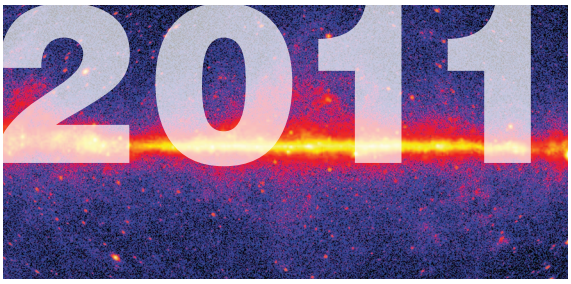
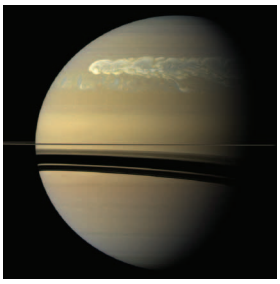
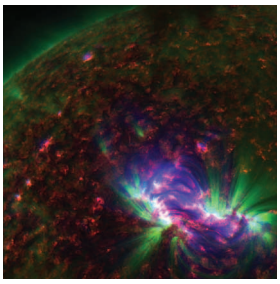
National Aeronautics and Space Administration

# NASA Exhibit Activities at the AGU Fall Meeting



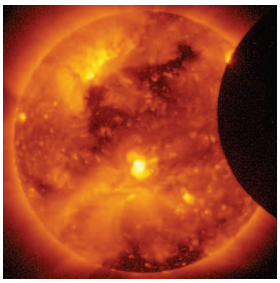


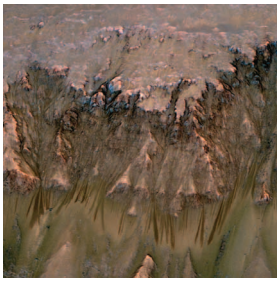


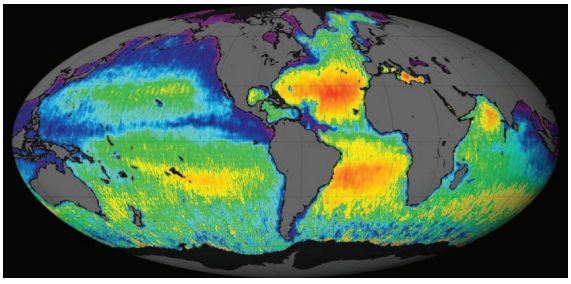


Please join us at the NASA booth (#1637), where we will showcase a wide variety of science presentations, cutting-edge, interactive science, technology and data demonstrations including data sharing and data exchange technologies. This year's program will be held on Tuesday, December 6, 2011 through Friday, December 9, 2011. Presentations will cover a range of research topics, science disciplines, and programs within NASA. Interactive data-oriented demonstrations will include sessions on data accessibility and data search-and-order-capabilities, and will feature selected data visualization, subsetting and manipulation tool.









# Schedule-at-a-Glance:

| Tuesday, December 6, 2011 | | |
|---|---|---|
| **Time** | **Presentation** | **Presenter** |
| **10:00** | SPECIAL PRESENTATION – HYPERWALL | |
| **11:00** | NASA Post-Doctoral Program | Robert Gibson |
| **11:30** | SDO in 2011: Submerged Active Regions, Dominated by Prominences, and an Optimistic Comet | Dean Pesnell |
| **12:00** | SoilSCAPE Wireless Sensor Web: An Embedded-System Paradigm for Large-Scale In-Situ Validation of NASA Earth Science Missions | Mahta Moghaddam |
| **12:30** | Rescue and Reuse of 1960s Satellite Data: Preliminary Nimbus Sea Ice Extent Results from September 1964, 1966, and 1969 | David Gallaher, G. Garrett Campbell, Walt Meier, John Moses |
| **1:00** | Using the 2011 TerraViva! SEDAC Viewer | Robert R. Downs |
| **1:30** | Seeing the Whole Sun with the Two Solar Terrestrial Relations Observatories (STEREO) | Eric Christian |
| **2:00** | The Radiation Belt Storm Probes (RBSP) Mission: Advancing Our Understanding of the Van Allen Belts | Shri Kanekal |
| **2:30** | New Data Sets from the NASA Aquarius Global Sea Surface Salinity Mission at the PO.DAAC | Edward Armstrong |
| **3:00** | Wind Resource Assessment for the Wind Energy Industry: What if You Could Do It Better? | Emilie Vanvyve |
| **3:30** | SPECIAL PRESENTATION – HYPERWALL | |
| **4:30** | You Are Now Free To Travel About the Solar System! | Kevin Hussey |
| **5:00** | Helping You Make a Difference: NASA's Science Education and Public Outreach (E/PO) Forums | Laura Peticolas, Theresa Schwerin, Denise Smith, Stephanie Shipp |
| **5:30** | Cloud-Based Mobile Application Development Tools and NASA Science Datasets | Daniel Hwan Oostra |

