ORNL DAAC
for Biogeochemical Dynamics

http://www.daac.ornl.gov

A briefing for
Simon Wills
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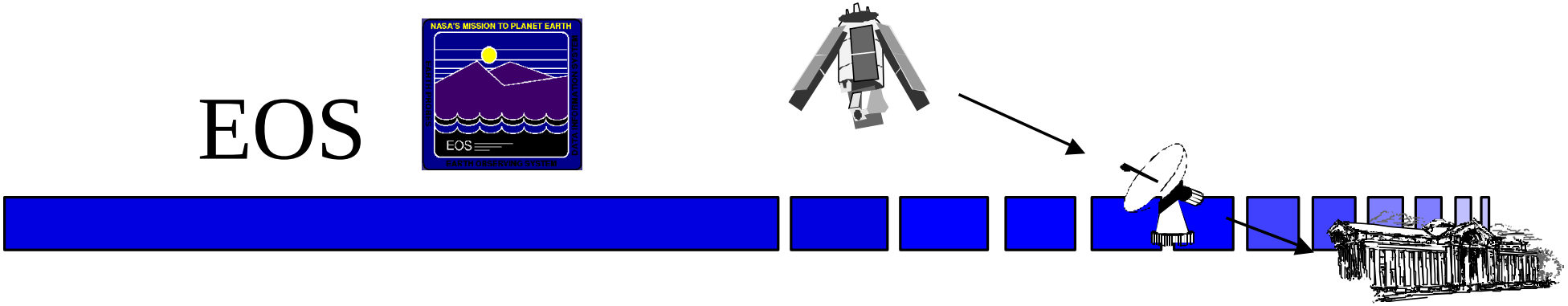
Outline

- Host Institution
- NASA’s Earth Observing System Program
- ORNL’s Mission and Role in EOSDIS
- Use of the Data
- Data Holdings and Accessing Data
- User Statistics
- Steps of Data Processing and Support
- DAAC Resources

Host Institution

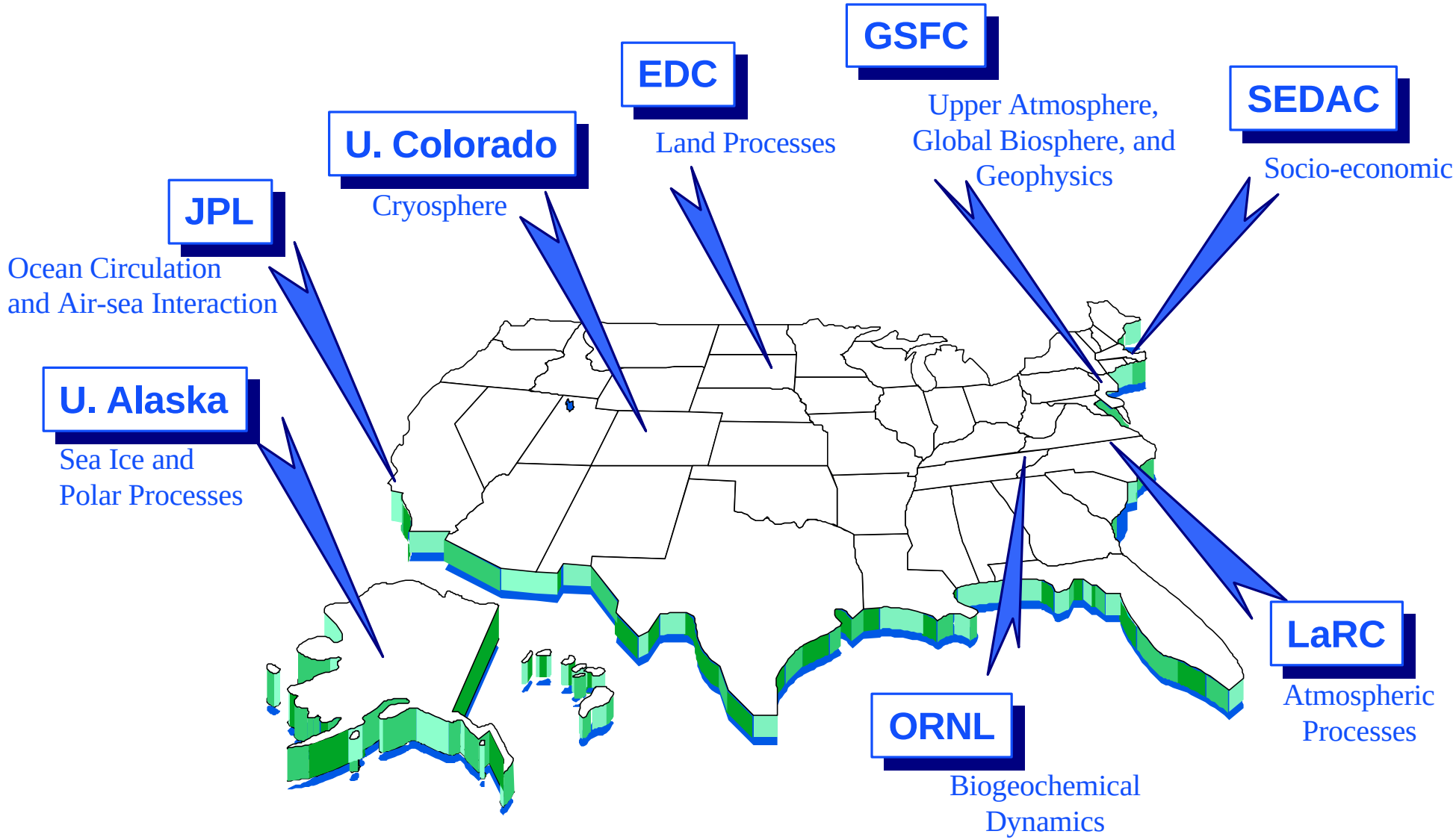
- Oak Ridge National Laboratory (ORNL), a U.S. Department of Energy R&D facility
- ~ 4,500 employees, 17 research divisions
- Environmental Sciences Division (ESD)
  ~ 300 staff, postdocs, students, and subcontractors
- DAAC has staff from ESD, computer science divisions at ORNL, and subcontractors
- Three international environmental data centers in ESD (i.e., DAAC, CDIAC, ARM Archive)

