



Kaia Williams and Yang Deng in a lab at the International Institute of Photonics and Optoinformatics (ITMO University) in St. Petersburg, Russia, while recently attending the Summer School on Photonics there.

Optics students gain research experience in Russia

Sze Wah Lee '18 of Optics says it was “on my bucket list to visit Russia one day.”

Now she’s not only checked Russia off her bucket list, but also picked up some valuable research experience.

Lee is one of six Institute of Optics undergraduates who attended the Summer School on Photonics at St. Petersburg’s National Research University of Information Technologies, Mechanics and Optics (ITMO) from May 28 to June 15. It is an example of the joint educational programs ITMO and the University of Rochester are pursuing as a result of a partnership agreement they signed last year.

Having just finished her freshman year, Lee said she “dived into this project with no prior research experience and limited optics related knowledge” after reading about the opportunity on the Institute’s Facebook page. “With the help and patience from the staff and students at ITMO’s International Institute of Photonics and Optoinformatics, I learned the behavior of graphene under optical excitation by comparing a bare substrate with graphene on a substrate of thin films. I also learned equipment handling and the schematics of the Time Domain Spectrometer -- all in the brief two weeks’ span of this program.”

Rising sophomores Yang Deng, Kaia Williams and Lei Ding and rising seniors Tyler Berryman and Guntis Rutins also participated. This trip was partly supported

by The Institute of Optics, the Hajim School of Engineering and Applied Sciences, and ITMO University. Dan Smith, the undergraduate program manager at The Institute of Optics organized this trip from the University of Rochester side. Prof. X. C. Zhang, Director of The Institute of Optics, met the students in St. Petersburg before they entered the lab to start their research projects.

Svetlana Lukishova, a Senior Scientist at The Institute of Optics who joined the students in St. Petersburg, said they carried out research in such fields as generation and analysis of terahertz radiation in femtosecond laser-induced plasma and in graphene, diffraction of a terahertz radiation on a dielectric cuboid with producing a terajet, and sub-carrier-wave quantum cryptography with different single-photon detectors for telecom wavelengths.

Williams, for example, studied the generation and detection of terahertz waves using a femtosecond laser. Like Lee, the rising sophomore hadn't had all that much experience in a lab setting "so being able to work in a lab and do research was a great experience," he said.

At the end of the school each student delivered a 15-minute power point presentation about their research and submitted 5-page reports.



Guntis Rutins and Lei Ding answer questions after their talk on quantum cryptography at the final session of the ITMO Summer School.

Lukishova praised the dedication and enthusiasm of ITMO faculty and staff who conducted the school. "They even worked with our students during three days of a Russian official holiday," she said.

In addition to their research, students also had lessons on Russian language, history and current events; attended scientific lectures; toured the city; visited the Peterhof (Peter the Great's "Russian Versailles"), the Hermitage museum of fine art and culture, and the Russian Museum (the museum of Russian fine art); and attended a ballet in Mariinsky Theatre.

"Talking with the students and faculty at ITMO was very interesting," Williams said. "They were very accommodating, and took us out to see sights in St. Petersburg. We compared experiences and learned about each other's cultures. The language barrier wasn't so bad; most people were willing to help us with our broken Russian if they didn't already speak English, and we were able to get by pretty well."

Lee said her most memorable experience was going on a midnight boat tour to watch the raising and lowering of bridges to let ships pass in and out of the Baltic Sea into the Volga-Baltic waterway system.

"The sun had just set, the clouds were turning from creamy orange to misty blue," Lee wrote. "Lights accented the exterior of historical buildings along the waterway, creating shadows that gave them a mysterious and sly character. The slow movement of the lights on the fences of the bridge signaled the beginning of the opening. Some stood up to snapshot this wondrous moment while others lay back to absorb this romantic view. That night was the first time I felt so overwhelmed with beauty – the beauty of Saint Petersburg."



Tyler Berryman, second from left, and Sze Wah Lee, second from right, with two Russian students they met in St. Petersburg.