| Wednesday, December 7, 2011 | | |
|---|---|---|
| **9:30** | NASA DEVELOP Students' Research Results – Utilizing Hyperspectral Imagery to Map Invasive Species and Develop Habitat Suitability Models | Andrew Nguyen, Michelle Newcomer |
| **10:00** | SPECIAL PRESENTATION – HYPERWALL | |
| **11:00** | ISS SpaceCube Experiment 2.0 | Tom Flatley |
| **11:30** | NASA Student Airborne Research Program (SARP) – Overview | Emily Schaller |
| **12:00** | NASA Student Airborne Research Program (SARP) – Student Results | David Austerberry, Brandon Furey, Nicholas Heath, James O'Shea, Kirsten Siebach, Esther Thomas |
| **1:00** | Tools and Services for Interactive Browsing of Near Real-Time EOS Data | Ryan Boller |
| **1:30** | Voyager and the Edge of the Solar System | Eric Christian |
| **2:00** | A Novel Approach to In Situ Aerosol Measurement Capabilities: the NASA Langley King Air Aircraft in the DEVOTE Field Campaign | Melissa Mei Ying Yang |
| **2:30** | Operation IceBridge Returns from Antarctica | Michael Studinger |
| **3:00** | Exploiting Satellite Remote Sensing Data for Estimation of Land Surface Hydrologic Conditions and Associated 'Downstream' Impacts | Christa Peters-Lidard |
| **3:30** | SPECIAL PRESENTATION – HYPERWALL | |
| **4:30** | Earth Observing Satellite Data Visualization with MY NASA DATA's Live Access Server | Preston Lewis |
| **5:00** | Looking Forward to the Landsat Data Continuity Mission | Jeffrey Masek |
| **5:30** | State of the Ocean: Visualizing Near Real Time Geophysical Parameters With Google Earth | Charles Thompson |

# Schedule-at-a-Glance:

| Thursday, December 8, 2011 | | |
|---|---|---|
| **Time** | **Presentation** | **Presenter** |
| **10:00** | SPECIAL PRESENTATION – HYPERWALL | |
| **11:00** | Coupling Advanced Modeling and Visualization to Improve High-Impact Tropical Weather Prediction | Bo-Wen Shen |
| **11:30** | Spatial Data Access Tool: On-demand Geospatial Data Visualization and Download | Yaxing Wei |
| **12:00** | Visualization and Analysis with Adaptive Mesh Refinement Data | Patrick Moran |
| **12:30** | NASA's Global Change Master Directory: Discover and Access Earth Science Data Sets, Data Services, and Climate Diagnostics | Alicia Aleman |
| **1:00** | Getting the Most Out of UAVSAR Data | Don Atwood |
| **1:30** | From Archive to Applications: ASTER Global Digital Elevation Model (GDEM) | Calli B. Jenkerson |
| **2:00** | High-End Computing Capability Project: Passing the Petaflop Barrier | William Thigpen |
| **2:30** | Mercury: Metadata Management and Search System | Ranjeet Devarakonda |
| **3:00** | Visualizing and Accessing Synthetic Aperture Radar Data through Vertex, ASF's Data Portal | Jessica Garron |
| **3:30** | SPECIAL PRESENTATION – HYPERWALL | |
| **4:30** | Introducing the Simple Subset Wizard for Cross-Data Center Data Retrieval | Calli B. Jenkerson |
| **5:00** | Monitoring Groundwater Levels and Drought from Space | Matthew Rodell |
| **5:30** | Landsat's Long History: Captured Stories | Laura E.P. Rocchio |

| Friday, December 9, 2011 | | |
|---|---|---|
| **10:00** | From Archive to Applications: Understanding MODIS Land Quality Assurance (QA) Bits | Calli B. Jenkerson |
| **10:30** | New! Introducing the NASA Earthdata.nasa.gov Website | Kevin Murphy |
| **11:00** | Communicating Scientific Data on a Sphere | Ginger Butcher |
| **11:30** | NASA Earth Exchange: A Collaborative Supercomputing Platform | Ramakrishna Nemani |