EOS



- NASA's Earth Observing System (EOS) Program
  - centerpiece of NASA's Earth Science Enterprise, largest component in the U.S. Global Change Research Program
  - spaced-based observing system
  - ground-based field campaigns
  - objective is to enable quick and easy access to data about the earth
- EOS Data and Information System (EOSDIS)
  - data distributed via 8 Distributed Active Archive Centers (DAACs), organized by scientific discipline
  - ORNL focuses on biogeochemical dynamics and ecological data

EOSDIS Distributed Active Archive Centers



ORNL DAAC Mission and Goal

- Mission
  - to acquire, document, quality-assure, archive, and distribute data for terrestrial biogeochemistry and the ecosystem dynamics of global environmental change
- Goal
  - to be recognized as a major source of ecological data for global change research

ORNL DAAC Role in EOSDIS

- Archive and distribute biogeochemical and ecosystem dynamics data
  - NASA's field campaigns
  - EOS land validation data
  - Regional and global ecosystem data
- Support NASA field campaigns
- Support EOS land validation field activities

Unique Characteristics of the ORNL DAAC

- Holds numerous and highly diverse data, resulting in many relatively small data files
- Supports NASA field projects of relatively short duration, having many PIs (~30-100)
  - data come to the DAAC from projects' data management systems
- Archives non-NASA data supporting global change research
- Does not receive unprocessed data from an instrument like other DAACs

ORNL DAAC Data Used for a Number of Purposes

- Document long-term trends
- Understand biogeochemical processes
- Develop and validate processed-based biogeochemical models
- Verify classifications based on remotely sensed information
- Integrate process understanding with remote sensing observations
- Validate remote sensing products and ecosystem models

Data Holdings (500+ data sets)

