
LLE's Summer High School Research Program

During the summer of 2013, 15 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, spectroscopy, cryogenic deuterium properties, liquid crystal devices, tritium detection and capture, ballistic deflection transistors, positioning systems, and 3-D virtual modeling (see Table 136.IV).

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, electronic paper, and scientific ethics. 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 28 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 twelve high school students have now participated in the program since it began in 1989. This year's students were selected from nearly 80 applicants.

At the symposium LLE presented its 17th annual William D. Ryan Inspirational Teacher Award. The recipient this year was Mrs. Eugenie Foster, a mathematics teacher from Brighton 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. Foster was nominated by Mitch Perry, Julia Tucker, and Jack Valinsky, participants in the 2012 program. They wrote, "Not only is Mrs. Foster a smart and capable teacher, she also has a knack for making math fun and cares about her students ... She allows her students to develop an intuition for the material on their own and encourages them to further their exploration of math outside of the classroom." They credit Mrs. Foster with developing a discrete math course to showcase mathematical topics outside of the core curriculum for students who "have that extra thirst which only mathematics can quench." They also credit Mrs. Foster with developing an Intro to College Math course "to reach out to students who do not perceive themselves pursuing math-related fields in college or those to whom math does not come easily." They go on to say, "Her popularity among her students is due not only to her superb teaching and love of math, but also the personal connections she makes with her students... Past students still come into her classes years after they have graduated to say hello, showing her lasting impact on each and every one of her students." Mrs. Foster also received strong support from Dr. Thomas Hall, principal of Brighton High School, who described her as "a phenomenal teacher, dedicated and passionate, someone who makes herself available to students 24/7."

Table 136.IV: High School Students and Projects—Summer 2013.

Name	High School	Supervisor	Project Title
Aaron Appelle	Brighton	R. Sobolewski and Y. Akbas	Drift-to-Ballistic Electron Transport in Conducting Nanochannels for the Operation of Ballistic Deflection Transistors
Alexander Frenett	Allendale Columbia	F. J. Marshall	Integration of X-Ray Microscope Elements to a High-Speed Framing Camera Format
Sara Gnolek	Webster Thomas	W. T. Shmayda	Catalytic Oxidation of Hydrogen in Air Streams
Samuel Goodman	Pittsford Mendon	W. T. Shmayda	Detecting Hydrogen in Helium Streams
Michael Hartman	Pittsford Sutherland	R. Kidder	Creating a Virtual Research Environment Through Collaborative Networking
Eric Hwang	Penfield	R. Boni and W. R. Donaldson	The Development and Testing of a Signal Processing Algorithm to Improve OMEGA Beam Timing
Katherine James	Honeoye Falls-Lima	K. L. Marshall	Rewriteable Photoalignment of Liquid Crystals as a Route to High-Laser-Damage-Threshold Active Beam Shapers
John Jamieson	Allendale Columbia	M. J. Guardalben	Modeling the Effects of Deformable Mirror Location in the OMEGA EP Pulse Compression System
Yifan Kong	Webster Schroeder	R. S. Craxton	Beam-Pointing Optimization for Proton Backlighting on the National Ignition Facility
Nathaniel Rogalskyj	McQuaid	G. Brent and D. Lonobile	A Cryogenic and Radiation Tolerant Encoder
Benjamin Saltzman	Brighton	P. M. Nilson	Understanding K-Line Shifts in Rapidly Heated Matter
Adeeb Sheikh	Pittsford Sutherland	R. Epstein	Controlling Laser Beam Speckle with Optimized Illumination of Zooming Phase Plates
Logan Toops	Webster Thomas	R. Sobolewski and Y. Akbas	Modeling and Controlling Electron Movement in a Ballistic Deflection Transistor
Erin Wang	Brighton	D. R. Harding	Thermodynamics of the Solid-Liquid Phase Boundary of Deuterium
Cameron Ziegler	Canandaigua Academy	S.-W. Bahk	Alignment of an Offner Triplet Radial Group Delay Compensator