# Detailed Description of In-Booth Demonstrations and Presentations

| Name | Description | Presenter |
|---|---|---|
| **NASA Postdoctoral Program** | The NASA Postdoctoral Program (NPP) offers scientists and engineers unique opportunities to conduct research at NASA Centers. Each NPP fellowship opportunity is designed to advance NASA research in a specific project related to space science, earth science, aeronautics, space operations, exploration systems, lunar science or astrobiology. Applicants apply for a specific research opportunity and, if selected by NPP's competitive process, are offered one- to three-year fellowship appointments. Applications are accepted three times each year: March 1, July 1, and November 1. Applications must be submitted online at: *http://nasa.orau.org/postdoc*. | **Robert Gibson**<br>Director, NASA Postdoctoral Program, Oak Ridge Associated Universities<br><br>**For information**<br>Robert.Gibson@orau.org<br>865-241-9820 |
| **SDO in 2011: Submerged Active Regions, Dominated by Prominences, and an Optimistic Comet** | During 2011, NASA's Solar Dynamics Observatory (SDO) has continued to discover new things about the same old Sun. We have seen prominence eruptions with time resolution and wavelengths of light never used before. This has given us a whole new view of the material moving away from the eruption and falling back down onto the surface of the Sun. Prominence eruptions are the source of coronal mass ejections, an important driver of space weather, so these new views will help us understand how the material is ejected into the heliosphere. A comet was observed to completely evaporate as it moved along its orbit close to the Sun's surface. Prediction is a major part of the Living With a Star program and 2011 saw the first successful prediction of emerging active regions. This represents a major advance in helioseismology and a big step toward predicting solar activity. | **Dean Pesnell**<br>SDO Project Scientist, NASA GSFC<br><br>**For information**<br>http://sdo.gsfc.nasa.gov |
| **SoilSCAPE Wireless Sensor Web: An Embedded-System Paradigm for Large-Scale In-Situ Validation of NASA Earth Science Missions** | The long-term vision of Earth Science measurements involves complementary remote sensors and in-situ sensor webs that together provide information at conforming spatial and temporal scales, and at selectable times and locations. This presentation discusses the customized development of a large-scale in-situ sensor web—called the Soil Moisture Sensing Controller and oPtimal Estimator (SoilSCAPE)—for validation of an example high-priority Earth science measurement, namely, soil moisture. With NASA ESTO support, we develop wireless sensor network technologies for dynamic and near-real-time validation of space-borne soil moisture measurements, in particular from the Soil Moisture Active and Passive (SMAP) mission. We present the latest developments of this wireless sensor network architecture including the latest results from field deployments in Michigan, Oklahoma, and California. | **Mahta Moghaddam**<br>Professor, Radiation Laboratory/ Electrical Engineering and Computer Science Department, University of Michigan |
| **Rescue and Reuse of 1960s Satellite Data: Preliminary Nimbus Sea Ice Extent Results from September 1964, 1966, and 1969** | Recovered data from 1960s Nimbus satellite sensor provides the potential to obtain sea ice extent estimates from as early as 1964. Until now, the earliest satellite data available to obtain estimates of total sea ice extent dated back to 1972, based on passive microwave sensors. Even earlier estimates, available from operational ice charts, provide incomplete coverage in the Arctic and virtually no coverage in the Antarctic. We are organizing visible and window channel infrared data from Nimbus I, II and III to attack this problem from old archive tapes (IR) and satellite based images on film (visible). There were over 7000 infrared files for just Nimbus II and over 200,000 images from the AVCS and IDCS from just the 1960s Nimbus missions. All this data is being recovered, scanned and rectified for comparison to modern ice extent measurements for both the Arctic and Antarctic. | **David Gallaher**<br>Technical Services Manager, National Snow and Ice Data Center (NSIDC)<br><br>**G. Garrett Campbell**<br>Technical Services Manager, NSIDC<br><br>**Walt Meier**<br>Project Scientist, NSIDC<br><br>**John Moses**<br>Ground System Engineer, NSIDC |
| **Using the 2011 TerraViva! SEDAC Viewer** | The 2011 TerraViva! SEDAC Viewer CD contains satellite-based data, maps, socioeconomic data, and geographic information system (GIS) tools that enable easy integration and visualization of satellite-based data along with socioeconomic data and maps to explore and demonstrate relationships between humans and the environment. Attendees will receive a copy of the 2011 TerraViva! SEDAC Viewer. | **Robert R. Downs**<br>NASA Socioeconomic Data and Applications Center (SEDAC) Senior Digital Archivist and Senior Staff Associate Officer of Research, Center for International Earth Science Information Network, Columbia University<br><br>**For information**<br>http://sedac.ciesin.columbia.edu/terraVivaUserWeb/ |

# Detailed Description of In-Booth Demonstrations and Presentations (cont.)

| Name | Description | Presenter |
|---|---|---|
| **Seeing the Whole Sun with the Two Solar Terrestrial Relations Observatories (STEREO)** | Until the twin STEREO spacecraft launched in 1997, nearly all solar observations were only of the half of the Sun that pointed directly at the Earth. It was like trying to predict the weather on the Earth if there were only weather stations and weather satellites on one side. Over the last four years, the two STEREO spacecraft, equipped with a number of telescopes and particle and field detectors, have been moving away from the Earth, one in front and one behind. This year, the spacecraft are more than 180 degrees apart, and when combined with observations from Earth, let us see the "Whole Sun" for the first time. This gives us an improved view of the evolution of the solar activity that causes "Space Weather", especially important as we head towards the active part of the solar cycle: Solar Maximum. | **Eric Christian**<br>STEREO Deputy Project Scientist, NASA GSFC<br><br>**For information**<br>http://stereo.gsfc.nasa.gov |
| **The Radiation Belt Storm Probes (RBSP) Mission: Advancing Our Understanding of the Van Allen Belts** | Since the discovery of long lived trapped radiation surrounding the Earth by James Van Allen in 1958, much has been learned. It is known now that there are two doughnut shape "belts" the outer mostly comprised of electrons and the inner mostly of protons. Of these, the outer belt is much more dynamic with particle populations increasing dramatically as well as depleting rapidly. The detailed physics of particle energization and loss however remains poorly understood. In this presentation, we describe the RBSP mission which seeks to fundamentally advance our knowledge of radiation belt dynamics. We set the stage by providing an overview of our current understanding, describes the mission in detail and summarize by describing advances in physics that may result from RBSP. | **Shri Kanekal**<br>RBSP Deputy Project Scientist, NASA GSFC<br><br>**For information**<br>http://rbsp.jhuapl.edu/ |
| **New Data Sets from the NASA Aquarius Global Sea Surface Salinity Mission at the PO.DAAC** | The Physical Oceanography Distributed Active Archive Center (PO.DAAC) at the Jet Propulsion Laboratory stores and provides access to NASA's oceanographic satellite data as well as other related data products. PO.DAAC is the NASA data center responsible for stewardship of global ocean surface salinity data from the recently launched Aquarius mission in June of 2011. We will review the status of Level 2 and Level 3 ocean salinity data sets including tools and services available to the scientific community. | **Edward Armstrong**<br>Senior Data Engineer/Scientist, NASA Physical Oceanography Distributed Active Archive Center (PO.DAAC), NASA JPL, CalTech |
| **Wind Resource Assessment for the Wind Energy Industry: What if You Could Do It Better?** | Part of the wind farm development process entails evaluating the wind resource at a prospective site to determine its long-term energy yield. This step is challenging because observational records at the site may be short or nonexistent. Using NASA's new Modern Era Retrospective-analysis for Research and Applications (MERRA)—a three-dimensional global record of weather every six hours since 1979—we have developed a novel technique that provides a very accurate estimate of the wind resource at a prospective site, by intelligently sampling representative case days from the MERRA data for subsequent atmospheric model downscaling. This new technique provides a long-term energy yield estimate that also has far less statistical uncertainty than the current industry standard approach, while alleviating limitations due to the lack (or absence) of observations at the prospective site. This has the potential to significantly reduce market barriers to onshore and offshore wind farm development, since insurers and financiers charge prohibitive premiums on investments deemed high risk—lower uncertainty translates to lower perceived risk. | **Emilie Vanvyve**<br>Associate Scientist, National Center for Atmospheric Research, Research Applications Laboratory, Boulder, CO |
| **You Are Now Free To Travel About the Solar System!** | Almost everyone with a computer can now access many of NASA's Earth Science data sets and 'ride-along' with our planetary missions in a video-game like fashion. Using "Eyes on the Solar System," people everywhere can experience missions in real time or travel through time viewing NASA missions from 1950 through 2050. New features and operation of NASA's "Eyes on the Earth" and "Eyes on the Solar System" online tools will be demonstrated. | **Kevin Hussey**<br>Manager, Visualization Technology Applications and Development NASA/JPL/Caltech<br><br>**For information**<br>http://solarsystem.nasa.gov/eyes<br>http://climate.nasa.gov/Eyes |
| **Helping You Make a Difference: NASA's Science Education and Public Outreach (E/PO) Forums** | NASA's Science Mission Directorate (SMD) has established four E/PO Forums—Astrophysics, Earth Science, Heliophysics and Planetary Science—working together with NASA for over five years to organize SMD education and public outreach projects and activities—including missions and granted programs—into a coordinated effort that effectively uses SMD science discoveries, expertise, and resources to advance SMD's vision for education and public outreach. The ultimate vision for the Forum's work is to bring together the many voices in science and education and public outreach, with a connected portfolio of products and activities, to articulate the story of the universe revealed by NASA investigation and discovery. The Forums are coordinating and supporting the NASA education and public outreach community. This support includes working with scientists, researchers, engineers, technologists, educators, product developers, and dissemination agents to increase awareness of best practices, existing NASA resources, and community expertise applicable to education and public outreach. | **Laura Peticolas**<br>Space Science Laboratory UC Berkeley, Berkeley, CA<br><br>**Theresa Schwerin**<br>Institute for Global Environmental Strategies, Arlington, VA<br><br>**Denise Smith**<br>Space Telescope Science Institute, Baltimore, MD<br><br>**Stephanie Shipp**<br>Lunar and Planetary Institute, Houston, TX |