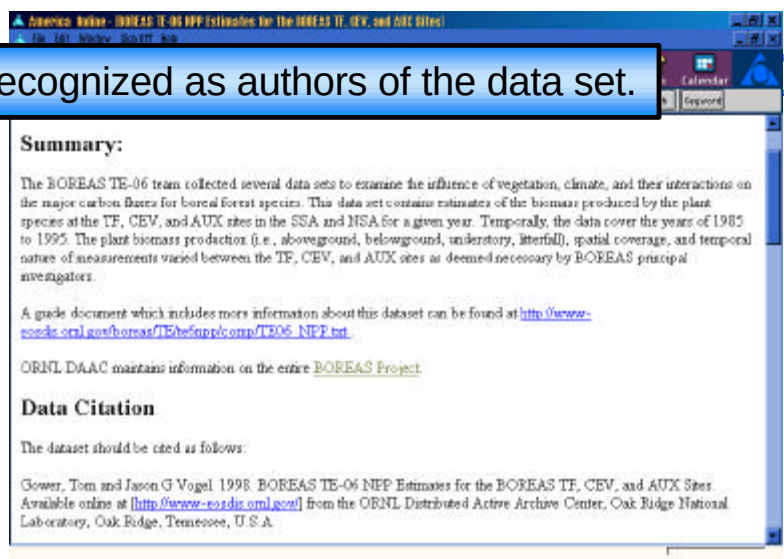
- Field Campaigns
  - BOREAS (280+ data sets)
  - FIFE (115 data sets)
  - OTTER (15 data sets)
  - LBA (1 data set)
  - SNF (37 data sets)
- Land Validation
  - Accelerated Canopy Chemistry Program (5 data sets)
  - 62 data sets registered in Mercury
- Regional and Global Ecosystem Data
  - global climate data (4 data sets)
  - global soil data (2 data sets)
  - global vegetation data (1 data set)
  - hydroclimatology data (5 data sets)
  - NPP (42 data sets)
  - RivDIS (1 data set)
  - VEMAP-1 (6 data sets)
  - 33 data sets registered in Mercury

Accessing ORNL DAAC Data

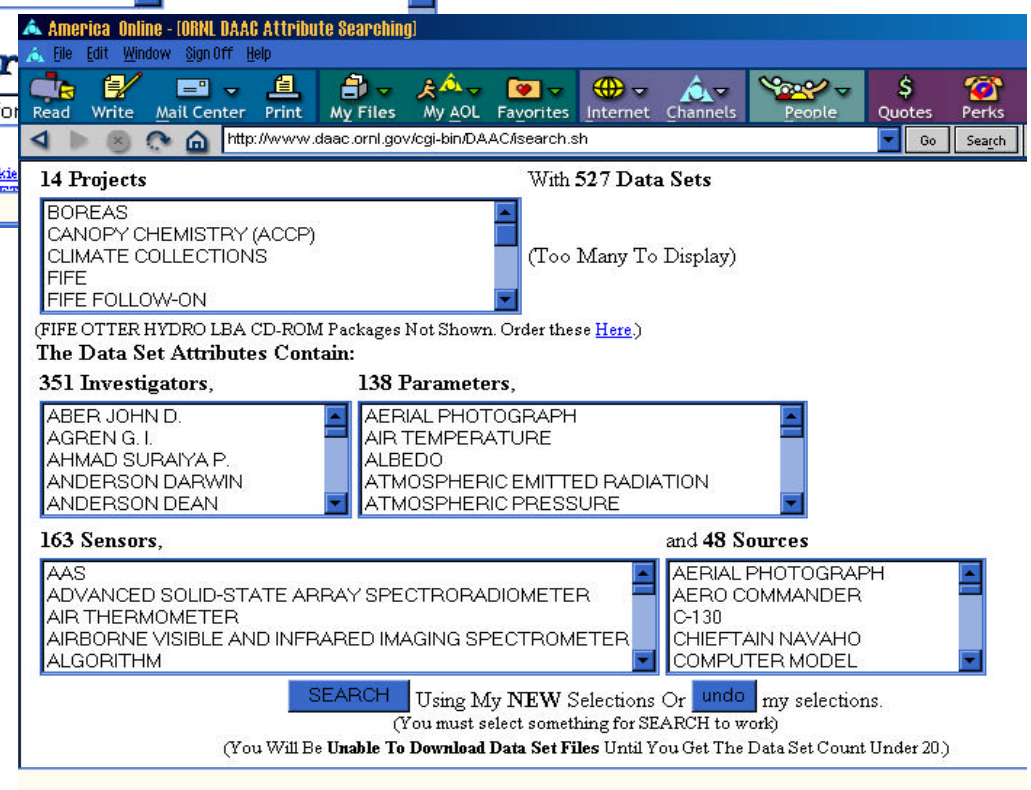
- ‘Local’ Web-based interface (http://www.daac.ornl.gov): search by parameters, sensors, sources, investigators, keywords, geographic locations, time
- Anonymous ftp, also supported with Web front-end
- EOSDIS Data Gateway: Web-based access for simultaneous searching of all NASA DAACs
- User Services Office (865-241-3952; ornldaac@ornl.gov)
  - e-mail, phone, fax, letters, walk-ins
  - multiple distribution media
  - outreach and advertisement

