2019 Ninth Symposium on Advances in Modeling and Analysis Using Python

The 2019 Ninth Symposium on Advances in Modeling and Analysis Using Python was another success. We had two Keynote speakers: Rachel Pruden and Kim Wood, both had over 100 attendees (not bad given the shutdown). We had a joint session with AI and HPC which allowed us to extend the Symposium into Wednesday. We had a tutorial session which was very well attended, particularly the session on Pangeo led by Daniel Rothenberg. And at the end of the Symposium we had a panel discussion on building inclusive Python communities. In addition, we held a Mentoring Mixer at Mother Brunch Brewing. Through the generosity of the AMS STAC we provided food and we had 47 attendees including 6 students. The topics and themes were wide ranging. Particularly noteworthy is more Scientists are sharing their code and making packages in Python that make doing our science easier. In the end we had 4 no shows due to the shutdown and several substitutions.

We plan to hold the 10th Symposium next year with a special introduction on the history of the Symposium. We will be engaging on social media to get ideas for events we can hold in Boston. We will also be working across the STAC committees on inclusive social events including some that involve life affirming activities like physical activity and intellectual events (Museums etc).

Fifth Symposium on High Performance Computing for Weather, Water, and Climate

The Fifth Symposium on High Performance Computing for Weather, Water, and Climate encountered significant growth over the previous year, hosting 7 sessions with 22 submissions. This year's sessions had a strong focus on the future, with multiple sessions presenting work related to preparing for the emergence of exascale computing systems over the next five to ten years. Effective use of these systems is presenting modelers with challenges in exploiting new hardware architectures and the associated software stacks, while their models continue to move to increasing resolution and more complex physics packages. An exciting emerging area of interest is incorporating machine learning into the models, not only in pre- and post- processing but also within the models themselves as a new approach to parameterization.

Machine learning, the need for modern software development languages and techniques, and increasing data volumes formed a natural bridge to a very successful themed joint session with the 18th Artificial Intelligence Conference and the Ninth Python Symposium regarding the topic of Big Data. The session included a Core Science Keynote with Jucas Joppa of Microsoft and attendance was standing-room-only throughout the session which showcased the interdisciplinary challenge that Big Data poses for those working with HPC resources, AI techniques, and Python libraries. The success of this session has already led to discussions of future joint sessions between the HPC, AI, and Python communities following the "Big Data, Big Computing, Bigger Science" theme.

A lively panel addressed the challenges facing HPC centers supporting the weather, water, and climate community as they work to provide the compute and storage resources scientists will need going forward. Speakers from NCAR, the ECMWF, and UKMET showed strong consensus that the decreasing rate of growth of compute capability per dollar and the massive demand for power put more and more pressure on budgets, while trends in exascale system

architecture, growing use of AI and machine learning, and the move to the cloud make planning more complicated than ever. All stressed the need to manage change, re-invent management and operating practices, and – most of all – the need for co-development, co-design, and collaboration across all parts of the community.

35th Environmental Information Processing Technology Conference (35EIPT)

The EIPT Conference held its 35th Annual Conference during the 99th Annual Meeting of the American Meteorological Society. The Conference spanned four days with 26 individual sessions in 14 topic areas ranging from road weather innovations to service updates from various organizations to cloud computing. EIPT also hosted an AMS Town Hall on NOAA's Big Data CRADA and held joint sessions with the 19th Conference on Aviation, Range and Aerospace Meteorology and the 22nd Atmospheric Science Librarians International Conference.

The EIPT Program Committee met on Monday, January 7th, for our annual face-to-face meeting where we announced upcoming Committee changes and Board updates. Most of the meeting was dedicated to filling in the gaps in session chairs and presentations left by the absence of federal employees due the government shutdown. Later in the day, several EIPT Program Committee Members participated in the 5th Annual Speed Networking Event for Students and Early Career Professionals.