# Detailed Description of In-Booth Demonstrations and Presentations (cont.)

| Name | Description | Presenter |
|---|---|---|
| **Cloud-Based Mobile Application Development Tools and NASA Science Datasets** | A number of cloud based visual development tools have emerged that provide methods for developing mobile applications quickly and without previous programming experience. This demonstration will explore how users can best combine these cloud-based mobile application tools and available NASA climate science datasets. Our vision is that users will create their own mobile applications with our data and develop tools for their own needs. | **Daniel Hwan Oostra**<br>Developer/Web Programmer<br>SSAI/NASA LaRC |
| **NASA DEVELOP Students' Research Results – Utilizing Hyperspectral Imagery to Map Invasive Species and Develop Habitat Suitability Models** | Mapping and predicting the spatial distribution of invasive plant species is central to habitat management, yet difficult to implement at landscape and regional scales. Remote sensing techniques can reduce the cost of field campaigns and can provide a regional and multi-temporal view of invasive species spread. Invasive perennial pepperweed (*Lepidium latifolium*) is now widespread in fragmented estuaries of the South San Francisco Bay, and is shown to degrade native vegetation in estuaries and adjacent habitats, thereby reducing forage and shelter for wildlife. The purpose of this study is to map the current distribution of pepperweed in estuarine areas of the South San Francisco Bay Salt Pond Restoration Project, and create a habitat suitability model to predict future spread. Hyperion on EO-1 and ASTER on Terra were utilized to map distribution of pepperweed, while a weighted overlay analysis model was generated within a geographic information system (GIS) framework to predict areas in the study site most susceptible to pepperweed colonization. | **Andrew Nguyen**<br>NASA DEVELOP National Program project lead,<br>San Jose State University<br><br>**Michelle Newcomer**<br>NASA Ames DEVELOP Center Lead<br><br>**For information**<br>http://develop.larc.nasa.gov<br>http://www.earthzine.org/2011/08/10/hyperspectral-mapping-of-invasive-species-in-the-san-francisco-south-bay-salt-ponds/ |
| **ISS SpaceCube Experiment 2.0** | The ISS SpaceCube Experiment 2.0 (ISE 2.0) will fly as part of the STP-H4 payload to the International Space Station (ISS) in collaboration with the U.S. Air Force – Space Test Program (Houston), and will include a number of NASA GSFC technology experiments. Central to these experiments is the SpaceCube 2.0 "Advanced Hybrid On-Board Science Data Processor" currently being developed under funding from the Earth Science Technology Office (ESTO). The goal of the ISE 2.0 experiment is to demonstrate "mission enabling" on-board science data processing capabilities for future Earth Science missions, and to collect system performance data to complement the results obtained from our SpaceCube 1.0 experiment on ISS/MISSE7-8. | **Tom Flatley**<br>Head, NASA GSFC Science Data Processing Branch |
| **NASA Student Airborne Research Program (SARP) – Overview** | NASA's Airborne Science Program, in partnership with the National Suborbital Education and Research Center (NSERC) at the University of North Dakota, sponsored a six-week summer internship program for science and engineering students during June and July 2011. Objectives were to (1) inspire students to continue in STEM fields, (2) develop the next generation of Earth System scientists, (3) expose students to NASA programs, and (4) demonstrate the integration of engineering, science, and operations in conducting research about Earth's global environment. The program utilized NASA's DC-8 research aircraft and the students participated on four, 3-hour research flights and one instrument test flight. Atmospheric samples and the remote sensing data collected onboard the aircraft were analyzed over the following weeks. | **Emily Schaller**<br>Science and Education Coordinator, National Suborbital Education and Research Center (NSERC)<br><br>**For information**<br>http://www.nserc.und.edu/learning/SARP.html |
| **NASA Student Airborne Research Program (SARP) – Student Results** | Twenty-nine advanced undergraduate or early graduate students were competitively selected for the 2011 NASA-NSERC Student Airborne Research Program (SARP). Three student teams were formed. Team 1: focused on the distribution and abundance of Giant Kelp in the Santa Barbara Channel through remote sensing using MASTER data. Team 2: Evapotranspiration of orchards and vineyards in the California Central Valley using MASTER data. Team 3: Atmospheric effects of emissions from waste water treatment facilities in the Los Angeles basin and from dairies in the California Central Valley using the Whole Air Sampler. Two students from each group will present the results of their individual research projects. | **David Austerberry**<br>Creighton University<br>**Brandon Furey**<br>Gustavus Adolphus College<br>**Nicholas Heath**<br>Florida State University<br>**James O'Shea**<br>University of Illinois at Chicago<br>**Kirsten Siebach**<br>California Institute of Technology<br>**Esther Thomas**<br>University of New Orleans |
| **Tools and Services for Interactive Browsing of Near Real-Time EOS Data** | This is a demonstration of how EOSDIS is using near real-time data products from LANCE to view coincident global observations from instruments aboard Terra, Aqua, and Aura (e.g. MODIS, AIRS, OMI) within three hours of observation. In particular, tools and services are being developed to enable interactive mapping of those products, facilitating their rapid evaluation. They support time-critical applications such as wildfire management, air quality measurements, and weather forecasting. EOSDIS has developed several web mapping tools for these purposes and their underlying web mapping services will be made available for integration into interfaces developed by the user community. | **Ryan Boller**<br>EOSDIS Visualization Lead,<br>NASA GSFC<br><br>**For information**<br>http://lance.nasa.gov |