- **The ORNL DAAC User Interface**

  . . . example of searching by attributes



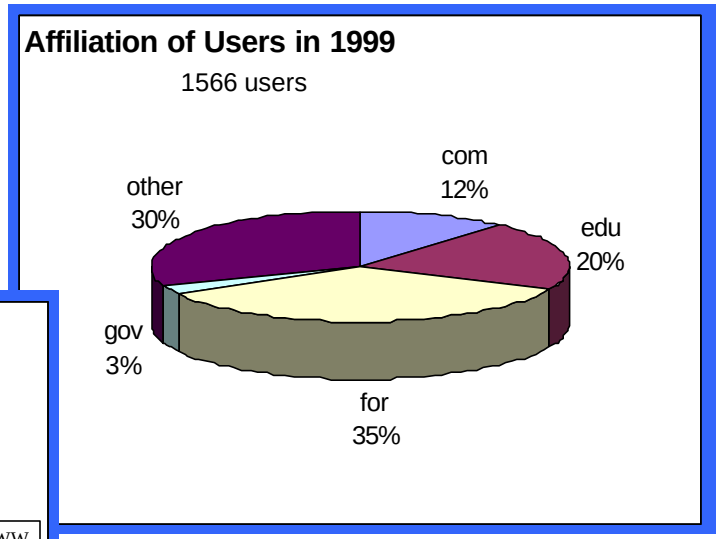
PIs recognized as authors of the data set.

