Aashish Panta

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Education

The University of Utah — Salt lake City, UT
Ph.D. Computer Science — Aug 2022 - Present
The University of Mississippi — University, MS
BS Computer Science *GPA: 3.84* — Aug 2017 - Apr 2021

Experience

NSF NCAR — Boulder, CO
Visiting Scholar — Sept 2025

- Advanced interactive web-based dashboards for multi-terabyte to petabyte-scale climate datasets in NSF NCAR's Research Data Archive, eliminating the need for lossy resampling to achieve real-time analysis.
- Developed scalable containerized dashboards and Python notebook workflows on the CISL CIRRUS system, enabling access to explore CESM2-LENS and ERA5 data stored in NetCDF and Zarr formats.
- Collaborated with NCAR researchers to adapt and optimize ingestion pipelines for large geoscience datasets, ensuring efficient deployment, reproducibility, and usability for domain scientists.

NASA Jet Propulsion Lab — Pasadena, CA
Machine Learning Intern — June 2025 - August 2025

- Developed a unified AI framework for Earth Science Intelligence, integrating Retrieval-Augmented Generation (RAG) with Large Language Models to enable interactive, high-accuracy analysis of massive climate datasets.
- Built modular tools including a climate data assistant, multi-model AI comparison interface, multilingual voice-enabled dashboard integration, and AI-to-AI debate platform to support diverse research workflows.
- Deployed the framework on Microsoft Azure, leveraging Blob Storage, AI Search, and Foundry services, with OpenAI's Whisper for multilingual speech-to-text, ensuring scalability, reproducibility, and ready-to-use code generation.

ViSOAR LLC — Salt Lake City, Utah
Software Engineer — April 2023 - Present

- Migrated backend database from SQLite to MongoDB, improving database performance and scalability.
- Implemented and integrated MongoDB Atlas cloud service for database hosting and management. Refactored backend API and ORM logic to work with the new MongoDB database system.
- Integrated Jupyter notebooks and visualization dashboards using packages like panel and bokeh into the web application for large-scale data analysis

NASA Jet Propulsion Lab — Pasadena, CA
Software Engineer Intern — June 2023 - August 2023

- Collaborated with the M2020 Perseverance Robotic Arm team to identify gaps in data trendings, fixed unnoticed bugs, and enhanced the system with added functionalities providing in-depth statistics of the Mars rover surface parameters.
- Actively worked on analyzing and graphically representing the Mars 2020 rover's trending data over time to detect proximity to the fault limit, thereby facilitating preventative measures against system failures.
- Successfully optimized the Mars rover backprocessing workflow, achieving a substantial reduction in processing time.

Scientific Computing and Imaging Institute — The University of Utah
Graduate Research Assistant — Aug 2021 - Present

- Working as a fellow researcher with Professor Valerio Pascucci and his team from SCI at The University of Utah to develop cyberinfrastructure for efficient visualization of large-scale datasets ranging from terabytes to petabytes.
- Working on developing a novel data model, with efficient progressive streaming, compressing, and automating the data reduction framework, in collaboration with national labs and federal agencies.

Peer-Reviewed Journal Papers

1. **Enhancing Scientific Research with FAIR Digital Objects in the National Science Data Fabric** Sep 2023

   M. Taufer, H. Martinez, J. Luettgau, L. Whitnah, G. Scorzelli, P. Newell, A. Panta, P.-T. Bremer, D. Fils, C. R. Kirkpatrick, and V. Pascucci, "Enhancing scientific research with fair digital objects in the national science data fabric," *Computing in Science & Engineering*, vol. 25, no. 5, pp. 39–47, 2023

Peer-Reviewed Conference Papers

1. **Data Use and Reuse: Lessons in Repurposing Scientific Data** August 2025

   A. Salinas, I. Sohail, V. Pascucci, P. Stefanakis, S. Amjad, **A. Panta**, R. Schigas, T.C.Y. Chui, N. Duboc, M. Farrokhabadi, and R. Stull, "Climate Data for Power Systems Applications: Lessons in Reusing Wildfire Smoke Data for Solar PV Studies," HICSS 2026(To appear).

2. **Web-based Visualization and Analytics of Petascale Data: Equity as a Tide that Lifts All Boats** Oct 2024

   A. Panta, X. Huang, N. McCurdy, D. Ellsworth, A. A. Gooch, G. Scorzelli, H. Torres, P. Klein, G. A. Ovando-Montejo, and V. Pascucci, "Web-based visualization and analytics of petascale data: Equity as a tide that lifts all boats," in *2024 IEEE 14th Symposium on Large Data Analysis and Visualization (LDAV)*, 2024, pp. 1–11

Peer-Reviewed Workshop Papers

1. **Scalable Climate Data Analysis: Balancing Petascale Fidelity and Computational Cost** May 2025