# Detailed Description of In-Booth Demonstrations and Presentations (cont.)

| Name | Description | Presenter |
|---|---|---|
| **Voyager and the Edge of the Solar System** | The Voyager 1 and 2 spacecraft were launched in 1977 and are continuing to generate new and exciting science. Both Voyagers are in the boundary layer between the heliosphere (solar system) and interstellar space; a layer known as the heliosheath. The data have raised lots of new questions about the structure of the solar magnetic field, the local interstellar magnetic field, and the origin of energetic particles called Anomalous Cosmic Rays. Combined with the data from the Earth-orbiting Interstellar Boundary Explorer (IBEX), which studies this region remotely, scientists are learning a lot about the interaction of our solar system with the galaxy. This excitement is expected to continue, as the two Voyagers are poised to leave the heliosphere and become humankind's first interstellar probes. | **Eric Christian**<br>IBEX Deputy Mission Scientist, NASA GSFC<br><br>**For information**<br>http://voyager.jpl.nasa.gov/ |
| **A Novel Approach to In Situ Aerosol Measurement Capabilities: the NASA Langley King Air Aircraft in the DEVOTE Field Campaign** | The Development and Evaluation of satellite ValidatiOn Tools by Experimenters (DEVOTE) project, a hands-on training initiative, is lead by a team of early career scientists and engineers who are not only gaining mission experience, but are also contributing to the latest Earth science research through a field campaign. The team is developing and demonstrating a new airborne aerosol measurement capability to enable systematic and coordinated flights with remote sensing and in situ instruments on two separate NASA Langley King Air aircraft. This capability evaluates and improves current satellite instruments like the Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) and future satellite sensors planned for the Aerosol, Clouds, and Ecosystems (ACE). The flight profiles incorporate both ground based AERONET overpasses and underpasses of the NASA A-Train providing case study datasets for comparison. The novel airborne platform provides datasets useful for the evaluation of aerosol retrievals from remote sensors targeted for use on future satellite missions. | **Melissa Mei Ying Yang,** DEVOTE Science Team<br><br>**For information**<br>http://science.larc.nasa.gov/devote |
| **Operation IceBridge Returns from Antarctica** | In November, scientists completed the third year of flights over Antarctica as part of NASA's Operation IceBridge mission. The mission's annual Arctic and Antarctic field campaigns provide continued monitoring of polar ice after the Ice, Cloud and land Elevation Satellite (ICESat) stopped collecting data in October 2009, and until the launch of ICESat-2, planned for early 2016. Gravity, radar and laser instruments on the airborne science laboratory have turned up unprecedented, detailed images of sea ice, ice sheets and key glaciers—at the surface, through the snow and down to the bedrock. The targeted, detailed look is advancing our understanding of ice dynamics within a changing climate. | **Michael Studinger**<br>IceBridge Project Scientist, NASA GSFC<br><br>**For information**<br>http:// www.nasa.gov/icebridge/ |
| **Exploiting Satellite Remote Sensing Data for Estimation of Land Surface Hydrologic Conditions and Associated 'Downstream' Impacts** | A diverse set of methods exist for exploiting the information content of remote sensing data to improve land modeling. These methods include data assimilation (state estimation), parameter estimation, and new methods for uncertainty estimation. Improvements in the estimation of land surface states and model parameters affects the ability to accurately forecast weather, estimate precipitation and soil moisture from satellites, and predict "downstream" impacts such as streamflow and landslides. In this talk, we discuss our accumulated experience integrating these methods within the NASA Land Information System (LIS) software and present results involving applications to NASA missions. | **Christa Peters-Lidard**<br>Chief, Hydrological Sciences Laboratory, NASA GSFC |
| **Earth Observing Satellite Data Visualization with MY NASA DATA's Live Access Server** | Have you needed a source of up-to-date authentic data? Do you or your students wonder why they need to know how to use data? Explore the MY NASA DATA Live Access Server (LAS) along with classroom-ready lessons using real satellite data. These data sets can be visualized in a number of ways to suit your established curriculum while grabbing the attention of your students. A focus on the implementation and the use of Earth Systems data sets, developed for student researchers in grades K-12, will allow you to better make use of this wonderful tool. All of the data sets are derived from an archive of remotely sensed data retrieved from the myriad of NASA's Earth Observing System Satellites. The data that you can manipulate is the same data, formatted for educational use, that NASA scientists rely on everyday to better understand our Earth. | **Preston Lewis**<br>Outreach Coordinator/Education Specialist, NASA LaRC<br><br>**For information**<br>http://mynasadata.larc.nasa.gov/ |
| **Looking Forward to the Landsat Data Continuity Mission** | Landsat data have been the cornerstone for land remote sensing for the past forty years, contributing to our knowledge of global land cover change, agricultural intensification, urban growth, and the impacts of climate change on land ecosystems. In 2012 the newest mission, the NASA/USGS Landsat Data Continuity Mission (LDCM), will launch. This talk discusses recent science advances contributed by the Landsat program to land cover and ecological mapping, and provides a preview of LDCM mission capabilities. Of particular interest are new applications enabled by the opening of the Landsat archive for free (no-cost) distribution in 2008. | **Jeffrey Masek**<br>NASA Landsat Project Scientist, NASA GSFC |

