Project Summary

Unidata is a community data facility for the atmospheric and related sciences, established in 1984 by U.S. universities with sponsorship from the National Science Foundation. Unidata's aim is to help transform the conduct of research and education in the atmospheric and related sciences by providing well integrated data services and tools that address the entire scientific 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. Today, Unidata serves more than five hundred U.S. universities and colleges, which form the core of a member community spanning thousands of educational, government, and research institutions that rely on Unidata technologies worldwide.

Intellectual Merit

In this proposal, we describe three strategic focus areas for Unidata's continuing efforts:

- managing geoscience data by making it accessible, discoverable, and usable by our community;
- providing software tools that promote efficient modern workflows, reproducibility, and open science; and
- supporting the researchers, educators, students, and others who make up our community by providing technical support, building capacity through training and open source development processes, leading cyberinfrastructure initiatives, and advocating for community data needs.

We propose to build on our recent successes in adding cloud-based technologies to the existing geoscience software toolset to make it possible for a much broader range of community members to access and easily use the very large and multidisciplinary datasets that have until recently been available only to those with significant dedicated computing resources. We aim to help our community begin transitioning to a "Science as a Service" model; initially by establishing a Unidata Science Gateway on the NSF-funded Jetstream Cloud facility, and providing a host of cloud-native data and software services, advanced workbench capabilities to access and execute data-proximate analysis tools and workflows, and supporting instructional training materials. We will enlarge and adapt Unidata's toolset to provide open, free, and easily shareable modern computational methods in support of Open and Reproducible Science.

Broader Impacts

Although Unidata's core activities focus on serving scientists and educators in the atmospheric and related sciences, virtually every project Unidata undertakes has a broader impact on the geosciences community and society at large. Among the many examples:

- Unidata's impact on research is evidenced by references to Unidata software and services in more than 2900 scholarly articles in the past 5 years alone. Such impact is expected to continue.
- Unidata has worked to encourage participation by a diverse array of academic institutions beyond its traditional constituency of universities granting degrees in the atmospheric sciences. Over 100,000 students in U.S. colleges and universities from all 31 EPSCoR states and numerous HACU and HBCU institutions use Unidata's products and services.
- Unidata-developed cyberinfrastructure will continue to be in wide use among U.S. federal agencies, private industry, and non-governmental and international organizations including NOAA, NWS, NASA, USGS, DOE, DOD, ECMWF, EUMETSAT, CMA, and CPTEC, as well as international projects like CMIP and Reanalysis activities.
- Unidata software is integrated into dozens of commercial and open source applications, including ArcGIS, Matlab, and IDL. We anticipate enhanced use of Unidata software in third-party applications.