While our federal colleagues were sorely missed over the entire week, other presenters answered the call and extended their presentations or provided unscheduled presentations to fill in. NOAA was not available for the Big Data Town Hall, but the cloud vendors were able to present the work they have been doing to support the storage and use of the data provided by NOAA and other sources.

We are looking forward to seeing you at our 36th Annual Meeting in Boston. We are planning several panels, joint events with the other conferences, invited talks and Town Halls. Please check for the conference announcement later this spring and you can already suggest session topics at the following link: https://annual.ametsoc.org/2020/.

Ninth Conference on the Transition of Research to Operations (9R20)
Summary of 2019 9R2O Conference for STAC EIPT Board
American Meteorological Society 99[th]Annual Meeting and
Ninth Conference on the Transition of Research to Operations [9R2O]
Phoenix Convention Center (PCC) and Sheraton Grand Phoenix, Phoenix, AZ

Overview:

The 9R2O Conference was held on January 6-10, 2019 as part of the 2019 American Meteorological Society (AMS) 99[th]Annual Meeting, at the Phoenix Convention Center (PCC), Phoenix, AZ.

The theme for the 2019 AMS Annual Meeting was "*"Understanding and Building Resilience to Extreme Events by Being Interdisciplinary, International, and Inclusive (III)."* The 9R2O Conference was designed to support the 2019 AMS theme by providing a comprehensive venue spanning the full 4-day AMS Meeting Week, January 7-10 for discussing research oriented towards providing research to operations' enablers, utilizing technologies, models, algorithms and applications which help fulfill the NOAA and national visions for weather, water and climate information on many time scales.The Conference demonstrated how traditional and non-traditional observations are identified and verified for advances in research, technology and applications that drive transitions to meaningful operations. This is especially the case for Extreme Events which often produce devastating effects on society. The Conference included papers describing recent advances in research, technology and applications that support the Nation's ability to provide more accurate weather, water, and climate information to decision makers and end users around the world. In addition, the 9R2O Conference supported the national imperative for the effective and efficient transition of research into sustained operations and the feedback process of operations back to research.

There were approximately 3,850 members (subject to the final, official count by AMS) of the weather, water and climate communities at the 99[th]AMS Annual Meeting. The participation-attendance might have been a record number for an Annual Meeting considering that there were approximately 800 planned participants that cancelled or never finalized their registration due to unintended consequences of the partial U.S. government shutdown. A major challenge for 9R2O was to populate the Session Co-Chairs positions – 6 of the 10 on our Organizing Committee are government employees, who would have Co-Chaired several our scheduled 27 Sessions - could not attend. With the help of substitutes arranged by these government employees, volunteers from the AMS Volunteer list and exceptional cooperation from government contractors who could participate we were able to bridge all our gaps in Session Co-Chairs. There were over 800 at the Student Conference on Saturday-Sunday, January 5-6. There was a reduced number of organizational exhibitors (institutional, industrial and government agency) in less than 90 Booths most likely due at least partly to the partial government shutdown. This year, despite the trying circumstances, these statistics and those below are a testimonial to a resilient and vibrant Society and a very successful 9R2O Conference.

The 9R2O Conference provided a lineup of R2O-related presentations for the twenty-seven (27) sessions available in the two different conference rooms assigned to 9R2O, for the four days, Monday through

Thursday or eight (8) full room-days plus three (3) Poster Sessions, Monday through Wednesday. Three of the Sessions had to be cancelled due to many of the presenters representing the government agencies shutdown who were unable to attend/participate. The unaffected presenters/presentations from these planned sessions were moved to gaps in other sessions. The remaining twenty-four (24) sessions were conducted using parallel sessions in the 2 conference rooms on Monday through Thursday. There were 146 oral presentations scheduled (some half-hour length) of which ~134 were delivered; 14 poster presentations in three poster sessions scheduled; a Town Hall meeting; and a co-hosted International Panel Discussion. There were also partnered sessions (four with 15NGOESS including a Special Session of invited presentations on National and International Operational Environmental Satellites, three with 2SMALLSATS, two with 10HEALTH, one with 7JCSDA (Joint Center for Satellite Data Assimilation) and a Panel Discussion with 9R2O, 15NGOESS and 7JCSDA during the four days of Conference Sessions.