# Detailed Description of In-Booth Demonstrations and Presentations (cont.)

| Name | Description | Presenter |
|---|---|---|
| **State of the Ocean: Visualizing Near Real Time Geophysical Parameters With Google Earth** | State of the Ocean (SOTO) is an enhanced Google Earth based web interface and imaging system that allows users to explore and assess near real time (NRT) parameters such as sea surface temperature, chlorophyll and ocean winds from swath and gridded science data products archived at NASA's Physical Oceanography Distributed Active Archive Center (PO.DAAC). Back end processing transforms incoming science data into KML that is updated throughout each day in order to serve requests for the latest raster and vector image layers at multiple spatial resolutions. Additional information layers include mashup components such as daily buoy data, the latest ocean storm tracks, and NRT imagery served from external services. | **Charles Thompson**<br>Technical Lead, PO.DAAC Tools and Services, NASA JPL, CalTech |
| **Coupling Advanced Modeling and Visualization to Improve High-Impact Tropical Weather Prediction** | To meet the goals of extreme weather event warning, this approach couples a modeling and visualization system that integrates existing NASA technologies and improves the modeling systems parallel scalability to take advantage of petascale supercomputers. It also streamlines the data flow for fast processing and 3D visualizations, and develops visualization modules to fuse NASA satellite data. | **Bo-Wen Shen**<br>Research Scientist, ESSIC, University of Maryland, Mesoscale Atmospheric Processes Laboratory, NASA GSFC |
| **Spatial Data Access Tool: On-demand Geospatial Data Visualization and Download** | The ORNL DAAC Spatial Data Access tool (SDAT) is an Open Geospatial Consortium (OGC) standards-based Web application to visualize and download spatial data in various user-selected spatial/temporal extents, file formats, and projections. Several data sets including land cover, biophysical properties, elevation, and selected ORNL DAAC archived data are available through SDAT. KMZ files are also provided for data visualization in Google Earth. | **Yaxing Wei**<br>Research Scientist, Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) |
| **Visualization and Analysis with Adaptive Mesh Refinement Data** | Adaptive Mesh Refinement (AMR) techniques are growing in popularity in the computational sciences community due to their ability to handle phenomena at many length scales and to dynamically adjust mesh resolution to the needs of the simulation. We describe recent progress in the development of visualization techniques and tools that are particularly well suited to AMR data. We present results including the visualization of a variety of cosmological simulations and discuss ongoing work. | **Patrick Moran**<br>Computer Scientist, Visualization Group, NASA Advanced Supercomputing Division, NASA Ames Research Center<br><br>**For information**<br>http://www.nas.nasa.gov/ |
| **NASA's Global Change Master Directory: Discover and Access Earth Science Data Sets, Data Services, and Climate Diagnostics** | NASA's Global Change Master Directory (GCMD) provides the scientific community with the ability to discover, access, and use Earth science data sets, data-related services, and climate diagnostics. The GCMD currently holds over 25,000 descriptions covering all Earth science disciplines. An online metadata authoring tool, docBUILDER, enables users to create and maintain data set, service and climate diagnostic records within the website. Controlled vocabularies (which include science keywords, service keywords, data centers, projects, location, data resolution, instruments, platforms and visualization/analysis type) help users accurately characterize their data and also provide for a normalized search. An update to the GCMD's search functionality is planned to further capitalize on the controlled vocabularies while performing database queries. By implementing a dynamic keyword "tree", users may search by combining keywords in new ways—enabling more relevant and efficient database searches to support the free exchange and re-use of Earth science data. | **Alicia Aleman**<br>Polar and Ocean Sciences Coordinator, NASA GCMD<br><br>**For information**<br>http://gcmd.nasa.gov |
| **Getting the Most Out of UAVSAR Data** | UAVSAR is an airborne L-band, quad-polarization, synthetic aperture radar (SAR) sensor developed by the NASA Jet Propulsion Laboratory. Since its first flight in 2009, more than 100 missions have been flown in the western hemisphere; encompassing oil spills, glaciers, mangroves, volcanoes, deserts, and tropical forests. The data from these missions is free and easy to download from the Alaska Satellite Facility. This talk will show how this rich data source can be accessed, processed, and used for useful science. Several interesting examples will demonstrate the benefit of fully polarimetric data. | **Don Atwood**<br>ASF Chief Scientist, Alaska Satellite Facility, University of Alaska Fairbanks |
| **From Archive to Applications: ASTER Global Digital Elevation Model (GDEM)** | The October 2011 release of the Version 2 Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM) collection includes availability through the Global Data Explorer, which facilitates access to both GDEM 2.0 and some of its input reference data sets. This presentation will demonstrate a Use Case in which a Shuttle Radar Topography Mission (SRTM) file that populates a fill value in a GDEM 2.0 tile is downloaded concurrently with a GDEM tile. Global Data Explorer will be used to subset both data sets over an area of interest, project them to Universal Transverse Mercator (UTM), and convert them to Arc American Standard Code for Information Interchange (ArcASCII) formatted files. | **Calli B. Jenkerson**<br>LP DAAC Senior Scientist, NASA Land Processes Distributed Active Archive Center(LP DAAC) at USGS EROS |

