LLE's Summer High School Research Program

During the summer of 2017, 11 students from Rochester-area high schools participated in the Laboratory for Laser Energetics' Summer High School Research Program. The goal of this program is to excite a group of high school students about careers in the areas of science and technology by exposing them to research in a state-of-the-art environment. Too often, students are exposed to "research" only through classroom laboratories, which have prescribed procedures and predictable results. In LLE's summer program, the students experience many of the trials, tribulations, and rewards of scientific research. By participating in research in a real environment, the students often become more excited about careers in science and technology. In addition, LLE gains from the contributions of the many highly talented students who are attracted to the program.

The students spent most of their time working on their individual research projects with members of LLE's technical staff. The projects were related to current research activities at LLE and covered a broad range of areas of interest including laser physics, computational modeling of implosion physics, experimental diagnostic development, laser system diagnostics, physical chemistry, cryogenic target characterization, and web-based data analysis (see Table 152.III).

Table 152.III: High School Students and Projects—Summer 2017.

Name	High School	Supervisor	Project Title
Viknesh Baskar	Webster Schroeder	J. P. Knauer and C. J. Forrest	Ion Temperature Analysis of Neutron Time-of-Flight Data
Nikhil Bose	Pittsford Sutherland	M. J. Guardalben	Compensation for Self-Focusing on OMEGA EP by Use of Frequency Conversion
Benjamin Chaback	Byron Bergen	J. P. Knauer and C. J. Forrest	Modeling and Analysis of Cherenkov Radiation Detectors
Meshach Cornelius	Gates Chili	T. Walker and G. Brent	Characterization and Detection of the Deterioration of Electrical Connectors in a Flash-Lamp System
Griffin Cross	Pittsford Sutherland	W. T. Shmayda	Studying the Hydrogen-Palladium System at Low Temperatures
Matthew Galan	Fairport	R. W. Kidder	Data Services for Scientific Analysis on OMEGA and OMEGA EP
Claire Guo	Penfield	A. Bose and R. Epstein	Analysis of Asymmetries of the Hot Spot Using Synthetic X-Ray Images
Joyce Luo	Pittsford Mendon	K. L. Marshall	Ambient-Temperature Ammonia Removal Process for Sol-Gel Coating Solutions
Jonathan Moore	Pittsford Sutherland	M. D. Wittman and A. Kalb	Predetermination of DT Fuel Mass in Cryogenic Target Capsules from Any Viewing Angle
Arian Nadjimzadah	Brighton	W. T. Shmayda	Modifying Stainless-Steel Surfaces by Electropolishing
Yujia Yang	Brighton	R. S. Craxton	Improving the Uniformity of *Revolver* Designs for the National Ignition Facility

The students attended weekly seminars on technical topics associated with LLE's research. Topics this year included laser physics, fusion, holography, nonlinear optics, atomic force microscopy, laser focusing, and pulsed power. The students also received safety training, learned how to give scientific presentations, and were introduced to LLE's resources, especially the computational facilities.

The program culminated on 30 August with the "High School Student Summer Research Symposium," at which the students presented the results of their research to an audience including parents, teachers, and LLE staff. The students' written reports will be made available on the LLE Website and bound into a permanent record of their work that can be cited in scientific publications.

Three hundred and sixty-four high school students have now participated in the program since it began in 1989. This year's students were selected from approximately 60 applicants.

At the symposium LLE presented its 21st annual William D. Ryan Inspirational Teacher Award to Mrs. Lois Houlihan, a chemistry teacher at Pittsford Mendon High School. This award is presented to a teacher who motivated one of the participants in LLE's Summer High School Research Program to study science, mathematics, or technology and includes a $1000 cash prize. Teachers are nominated by alumni of the summer program. Mrs. Houlihan was nominated by Sapna Ramesh, a participant in the 2016 program. Sapna wrote, "Mrs. Houlihan cares deeply about all her students and does everything she can to help them succeed… She goes above and beyond to encourage her students… Her teaching style is also very unique and practical. Whenever we went over a new topic in class, Mrs. Houlihan would start off by asking us about the practical uses of the concept, such as in medicine or industry. She makes a point of learning about each student's interests and background… Instead of teaching to the test, Mrs. Houlihan wants to spark an interest in science and technology in her students." Sapna acknowledged her personal debt to Mrs. Houlihan: "In terms of encouraging students, Mrs. Houlihan is the reason that I applied to the summer internship at the Laser Lab… I feel blessed to have had Mrs. Houlihan as a teacher, because she was the first teacher I really connected with. The thing with Mrs. Houlihan is that she has high expectations for each and every student she teaches, but also helps everyone individually to push their limits and reach her expectations." Sapna concluded by saying, "All in all, Mrs. Houlihan has inspired me and many of her other students to love chemistry and science in general. Not only that, but she has opened my eyes to the practical applications of chemistry in the world. I think the best thing about Mrs. Houlihan is that it is obvious that she enjoys teaching, but her greatest joy is seeing her students succeed in college and beyond." Ms. Houlihan also received strong support from Mr. Karl Thielking, Principal of Pittsford Mendon High School, who described her as a caring and dedicated teacher with a passion for chemistry.