Pacific Research Platform: The Future of Big Data Collaboration

From biomedical sciences to particle physics, today nearly all research and data analysis involves remote collaboration. In order to work effectively and efficiently on multi-institutional projects, researchers depend heavily on high-speed access to large datasets and computing resources.

To meet the needs of researchers in California and beyond, the National Science Foundation (NSF) has awarded a five-year, $5 million grant to fund the Pacific Research Platform (PRP). The PRP integrates Science DMZs, an architecture developed by the U.S. Department of Energy’s Energy Sciences Network (ESnet), into a high-capacity regional “freeway system.” This system makes it possible for large amounts of scientific data to be moved between scientists’ labs and their collaborators’ sites, supercomputer centers or data repositories, without performance degradation.

A Regional Model for Multi-Discipline Data-Intensive Networking

The PRP, led by researchers at UC San Diego and UC Berkeley, will enable fast and secure data transfers between researchers in over 20 universities. The PRP builds on the optical backbone of Pacific Wave, a joint project of CENIC and the Pacific Northwest GigaPOP (PNWGP) to create one large, seamless research platform that will encourage statewide, regional—even worldwide—collaboration.

The PRP will support a broad range of data-intensive research projects that will have wide-reaching impacts on science and technology worldwide. Cancer genomics, galaxy evolution research, climate modeling, and the creation of virtual reality gaming systems are just a few of the projects that will benefit from the PRP.

### Principal Investigator

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**During a demonstration of its capabilities at the 2015 CENIC Conference, researchers showed that the PRP moved data up to 500 times faster than speeds currently available.**
Pacific Research Platform: Cyberinfrastructure for Big Data

The PRP’s data-sharing architecture, with disk-to-disk 10-100Gbps connections, enables region-wide virtual co-location of data with computing resources. Today, dozens of top universities and research centers are doing work across ten major application areas, positioning the PRP to be a regional-scale model for a future national-scale Big Data cyberinfrastructure.

### Pacific Wave 100Gbps Research DMZ Backbone with PNWGP DMZ & CENIC’s 100Gbps Network

**West Coast Participants:**
- Caltech
- CENIC
- ENet
- LBNL/NERSC
- NASA Ames/NREN
- Naval Post Graduate School
- NCAR/UCAR
- San Diego State Univ.
- Stanford
- UC Berkeley
- UC Davis
- UC Irvine
- UC Merced
- UC Riverside
- UC San Diego/SDSC
- UC San Francisco
- UC Santa Barbara
- UC Santa Cruz
- UCLA
- USC
- Univ. Washington/PNWGP

### Biomedical Data Analysis

- **Cancer Genomics:** UCSC, UCSD/SDSC, UChicago
- **Microbiome and Integrative ‘Omics:** UCSD, Caltech, UC, UCSD
- **Integrative Structural Biology:** UCSD, UCSD/SDSC, LBNL/NERSC
- **Microscopy Data Wormhole:** UCSD, UCR, NSCC

### Earth Sciences Data Analysis

- **Data Analysis and Simulation for Earthquakes and Natural Disasters:** Pacific Earthquake Engineering Research Center (PEER) [UCB, UCSD, UCSC, UCD, UCLA, UCI, USC, Stanford, OSU, & UW]
- **Climate Modeling:** NCAR/UCAR
- **California/Nevada Regional Climate Data Analysis:** NCAR/UCAR, UCSD/SIO
- **CO₂ Subsurface Modeling:** SDSU, UCSD/SDSC
- **Drones & 3D Terrestrial Modeling:** UCSD, UCM
- **Wildfire Simulations & Situational Awareness:** UCSD, NCAR/UCAR

###粒子物理数据分析

- UCSD/SDSC, UCI, UCR, UCSB, UCSC, UCD, Caltech, OSG

###天文学与天体物理学数据分析

- **Telescope Surveys:** LBNL/NERSC, LLNL, UCB, UCI, UCSC, Caltech/IPAC/JPL, Stanford/SLAC, UW
- **Galaxy Evolution:** UCI, UCSD, UCLA, UCSB, UCR, UCSC, LBNL/NERSC, NASA Ames, UW
- **Gravitational Wave Astronomy:** Caltech, LIGO Laboratory, UCSD, OSG

###可伸缩可视化、虚拟现实和高分辨率视频

- UCSD, UCI, UCLA, UCSC, UCB, UC, UCM, USC, UIC, UHM, Jackson State U, UvA

###高性能无线R&E网络

- UCSD, SDSU, UCI, UCR, UCSC, UCM

###JupyterHub/Deep Learning

- UCSD/SDSC, UCI, UCB, LBNL, LLNL, UIC

###国家和全球参与者

- AARNet, Australia
- Chameleon
- Clemson Univ.
- ENet
- KISTI/KREONet, Korea
- Montana State Univ.
- MREN
- Northwestern Univ.
- NSCC, Singapore
- Open Science Grid
- Pacific Wave (CENIC + PNWGP)
- StarLight
- Univ. of Chicago
- Univ. of Hawaii System
- UC / EVL
- Univ. of Tokyo, Japan
- Utah University
- UIC/NCSA
- Univ. Amsterdam, Netherlands
- Univ. of Utah
- Univ. Washington/PNWGP

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**For more information visit:** [http://pacificresearchplatform.org](http://pacificresearchplatform.org)