# Detailed Description of In-Booth Demonstrations and Presentations (cont.)

| Name | Description | Presenter |
|---|---|---|
| **High-End Computing Capability Project: Passing the Petaflop Barrier** | High-End Computing (HEC) represents an essential IT tool for the advancement of many critical engineering and scientific disciplines within NASA. The High-End Computing Capability (HECC) Project provides the indispensable hardware augmented by a suite of value-added services balanced to provide an optimal return on investment to NASA. Run out of the NASA Advanced Supercomputing facility at the NASA Ames Research Center, HECC provides access to Pleiades, a large traditional HEC cluster with over 110,000 processor-cores and over 1.3 petaflops peak performance, and Columbia, providing over 4,600 processor-cores. Augmented by 9 petabytes of spinning storage and close to 100 petabytes of archive storage, HECC is sized to meet the most demanding scientific and engineering challenges of the agency. Adding to the facility capability are two visualization and data analysis environments, both connected directly to the supercomputers through InfiniBand. This presentation provides an insight into the hardware environment, the complementing services, and how they meet NASA's demanding engineering and scientific needs. | **William Thigpen**<br>HECC Deputy Project Manager, Systems and Engineering Branch Chief, NASA Advanced Supercomputing Division, NASA Ames Research Center<br><br>**For information**<br>http://www.nas.nasa.gov/hecc/ |
| **Mercury: Metadata Management and Search System** | Mercury enables scientists to search for terrestrial ecology data located in diverse NASA and non-NASA data centers, using a straightforward web browser interface, and integrating multiple different types of metadata. Searches can use spatial bounding boxes, temporal ranges, and fielded keywords. Search results can be dynamically sorted and/or filtered based on facets, to hone in on the key data sets of interest, and there's a "more like this" search feature to find similar data sets to one of interest. Users can create a custom RSS feed to be notified of new data sets matching the search criteria, can create a bookmark to re-execute the search at any future point, and can easily send an e-mail with the search results to colleagues for discussion. Mercury provides a simple data set description and always links to the full, original metadata record for reference. Where data providers provide direct links to the data, such as through OGC web services, shopping cart applications, OPeNDAP servers, or ftp sites, Mercury provides direct links to the data. | **Ranjeet Devarakonda**<br>Research Staff, Environmental Science Division, ORNL<br><br>**For information**<br>http://mercury.ornl.gov/ornldaac to search the ORNL DAAC holdings and related data center. |
| **Visualizing and Accessing Synthetic Aperture Radar Data Through Vertex, ASF's Data Portal** | Synthetic Aperture Radar (SAR) data has historically been difficult to casually visualize due to processing requirements, post-processing data manipulation imperatives, as well as the software packages required to view and analyze the data itself. The Alaska Satellite Facility (ASF) is working to remove these data barriers for SAR users by processing the entirety of the NASA SAR archive into the ASF Datapool, implementing direct and bulk data download solutions and creating a new data interface, Vertex. Vertex, initially released in the fall 2011, provides users an intuitive search, visualization and download interface, highlighting the ASF Datapool contents. As an unregistered user, one can see browse imagery for almost all SAR platforms and sensors, the basic metadata for each pre-processed SAR scene, and information about the supported SAR platforms, all without navigating to any other virtual location. This demonstration will introduce Vertex to both new and experienced SAR users while emphasizing data synthesis capabilities available through this new interface. | **Jessica Garron**<br>ASF User Services, Alaska Satellite Facility SAR Data Center, Fairbanks, AK<br><br>**For information**<br>https://vertex.daac.asf.alaska.edu/ |
| **Introducing the Simple Subset Wizard for Cross-Data Center Data Retrieval** | Locating and retrieving data sets from more than one Data Center is potentially challenging to coordinate. This presentation will show how users can search two host archives simultaneously using the Simple Subset Wizard. A Use Case will demonstrate how users can subset and download Advanced Very High Resolution Radiometer (AVHRR) and Moderate Resolution Imaging Spectroradiometer (MODIS) Vegetation Index products from the Oak Ridge National Laboratory (ORNL) and Land Processes (LP) Distributed Active Archive Centers (DAAC) respectively. Additional manipulation using public domain tools will demonstrate how to prepare these two data sets for comparison. | **Calli B. Jenkerson**<br>LP DAAC Senior Scientist, NASA Land Processes Distributed Active Archive Center (LP DAAC) at USGS EROS |
| **Monitoring Groundwater Levels and Drought from Space** | Groundwater is a vital resource for agricultural, domestic, and even industrial uses. It is also an excellent indicator of variations in water availability, ranging from droughts to floods. Unfortunately, there are large gaps in the groundwater monitoring networks of the U.S., and outside of the U.S. very little groundwater data is available at all. Wouldn't it be great if we could monitor groundwater levels from space? Well, we can! Using precise, satellite based gravity measurements combined with rainfall and other meteorological data, scientists at NASA Goddard Space Flight Center are now producing maps of groundwater conditions, which are proving to be valuable for drought monitoring, among other applications. | **Matthew Rodell**<br>Physical Scientist, NASA GSFC<br><br>**For information**<br>http://drought.unl.edu/MonitoringTools/NASAGRACEDataAssimilation.aspx |

