# SAS SPECTRUM eNEWS



## New York Section, Society for Applied Spectroscopy Announcement

The next New York/New Jersey SAS dinner meeting is scheduled for Thursday, May 3rd at 5:30pm-8pm. Light dinner will be served. Cost: $10.00/person. RSVP by Wednesday, May 2nd by email to debperu@outlook.com. All Students are welcome to attend at no cost.

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| Location: | Rutgers University, Electrical and Computer Engineering (ECE) building<br>94 Brett Rd, Piscataway, NJ 08854, Room 240 |
| Guest Speaker: | Dr. Laleh Najafizadeh, Department of ECE, Rutgers University |
| Topic: | Functional Near Infrared (fNIRS) and Electroencephalography (EEG)<br>for measurement of cortical (brain) activity. |

## A Spectroscopist Dispossessed by Hurricane Maria: Vladimir Villanueva-Lopez

During this six-month anniversary of the landfall of Hurricane Maria, we continue to hear about the infrastructure challenges of rebuilding Puerto Rico. Teaching is continuing, but access to instrumentation in teaching labs is restricted. Research laboratories are also affected by power availability, supplies, and functioning instrumentation. A recent story in Spectroscopy (http://www.spectroscopyonline.com/puerto-rico-after-hurricane-maria-effect-science-students) highlighted the impact of these interruptions on undergraduates in San Juan, the largest city on the island. We follow up on this with an interview with Vladimir Villanueva-Lopez, a doctoral candidate at the University of Puerto Rico–Mayaguez.

Vladimir is a graduate student in the Chemistry Department in Mayaguez. His career goal is to apply spectroscopy to process control in the pharmaceutical industry. He has already had co-op experiences in the industry. His work was interrupted by Hurricanes Irma and Maria and the aftermath. He is now being sponsored by Spectroscopists Helping Spectroscopists at Northeastern University in Professor Matteo Rinaldi's lab.

**1. Can you tell us about yourself and your connection to spectroscopy?**

I graduated with my Master's degree in Chemical Engineering at the University of Puerto Rico. After that, I decided that I wanted to learn more about spectroscopy because of the broad applicability of this science and because it opens doors to understand the molecular world and its influence on macroscopic properties. I found out that Professor Samuel Hernandez-Rivera at the chemistry department at University of Puerto at Mayaguez is an expert in molecular spectroscopy, supported by more than a hundred publications related to Raman spectroscopy, mid-IR spectroscopy, chemometrics, and his contributions to the teaching of chemistry.

I contacted him and he also gave me a tour of his facilities. He explained in general his current projects. I realized that by pursuing a doctoral degree in chemistry under his mentorship and working with his graduate students, I would be able to acquire the knowledge and skills related to all aspects of vibrational spectroscopy.

I am currently in my second year and I have developed a strong interest in studying polymorphisms of materials using Raman spectroscopy and I expect to learn more about spectroscopy from each year of the doctoral journey.

**2. What was your experience during the hurricane and how did it affect your personal life?**

I was worried before Hurricane Irma approached, but fortunately that hurricane only slightly affected where I live in Mayaguez. We were caught off guard by Hurricane Maria; we thought it would change its path.

I live in Mayaguez, Puerto Rico, which is located on the west side of the island. In comparison to what people experienced on the east side of Puerto Rico, we did not experience the whole fury of the hurricane. But, many people were affected nearby my apartment. The winds roared and the water squeezed through the door of our apartment. My sister and I decided to take turns collecting the water accumulated in our small living room and throw the water down the sink. We spent the whole night collecting water in the dark; sleepless and desiring the end of that nightmare.

After the hurricane, we only ate canned and dry food. We could not take enough cash from ATMs, but at least we had enough water and food for four more days. We were without signal from our mobile network and landline phone was limited. We were anxious to tell our parents in Colombia that we were safe.

A group of friends of mine invited us to go to their house. There was a gathering of graduate students at that house, bringing perishable food, and they were cooking for everyone. A couple of days after that, the government of Puerto Rico provided food for students at the local coliseum designated as a shelter.

Our resources were decreasing, and we were worried about the situation. Without electric power and with the uncertainty of knowing when the university was planning to restart the classes, a group of Colombian graduate students from our university decided to talk to local government officers for help to connect with the Colombian Ministry of Foreign Affairs to rescue us.

Families of the Colombian students united to contact the Colombian government and the press to ask for rescue. I longed to be with my family because I had not seen them in almost three years, but at the same time we felt sad for our friends on the island. We stayed in Colombia for one month and then we went back to Puerto Rico.

