

The Institute of Electrical and Electronics Engineers (IEEE) Geoscience and Remote Sensing Society (GRSS) hosted the International Geoscience and Remote Sensing Symposium (IGARSS) 2015 from Sunday July 26<sup>th</sup> through Friday July 31<sup>th</sup>, 2015 at the Milano Congressi Convention Center in Milan, Italy. The theme for the conference was “Remote Sensing: Understanding the Earth for a Safer World.” Consequently, the role of remote sensing for assessing, monitoring, and managing risks related to natural disasters was explored during the oral, poster, and technical sessions. Overall, more than 1900 poster and oral reports were presented using the following primary areas: data analysis methods; atmospheric; cryosphere; oceans; land; missions, sensors and calibration, data management and education.

Among the thousands of students and professional attendees were a combination of student-researchers and mentors from the Undergraduate Research Experience (URE) in Ocean, Marine, and Polar Science (OMPS) 2014 who presented their research. They include Raveen McKinzie (Mississippi Valley State University), Ryan Lawrence (University of New Hampshire) and Andrew Brumfield (Elizabeth City State University). Furthermore, Dr. L. Hayden (IEEE-GRSS Administrative Committee and Director of the Center of Excellence in Remote Sensing Education and Research), Dr. A. Lawrence (Professor of Computer Science – Spelman College), and Mr. Luther (Past President of IEEE-GRSS) attended the conference and served in the capacity of session chairs.

On Monday, July 27<sup>th</sup>, the opening plenary session featured oral presentations by several speakers, such as Dr. Volker Liebig (Director of Earth Observation Programmes, European Space Agency) and Dr. Dave Thau (Senior Developer Advocate, Google). Dr. Liebig talk was titled “Earth Observations Today – Meet The Challenges of the 21<sup>st</sup> Century.” Although climate change is a challenge of the 21<sup>st</sup> Century, Dr. Liebig highlighted population growth a huge problem. Over the next 30 years (i.e. by 2050), the population is estimated to increase by 2 billion people, resulting in 9 billion people on Earth. To accommodate the population growth, food production will have to double, which will be a major feat. Although, having the space to grow food is a concern (may be addressed by vertical farming), the biggest challenge is water. Water is becoming very scarce. If there is any future indication of water scarcity, look at California.

As noted by Dr. Thau, California is very risky place to live. There are earthquakes, fires, risk from sea level rise, as well as the increased spread of Malaria (a mosquito-borne infectious disease that affects humans and animals). Due to humans living in risk adverse areas, it is important for us to utilize remote sensing, in particular satellite imagery. A specific satellite program Dr. Thau mentioned was Landsat, which has been around for over 40 years. When Landsat imagery was not free to download, a maximum of 25,000 images were downloaded in 2001. In January 2009, all Landsat data became available for free download, resulting in a 60 fold increase of downloads (i.e. a maximum of 2.5 million downloads in 2010 and over 25 million downloads in 2014). With public access to millions of images (several hundred terapixels) from the Landsat program, humans are able to look at a vast number of datasets, which examine terrestrial and atmospheric biomes. Having this capability is very important to the future of Earth and the advancement of our society.

Furthermore, the significance of “Earth observation” from satellites was discussed in the plenary

session and several “big data” sessions. As noted by one of the speakers, “Earth Observation is a new kind of economy — one that can not be computed in terms of direct payment for services (i.e. selling data), but instead of reduction so damages induced by emergencies, pollution, illegal operations, etc.” Overall, weather forecasts have been improved by 5-10%, leading to a increase in profit by 250 – 800 billion USD.” As expressed by the speaker, “People do not understand the value of not having people to avoid evacuations. For example, “people in Florida, USA did not evacuate during Hurricane Sandy, but we knew with 36 hours of landfall in NJ/NY the intensity of the storm.” Dr. Pier Sellers (NASA), “Without satellites we cannot see what is happening around the world. Without models we cannot see into the future.”

A challenge with big data and models is the lack of uniformity between processing, schemas, etc. Similar to the recent standardization of Italian and the push to standardize Chinese, there is a need to make “metadata, processing, schemas, naming conventions, etc. uniform.” Currently, there are many different metadata used for various satellites (such as LIDAR, MODIS, etc.) and therefore model predictions, even if from the same model, are inherently different. This lack of consistency poses a serious challenge for the global community. Therefore, much work is being done to ensure the scientific community is utilizing a common system, which maybe collectively improved upon.

During the conference, the Minority Travel Program (MTP) meeting was held. “The MTP was established by the GRSS Society in 1997 for the purpose of increasing the number of Minority students involved in the activities of the Society, with the ultimate goal of improving Minority membership in the Society.” In attendance were Ryan Lawrence, Andrew Brumfield, Raveen McKinzie, Dr. Hayden, Dr. Lawrence, Mr. Luther, and Mr. Eric Baptiste (Enterprise Electronics Corporation). Mr. Luther conducted the meeting and asked the cohort several questions about our career goals, discussed the importance of attending/participating in conferences, and focused our attention on steps to successfully accomplish our goals over the next 5 years. In addition to the roundtable discussion, Mr. Eric Baptiste encouraged the group to “start with the end in mind” and always remember to work on having a balanced life. He stated that every action we take should be geared towards accomplishing our end goal and not merely a next step. After the meeting, there was a renewed focus on making strategic steps and taking the necessary actions to be the best one may possibly be.

At the end of the week, the MTP group traveled to the Swiss Alps on the Glacier Express. The 8-hour daytrip featured impressive mountain glacier scenery, background information on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Region, and the opportunity to explore St. Moritz. During the journey, the train reached a maximum height of 2,033m (6,699ft), which allowed us to peak over the Oberalp pass in Switzerland.

IGARSS 2015 in Milan, Italy was both an exciting and eye-opening experience - from the numerous presentations to the MTP meeting to viewing the Swiss Alps. Hopefully, IGARSS 2016 in Beijing, China will provide many more students and young professionals, especially minorities, with the opportunity to present, learn about cutting edge research, and advance the field of geoscience and remote sensing.