LLE's Summer High School Research Program

During the summer of 2012, 16 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 experimental concept development and diagnostics modeling, computational modeling of implosion physics, materials science, laser system development and diagnostics, isotope separation, and database development (see Table 132.IV).

The students attended weekly seminars on technical topics associated with LLE's research. Topics this year included laser physics, fusion, holography, nonlinear optics, shape memory polymers, 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 29 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.

Two hundred and ninety-seven high school students have now participated in the program since it began in 1989. This year's students were selected from over 60 applicants.

At the symposium LLE presented its 16th annual William D. Ryan Inspirational Teacher Award to Ms. Sage Miller, a mathematics and computer science teacher at Webster Schroeder and Webster Thomas High Schools. 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. Ms. Miller was nominated by Troy Thomas and Avery Gnolek, participants in the 2011 program, both of whom credit her for their decisions to major in computer science. Troy wrote, "I get most inspired by the way Ms. Miller teaches computer science…I had not realized how intricate and complex this subject was, and I now know that I will definitely study this in college…Ms. Miller is completely responsible for this decision as she showed me the true nature of computer science, and inspired me to pursue this more closely as a possible career option." Avery wrote, "As my math teacher Ms. Miller inspires many of her students and also displays a passion for teaching…She went out of her way to help students succeed, even when it used her own time…She would frequently meet after school with students to help them make up missed work or understand topics better…Her enthusiasm and attitude made class both informative and enjoyable…I believe that I would have never chosen such a career path had it not been for Ms. Miller's teaching and assistance." Ms. Miller also received strong support from Mr. Joe Pustulka, principal of Webster Schroeder High School, who described her as "a wonderful math and computer science teacher" who "is very devoted to her students, and is well respected and admired by her colleagues."

Table 132.IV: High School Students and Projects—Summer 2012.

Name	High School	Supervisor	Project Title
Emily Armstrong	Mercy	M. Barczys, B. E. Kruschwitz	Wavefront Measurements of High-Power UV Lasers with a Hartmann Sensor
Virginia Boy	East Rochester	R. W. Kidder	Integrating Semantic Technology with Legacy Databases
Christa Caggiano	Victor	K. L. Marshall, C. Dorrer	Fabrication of Radial Polarization Converters with Photo-aligned Liquid Crystals
Ian Gabalski	Webster Thomas	P. B. Radha	Polar-Drive Target Designs for Early Experiments on the National Ignition Facility
Mary Kate Hanchett	Fairport	W. T. Shmayda	Oxygen Uptake Using a Nickel Catalyst
Aaron Jo	Victor	W. T. Shmayda, N. Redden	Hydrogen Isotope Separation Using Gas Chromatography
Alec Kirkley	Pittsford Sutherland	G. Fiksel	Magnetic-Field Penetration into a Conducting Hohlraum
Evan Lustick	Canandaigua Academy	R. S. Craxton, M. D. Wittman	Modeling Density Change Inside a Cryogenic Target Using a Fabry–Perot Interferometer: A Feasibility Study
Aimee Owens	Home School	T. Z. Kosc, S. D. Jacobs	Performance Degradation of OMEGA Liquid Crystal Polarizers
Jesse Pan	Webster Thomas	S. X. Hu	Examination of Opacity Effects in Inertial Confinement Fusion Implosions
Mitchell Perry	Brighton	J. Qiao	Deformable-Grating Design Evaluation and Optimization for Large-Aperture Pulse-Compressor Systems
Raz Rivlis	Brighton	R. Boni	Optical Modeling and Analysis of a High-Throughput and High-Temporal-Bandwidth Spectrometer
Lucas Shadler	West Irondequoit	W. D. Bittle	Prediction of Getter Bed Regeneration Intervals Through Absolute Humidity and Flow Rate
Julia Tucker	Brighton	R. Epstein	The Dependence of Plasma Ionization Equilibrium on Electron and Radiation Temperatures
Jack Valinsky	Brighton	W. R. Donaldson, D. H. Froula	Electronic Analysis of Pulse Propagation Through an X-Ray Framing Camera
Charles Wan	Penfield	K. L. Marshall	Dynamic Mechanical Analysis of Cryogenic Target Materials