape are transforming the ways our community members conduct their research and educate new generations of scientists. To meet these challenges, Unidata seeks to reimagine how the program can best fulfill its mission. This proposal provides a description of how Unidata plans to serve its community going forward by focusing on four types of activities:

- **Providing Data and Tools:** ensuring fair and equitable access to ESS and other data from a variety of sources, along with cutting-edge tools to analyze and visualize that data.
- **Reducing Barriers to Participation:** building partnerships with minority-serving institutions and under-resourced groups to increase engagement and collaboration, helping to build a larger, more inclusive community of ESS practitioners.
- **Fostering Community Action:** engaging community members to advance adoption of initiatives like FAIR and CARE data principles, strengthening ESS teaching and research.
- **Providing Innovative Technical Solutions:** guiding the ESS community toward technical solutions that leverage the most useful innovations in AI/ML, modern open source software, and cloud-centric data-proximate analysis.

Within these broad categories, we propose a variety of actions guided by the concept of *convergence science*, wherein individuals from across many disciplines collaborate to address “Grand Challenge” questions in areas such as climate change, ocean health, and natural disaster resilience. Unidata’s part in this endeavor centers on the creation of *community hubs*, which will bring together varied data, software tools for analysis and visualization, and learning resources to inform the community members who gather to find innovative courses of action with respect to these complex problems.

Broader Impacts

Service to the broad ESS education and research community is at the core of Unidata’s activities, with impacts extending across disciplines and with relevance to society at large. Some examples:

- Unidata's impact on research is evidenced by widespread use of Unidata products (especially netCDF) beyond the research and education communities more traditionally served by Unidata. As our activities embrace even more disciplines, we expect adoption of our technologies to widen.
- Unidata will continue to expand its partnerships with underserved communities, collaborating with TCUs, HBCUs, and other minority-serving institutions across the U.S. to provide training and scientific opportunities for students alongside data services and technical support for researchers and educators.
- Unidata-developed cyberinfrastructure is in use among U.S. federal agencies, private industry, and non-governmental and international organizations including NOAA, NWS, NASA, USGS, DOE, and many others, as well as projects like CMIP and Reanalysis activities. Going forward, we will continue to support these wide-ranging uses of our technologies.