**3. What was the effect on your laboratory and research?**

Due to the lack of electricity, the dehumidifiers in our laboratory were not working and therefore the humidity increased significantly. This led to fungi growing everywhere in our laboratory and damaged the equipment that is sensitive to high humidity. I could not access the equipment I needed to continue my research because of the cleaning process took additional time. We lost approximately three months of work. I felt frustrated, stressed, and unmotivated.

I was worried about my future at the chemistry department, and I also contemplate the idea of taking the next semester off to think about what I should do next because the conditions of our laboratory were not appropriate to continuing doing researcher.

It is sad to see that Professor Hernandez has being doing research for more than thirty years and this inopportune event basically slowed down our momentum, and drastically affected our laboratory facilities. Nonetheless, we needed to be strong to continue with our projects for the benefit of the undergraduate and graduates students. I believe it is a privilege to work with Professor Hernandez and my laboratory partners at University of Puerto Rico Mayaguez. We are trying to move forward with what we have in our laboratory but I think It would be great to receive some help to rebuild and repair what was destroyed.

**4. You came to Northeastern to continue your research. How did that come about?**

Professor Samuel P. Hernandez-Rivera contacted Professor Matteo Rinaldi at Northeastern University. They both are members of the ALERT Program (Awareness and Localization of Explosives-Related Threats) which is a multi-university Department of Homeland Security Center of Excellence (COE). Professor Hernandez requested that professor Rinaldi host me as a visiting researcher for three months. Professor Rinaldi's Research group is focused on hybrid piezoelectric MEMS/NEMS for advanced sensing and wireless communications. I am currently working on a project that is a joint effort for both research groups. We are trying to use MEMS as thermal sensors for spectroscopy applications related to standoff detection.

I was awarded a grant by SHS with housing and travel expenses to come to Boston and continue my research at Northeastern University, and I am so thankful for that.

**5. What are your thoughts about working and living in Boston?**

I love living in Boston, it is a city full of modern architecture and provided the perfect environment for intellectual growth. There are several well-known museums and open to community seminars from top universities such as Northeastern University, Massachusetts Institute of Technology, Harvard, Boston University, Tufts University, and I could continue counting. I adapted well to the weather conditions and the lifestyle in Boston.

Ellen Miseo from SHS and her husband offered kindly to host me at their house in Needham, Massachusetts, during my stay at Northeastern University. They made me feel at home and from each conversation after dinner with them I have learned about spectroscopic instruments, infrared detectors, and American culture.

I also met Frederick Haibach at one of the NESAS Meetings, and he gave me some insights about a small project I am planning to continue when I finally go back to Puerto Rico. I had also the opportunity to met Fred Perry at Boston Electronics to receive some recommendations about how to use a MCT detector professor Hernandez bought from them and I am planning to use. It is valuable for a young scientist being surrounded by a community of people that have been working in the spectroscopy area for several years because from each discussion it is possible to learn and grow as a spectroscopist.

**6. Are there other stories about research in Puerto Rico that we should know about?**

My sister is a master's degree student in Chemical Engineering at University of Puerto Rico–Mayaguez, and her research is related to the development of polymeric membranes for desalination. Due to the lack of electricity on our campus, humidity levels in the room where she stored her samples rose and all her samples were destroyed. Some of the instruments in her laboratory also were damaged by the sudden increase of the voltage in the electric network. She is trying to finish her experiments but the challenges are great. She is doing her best to complete her experiments soon to finally obtain her degree. She cannot stay longer because teaching assistantships are limited and she will not be supported.

She and her laboratory partners are struggling sharing one fume hood dedicated to teach chemistry that is temporarily on loan to them to continue their experiments; however, the humidity of the rooms change drastically with the change of the weather conditions affecting her experimental results.

A few of my colleagues that work in bioengineering projects have to make experiments growing cells and the process requires several weeks under a controlled environment, but due to the unstable conditions of the electrical power grid, their advisors decided to send them temporarily to universities on the mainland to continue with their research to avoid setbacks.

My friends are scattered across the mainland in unfamiliar areas, trying to complete the research they started. In moments like this, I try to remember that Aristotle said, "[t]he roots of education are bitter, but the fruit is sweet." We are determined to pursue our dreams and work hard to archive our academic goals.

**Do you have something spectroscopy-related you want to discuss in the newsletter?**
**Or something that will help our membership such as career tips or application tips?**
**Please let us know by emailing xchen4@dow.com.**

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