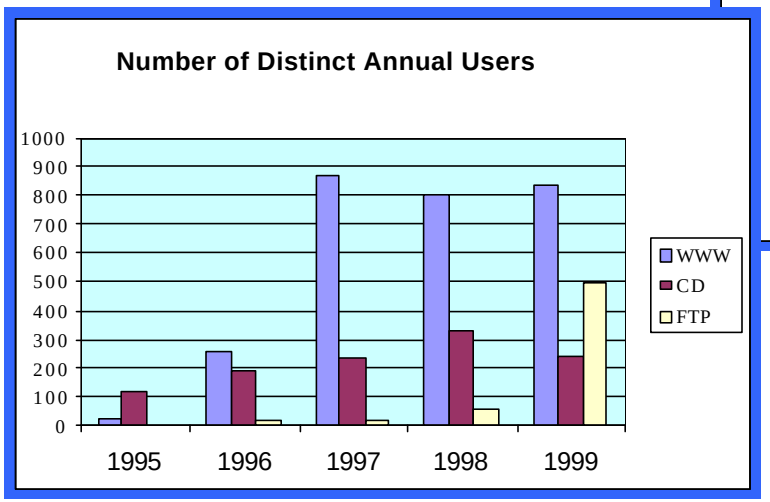


User Statistics

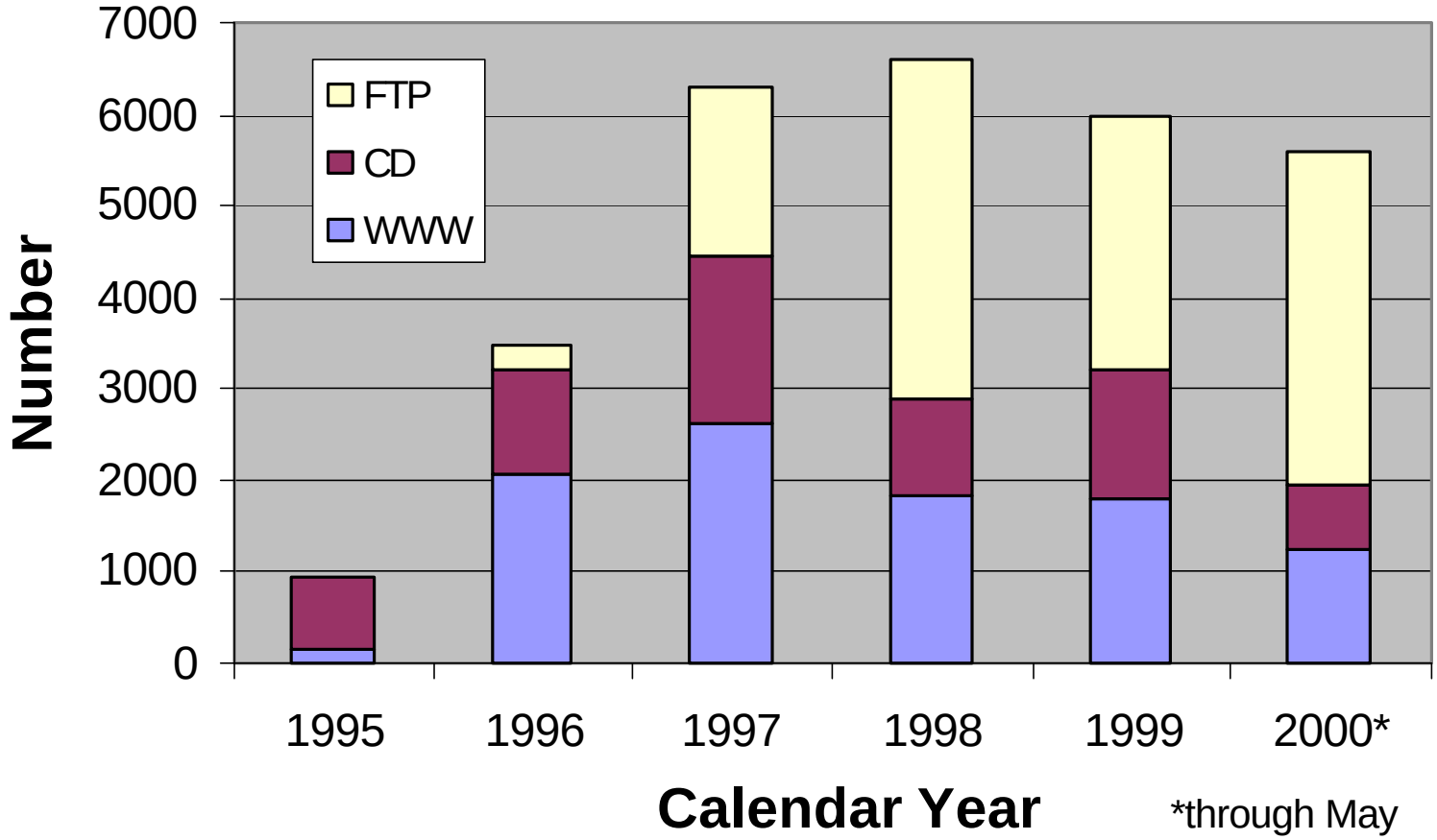
- Goals: - to determine if the DAAC is meeting its mission and
  - to characterize the DAAC's users so that we can understand and serve users better

- Who orders data?
- How many users order DAAC data?
- What data sets are ordered?
- How many data sets (and their volume) are ordered?
- How the data are ordered and delivered?





Number of Data Products Delivered by FTP, CDs, and WWW



*through May

Steps of Data Processing and Support

- Acquisition
  - identify how best to serve the scientific community
  - establish how and when to receive data
  - acquire data
- Ingest
  - perform QA checks
  - reformat for consistency
  - compile project-provided metadata
  - generate additional metadata
  - select keywords
- Enhance
  - add supplementary variables
  - standardize to common units
  - aggregate files
- Documentation
  - collect available documentation
  - write guide documents for each data set, instrument, etc., as needed
- Marketing and Distribution
  - survey the market (users) and advertise
  - provide data access to users worldwide
- Post-Project Data Support
  - provide long-term secure archiving of the data
  - serve as a buffer between end users and PIs
  - provide usage statistics to data providers
- User Working Group
  - science panel that provides advice on all aspects of the DAAC

DAAC Resources

- Staff
  - ~ 12 full-time equivalents
  - ORNL staff and subcontractors
  - individuals perform multiple functions
- Physical resources
  - hardware and software
    - Silicon Graphics servers
    - Unix, Sybase, C, Perl, Java/JavaScript, SAS
    - ORNL mass storage system for large files
    - Unix- and Windows-based workstations
  - located at ESD/ORNL