# Detailed Description of In-Booth Demonstrations and Presentations (cont.)

| Name | Description | Presenter |
|---|---|---|
| **Landsat's Long History: Captured Stories** | Since the project's inception in 1966, Landsat has stood at the forefront of space-based Earth observation and has been the trailblazer for land remote sensing as it is known today. Despite the program's prominence in civilian Earth observation, the forty-five year history of Landsat has been tumultuous. Three government agencies and a private company have operated the Landsat satellites at various times over the course of four decades and eight Landsat missions. In 2004, an effort to accurately document Landsat's evolution began with the advent of the Landsat Legacy project. Landsat Legacy research has uncovered lost details about the storied Landsat project. While untangling the web of long held beliefs and reality, a fascinating history has reemerged. Some of these stories are shared here. | **Laura E.P. Rocchio**<br>Senior Outreach Scientist,<br>NASA GSFC, Science Systems and Applications, Inc.<br><br>**For information**<br>http://landsat.gsfc.nasa.gov |
| **From Archive to Applications: Understanding MODIS Land Quality Assurance (QA) Bits** | Land Processes Distributed Active Archive Center (LP DAAC) and the Moderate Resolution Imaging Spectroradiometer (MODIS) Science Team highly recommend checking pixel quality in land products prior to application, but users have reported difficulty in finding and interpreting this information. This presentation will demonstrate how data extraction tools hosted at the LP DAAC are used to unpack and read bit-encoded quality assurance (QA) data. Stepping through a Use Case will show how users can download a MODIS Vegetation Index product, isolate its quality layer, retrieve per-pixel QA values, translate them into bit form, and appropriately reference the results to a quality bit legend. | **Calli B. Jenkerson**<br>LP DAAC Senior Scientist,<br>NASA Land Processes Distributed Active Archive Center (LP DAAC) at USGS EROS |
| **New! Introducing the NASA Earthdata.nasa.gov Website** | The Earth Science Data and Information Systems (ESDIS) project at the Goddard Space Flight Center has released a new Earth Observing System Data and Information System (EOSDIS) website. This release is the first step in a continuing process of improving the ESDIS and EOSDIS web presence and services, as well as representing EOSDIS as an efficient and interoperable program to support NASA¹s Earth science research. This new website reorganizes the information into a more intuitive structure and is designed to help facilitate end users' discovery of the wide array of data information, services and tools offered by the twelve EOSDIS data centers. | **Kevin Murphy**<br>Earth Science Data Information System Project, NASA GSFC<br><br>**For information**<br>http://earthdata.nasa.gov |
| **Communicating Scientific Data on a Sphere** | The Science on a Sphere presentation technology, developed by NOAA, is providing scientists and educators with a unique perspective to view and present scientific data. From the ozone hole to El Niño, Science on a Sphere can help illustrate and communicate global phenomena. Presentations of a variety of NASA data, including Aura atmospheric data, have been shown in science centers around the world and have actively engaged the public audience. New capabilities, such as integration with NASA's Earth Observations (NEO) data, allows for the demonstration and active probing of data sets. This technology is still in its infancy and we are only just beginning to learn the best ways to engage the public audience and communicate complex science systems. | **Ginger Butcher**<br>EPO lead, Aura Mission,<br>NASA GSFC |
| **NASA Earth Exchange: A Collaborative Supercomputing Platform** | The NASA Earth Exchange (NEX) represents a new platform for the Earth science community that provides a mechanism for scientific collaboration and knowledge sharing. NEX aims to combine state-of-the-art supercomputing, Earth system modeling, workflow management, and NASA remote sensing data feeds to deliver a complete work environment in which users can explore and analyze large datasets, run modeling codes, collaborate on new or existing projects, and quickly share results. As the development of NEX continues, it will lower the barrier of entry to data- and compute-intensive science and provide a mechanism for continuous engagement among members of the global change science community. Integration with NASA supercomputing provides a crucial component that enables NEX communities to address problems at a scale not previously achievable. We will show examples of this new capability for global monitoring with Landsat data at 30-meter resolution every 15 days. | **Ramakrishna Nemani**<br>Physical Scientist,<br>NASA Ames Research Center<br><br>**Petr Votava**<br>Senior Research Scientist,<br>NASA Ames Research Center<br><br>**Andrew Michaelis**<br>California State University, Monterey Bay<br><br>**For information**<br>https://c3.nasa.gov/nex/about/ |