Town Hall - *NASA's Earth Science - Flight Program Investments in and Planning for the Next-Generation Earth Observatories – An Update*

The 9R2O Conference had a confirmed lunchtime Town Hall on January 7th presenting the annual status of the NASA Earth Science missions. The Town Hall was to be conducted by Eric E. Ianson, the Associate Director, Flight Programs, Earth Science Division, NASA Science Mission Directorate: *Town Hall Meeting: NASA's Earth Science - Flight Program Investments in and Planning for the Next-Generation Earth Observatories – An Update*. The Town Hall had to be cancelled due to NASA employees' inability to participate due to the partial government shutdown.

Panel Discussion – "*Building Resiliency to Extreme Weather Events through International Partnerships with the Application of Advanced Satellite Technology*"
On Tuesday, January 8, Lunchtime 9R2O co-hosted with 15NGOESS and 7JCSDA an International Panel Discussion. There were approximately 115 attendees at this highly praised Panel Discussion and audience-participation discussion.

Synopsis

Today's new generation of environmental satellites and the international partnerships in place for sharing their data and resulting product applications contribute significantly to building resiliency to extreme weather events. Resiliency to extreme events is being built by better remote sensing and forecasting capabilities made possible by the new and improved satellite data products which help mitigate damage to life and property and aid in the recovery process. In addition, resiliency of these satellite systems themselves is being increased by the advanced technology incorporated in the design of the environmental satellites and by international agreements which facilitate their operation and data access among nations. Panelists from the US and partnering nations will describe how satellite information is used to improve their observation and forecasting capabilities for extreme weather events.

Moderator:

Lars Peter Riishojgaard- Manager, Integrated Global Observation System (WIGOS), World Meteorological Organization (WMO), *Geneva, Switzerland*

Panelists:

Louis Uccellini- Director, NOAA National Weather Service (NWS), *Silver Spring, MD, USA*

Unable to participate due to partial government shutdown;
Florence Rabier- Director General, European Centre for Medium-Range Weather Forecasts (ECMWF)*, Reading, Berkshire, U.K.;*
Kenneth Holmlund - Chief Scientist, European Organisation for the Exploitation of Meteorological Satellites (*EUMETSAT), Darmstadt, Germany;*
Naoyuki Hasegawa- Director-General, Observation Department, Japan Meteorological Agency (JMA), *Tokyo, Japan;*
Hoon Park- Director-General, National Meteorological Satellite Center, Korea Meteorological Administration (KMA), *Jincheon, Republic of South Korea.*

9R2O Student Presentation Competition and 9R2O Co-hosted Student and Early Career Professionals Speed Networking Event and Reception

The 9R2O Conference co-sponsored the 15NGOESS Symposium two student activities within its Conference and the AMS Annual Meeting. A Student Competition with Awards was included as an integral part of the 9R2O and 15NGOESS hosted sessions for both Oral Presentations and Poster Presentations. The 9R2O/15NGOESS judges will be awarding a1st place ($200 plus Certificate)and 2nd place ($150 plus Certificate) awards for the Oral Presentation competition and a 1st place ($200 plus Certificate) for the Poster Presentation competition.

In addition, the 9R2O Conference co-hosted with six other conferences a Student Reception on the evening of January 7th within the Phoenix Convention Center. The main event of the reception was a Speed Networking session giving over 130 students and early career professionals an opportunity to network and discuss the experiences of ~40 professionals serving as mentors. A kick-off to the Speed Networking and an introduction with some of her own student and early career professional experiences was given by the AMS President-Elect, Mary Glackin.