   A. Panta, A. Gooch, G. Scorzelli, M. Taufer, and V. Pascucci, "Scalable climate data analysis: Balancing petascale fidelity and computational cost," in *2025 IEEE 25th International Symposium on Cluster, Cloud and Internet Computing Workshops (CCGridW)*, 2025, pp. 245–248

2. **Leveraging National Science Data Fabric Services to Train Data Scientists** Nov 2024

   M. Taufer, H. Martinez, A. Panta, P. Olaya, J. Marquez, A. Gooch, G. Scorzelli, and V. Pascucci, "Leveraging national science data fabric services to train data scientists," in *SC24-W: Workshops of the International Conference for High Performance Computing, Networking, Storage and Analysis*, 2024, pp. 355–362

Abstracts and Posters

1. **A Voice-Enabled AI Agent for Interactive Visualization and Analysis of NASA's Downscaled Dataset** Dec 2025

   American Geophysical Union (AGU), 2025

2. **From Validation to Societal Value: A User-Centric Framework for Evaluating Regional Climate Models** Dec 2025

   American Geophysical Union (AGU), 2025

3. **Scalable Web-Based Exploration and RAG-enhanced Insights for NASA's Downscaled Climate Data** May 2025

   Cloud-Native Geospatial (CNG) Conference, 2025

4. **Real-time Web-based Visualization and Analytics of Petascale Climate Data From the Cloud** April 2025

   AGU Data Visualization Student Showcase, 2025

5. **Managing Large-scale Atmospheric and Oceanic Climate Data for Efficient Analysis and On-the-fly Interactive Visualization** December 2024

   American Geophysical Union (AGU), 2024

6. **Visualization of a Petascale Climate Data from a Browser: A NASA Usecase** August 2024

   WIRED Symposium, 2024

Invited Presentations

1. **OpenVisus for Visualization of Petascale Scientific Data** March 2025
   NASA Earth Exchange (NEX) Biweekly Meeting, Remote
2. **OpenVisus for Petascale scientific visualization** March 2025
   NCAR Earth System Data Science (ESDS) Initiative, Remote

Honors and Awards

1. The CCGRID International Scalable Computing Challenge (SCALE) 2025, **Finalist**
2. IEEE Large Scale Data Analysis and Visualization (LDAV) symposium 2024, **Best Paper Award**

Tutorials

1. **NASA ARSET Program: Assessing Extreme Weather Statistics using NASA Earth eXchange Global Daily Downscaled Projections (NEX-GDDP-CMIP6)** Sep 2025
   A. Mehta, B. Thrasher, H. K. Lee, A. Goodman, A., ***A. Panta*** *, V. Pascucci, G. Scorzelli.* ***(700 participants from 93 countries)***
2. **Tutorial: Strategies for Large-Scale Data Analysis with the National Science Data Fabric (NSDF)** June 2025
   M. Taufer, V. Pascucci, J. Marquez, A. Gooch, and ***A. Panta****, IEEE IPDPS, 2025*
3. **Enabling Scientific Discovery: A Tutorial for Harnessing the Power of the National Science Data Fabric for Large-Scale Data Analysis** Nov 2024
   V. Pascucci, A. Gooch, ***A. Panta****, X. Huang, A. Sahıstan, G. Scorzelli, M. Taufer, J. Marquez, H. Martinez, P. Olaya, G. Laboy, and J. Ashworth, IEEE VIS, 2024*
4. **Using the NSDF Services for End-to-End Analysis and Visualization of Large Scientific Data** April 2024
   H. Martinez, ***A. Panta****, P. Olaya, G. Laboy, J. Ashworth, G. Scorzelli, J. Marquez, V. Pascucci, and M. Taufer, NSDF Webinar Series, 2024*

Projects

A Unified and Interactive Framework for Data Intelligence

- Developed an interactive data intelligence framework integrating Azure AI Search, Azure OpenAI, and cloud-hosted datasets, enabling natural language querying, dynamic subsetting, and on-demand analytics directly from the deployed interface, in collaboration with NASA JPL and Microsoft.

Dynamic Super-Resolution for Large Multi-variate Climate Dataset

- Designed and implemented a deep neural network architecture integrating convolutional layers, upsampling, and multi-quality inputs to achieve dynamic super-resolution and efficient analysis of large multivariate datasets, as part of research at the University of Utah.

OpenVisus: Large-scale Scientific Visualization Tool

- Developed and optimized Python APIs and data access plugins for OpenVisus to enable high-performance streaming, multiresolution visualization, and analysis of large-scale datasets across research domains including synchrotron facilities, materials science, and data commons.

NASA AIST Open Climate Workbench

- Collaborated with scientists at NASA Jet Propulsion Laboratory (JPL) to develop scalable cyberinfrastructure supporting data streaming, subsetting, and real-time visualization of climate datasets within the AIST OCW framework.

Skills and Technologies

Web Development:	Express, NodeJS, MongoDB, MySQL, React, HTML5, CSS
Data Visualization:	Paraview, 3D Slicer
Languages and Service:	Python, Azure Services, PHP, SQL, JavaScript, Agile, GIT