LLE's Summer High School Research Program

During the summer of 2011, 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 systems and diagnostic development, computational modeling of implosion physics, chemistry, materials science, laser system development and diagnostics, and database development (see Table 128.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, glass and glass fracture, and electronic paper. 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 24 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 eighty-one high school students have now participated in the program since it began in 1989. This year's students were selected from over 50 applicants.

At the symposium LLE presented its 15th annual William D. Ryan Inspirational Teacher Award to Mrs. Deborah Reynolds, a chemistry teacher at 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. Reynolds was nominated by Andrew Chun and Connie Jiang, participants in the 2010 program. Andrew described Mrs. Reynolds as "one of the few teachers who can take AP-level material and make it extremely easy for everyone in the class to understand…She makes learning fun and entertaining…She inspires her class through her kindness and unique ability to reach each of her individual students, in a special way that few teachers can, to want to learn more about science." For Connie, Mrs. Reynolds was "a truly inspirational teacher" who was "so outstanding because she was so thorough." Connie added, "She was kind, patient, organized and thorough, and taught me more about chemistry than I had ever thought to ask or know." Mrs. Reynolds was also enthusiastically recommended by Dr. Nancy Hackett, Brighton High School Principal, who attended the symposium. She said of Mrs. Reynolds, "She takes the students to the next level and she is passionate about chemistry. She always tries to improve herself professionally to keep her teaching at the cutting edge."

Table 128.IV: High School Students and Projects—Summer 2011.

Name	High School	Supervisor	Project Title
Brandon Avila	Allendale Columbia	R. W. Kidder	Optimizing LLE Information Operations Through Natural Language Processing
Andrew Boyce	McQuaid	W. T. Shmayda	Water-Stimulated Tritium Release from Metals
Matthew DeCross	Pittsford Sutherland	L. D. Lund	Automation of Vibration Measurement and Characterization of Cryogenic Deuterium–Tritium Target Motion
Avery Gnolek	Webster Thomas	K. L. Marshall	Photoaligned Liquid Crystal Wave Plate
Dana Gretton	Honeoye Falls Lima	R. G. Peck, E. Druszkiewicz	Design of a New Master-Timing Generator
Sean Hamlin	Fairport	R. Epstein	X-Ray Fluorescence as an Imploded-Shell Diagnostic
Felix Jin	Brighton	G. Fiksel	Characterization of Magnetic Coils for the Magneto-inertial Fusion Energy Delivery System
Jefferson Lee	Canandaigua Academy	W. T. Shmayda	Modeling Tritium Removal from Metal Surfaces
Kevin Mizes	Pittsford Sutherland	R. Boni, D. H. Froula, S. Ivancic	Two Techniques for Array Generation with Applications in Grid-Imaging Refractometry
Patricia Olson	Brighton	R. S. Craxton	Optimization of Beam Configurations for Shock-Ignition Experiments on the NIF and OMEGA
Sean Reid	Fairport	M. Burke, R. Boni, S. D. Jacobs	Surface Grinding and Polishing to Remove Etch-Induced Noise Pitting in CR-39 Samples
Madeline Rutan	Penfield	K. L. Marshall	Abrasion-Resistant Antireflection Sol-Gel Coatings
Michael Statt	School of the Arts	K. L. Marshall, C. Dorrer	Generation of Radially Polarized Beams Using Optically Patterned Liquid Crystals
Troy Thomas	Webster Thomas	B. E. Kruschwitz	Optical Time-Domain Reflectometry for the Transport Spatial Filter on the OMEGA Extended Performance Laser
Harrison Xiao	Pittsford Sutherland	P. A. Jaanimagi	Dynamic Defocusing in Streak Tubes
Andrew Zhao	Webster Thomas	R. Boni, D. H. Froula, S. Ivancic	Image Processing and Analysis of 4ω Grid-Image Refractometry Data