
LLE's Summer High School Research Program

During the summer of 2002, 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 optics modeling, analysis of OMEGA implosion experiments, hydrodynamics modeling, cryogenic target physics and characterization, liquid crystal chemistry, thin-film deposition, and the development and control of laser fusion diagnostics (see Table 92.IV).

The students attended weekly seminars on technical topics associated with LLE's research. Topics this year included lasers, fusion, holographic optics, hydrodynamic stability, laboratory astrophysics, computer-controlled optics manufacturing, and microcontrollers and their applications. 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 bound into a permanent record of their work that can be cited in scientific publications. These reports are available by contacting LLE.

One hundred forty-five high school students have now participated in the program since it began in 1989. This year's students were selected from approximately 50 applicants.

At the symposium, LLE presented its sixth annual William D. Ryan Inspirational Teacher Award to Mr. James Keefer, a physics and chemistry teacher at Brockport High School. This award includes a \$1000 cash prize. Alumni of the Summer High School Research Program were asked to nominate teachers who played a major role in sparking their interest in science, mathematics, and/or technology. Mr. Keefer was nominated by Priya Rajasethupathy, a participant in the 2000 Summer Program. Priya credits Mr. Keefer with preparing her well for college and writes of her former teacher: "What impresses me most about Mr. Keefer is his teaching style, his ability to communicate with his students and captivate their interest." Mr. Jeff Brown, principal of Brockport High School, also had many words of high praise for Mr. Keefer. He noted that Mr. Keefer "is an exceptional teacher recognized by our students, faculty, administration, and community." He also said that Mr. Keefer "has some unique qualifications" as he is certified in five areas of science (earth science, chemistry, biology, physics, and general science).

Table 92.IV: High School Students and Projects—Summer 2002.

Name	High School	Supervisor	Brief Project Title
Megan Alexander	Honeoye Falls–Lima	J. Zuegel/W. Seka	Picket Pulse Shaping with Phase and Amplitude Modulation in the Frequency Domain
Stefan Astheimer	Honeoye Falls–Lima	P. B. Radha	Estimation of Magnetic Fields in Direct-Drive Implosions
Christine Balonek	Byron–Bergen	K. Marshall	Optical Applications of Lyotropic Liquid Crystalline Polysaccharides
David Dingeldine	Churchville–Chili	J. Knauer	Plasma Energy Measurement with an Open-Cell Metal Foam
Sonya Dumanis	Harley School	V. Smalyuk	Structure of Shell Modulations Near Peak Compression of Spherical Implosions
Sid Ghosh	Pittsford–Mendon	P. Jaanimagi	Secondary Electrons from X-Ray Photocathodes
Kyle Gibney	Livonia	C. Stoeckl	Computer-Controlled Neutron Diagnostics
Sharon Jin	Victor	S. Craxton	A Ray-Tracing Model for Cryogenic Target Uniformity Characterization
Jue Liao	Brighton	R. Epstein	Rayleigh–Taylor Growth Rates for Arbitrary Density Profiles Calculated with a Variational Method
Christopher Moody	Spencerport	D. Harding	Characterization of the Absorption Spectrum of Deuterium for Infrared Wavelengths
Phoebe Rounds	Irondequoit	S. Craxton	Multiple-Tripler Broad-Bandwidth Frequency Conversion
Micah Sanders	Pittsford–Mendon	N. Bassett	Thin Film Characterization of Al_2O_3 Utilizing Reactive Pulsed dc Magnetron Sputtering
Gurshawn Singh	Rush–Henrietta	J. Marozas	2-D Pulsed Laser Beam Modeling Using PROP
Archana Venkataraman	Brighton	F. Marshall	Characterization of Multilayer Diffractors for Framed Monochromatic Imaging
Joy Yuan	Pittsford–Mendon	M. Guardalben	Noncollinear Phase Matching in Optical Parametric Chirped-Pulse Amplification