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## LLE's Summer High School Research Program

During the summer of 2014, 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 laser physics, computational modeling of implosion physics, radiation physics, experimental diagnostic development, cryogenic targets, theoretical and experimental chemistry, tritium capture, electronics, image display, and 3-D virtual modeling (see Table 140.II).

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 attosecond science. 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 27 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 twenty-eight high school students have now participated in the program since it began in 1989. This year's students were selected from nearly 70 applicants.

At the symposium LLE presented its 18th annual William D. Ryan Inspirational Teacher Award to Dr. Jeffrey Lawlis, Chair of the Science Department at Allendale Columbia 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. Dr. Lawlis was nominated by Alex Frenett, a participant in the 2013 program. Describing his physics class, Alex wrote, "Dr. Lawlis began the year challenging the students, not spoon-feeding them information. He not only taught them to derive the necessary equations (instead of having us memorize them), but also used his background in science to make the class entertaining, as he constructed many of the lab setups himself." He proceeded to say, "Dr. Lawlis' dedication to students is rare to find. Throughout the year, you could find his students in his classroom, working one-on-one with him for help...His class, his help, and his distinctive puns somehow inspired intelligent thinking." He concluded, "This combination of intellect, support, and talent exemplifies how this man has devoted himself to his school, his community, and, most of all, his students in a way that only the best teachers ever do." Dr. Lawlis also received strong support from Mr. Michael Gee, principal of Allendale Columbia High School, who described him as "a knowledgeable person who has raised the bar of the Science Department."

Table II: High School Student and Projects—Summer 2014.

Name	High School	Supervisor	Project Title
Ryan Dens	Allendale Columbia	D. W. Jacobs-Perkins	Display of Scientific Image Sources with Mobile Devices
Pranav Devarakonda	Brighton	R. Epstein	The Use of Rosseland- and Planck-Averaged Opacities in Multigroup Radiation Diffusion
William Franceschi	Victor	B. E. Kruschwitz and A. Kalb	Optimization of Wavefront Control Using a High-Resolution Wavefront Sensor
Emma Garcia	Penfield	R. S. Craxton	Optimization of Uniformity for Current Polar-Drive Implosion Experiments on the National Ignition Facility
Jack Gumina	Harley	K. L. Marshall	Next-Generation Polymers for High-Power UV Optics
Krishna Patel	Webster Schroeder	W. T. Shmayda	Capturing Hydrogen on a Chilled Molecular Sieve
Sophia Rogalskyj	Mercy	W. T. Shmayda	Isotopic Exchange on a Platinum-Coated Molecular Sieve
Liam Smith	Webster Schroeder	R. W. Kidder	Evaluation of a Collaborative Networking Environment for Experimental Configurations
Jeremy Weed	Victor	D. Hassett, R. Peck, and D. Axman	Creating an Open Source LLE-Based Ethernet to LonTalk Adapter
Felix Weilacher	Penfield	P. B. Radha	Optimizing Beam Profiles for Polar-Drive Implosions on the National Ignition Facility
Kyle Xiao	Webster Schroeder	K. L. Marshall	Computational Modeling of Azobenzenes for Optically Addressable Liquid Crystal Alignment
Nathan Xu	Pittsford Sutherland	S. X. Hu	Effects of Alpha-Particle Stopping-Power Models on Inertial Confinement Fusion Implosions
Christopher Ye	Webster Schroeder	J. A. Delettrez	Limits on the Level of Fast-Electron Preheat in Direct-Drive Ignition Designs
Robin Zhang	Webster Schroeder	C. Kingsley	Statistical Investigation of Cryogenic Target Defects
Roger Zhang	Webster Schroeder	R. S. Craxton	Polar-Driven X-Ray Backlighter Targets for the National Ignition Facility
Junhong (Sam) Zhou	Victor	C. Stoeckl	Analyzing the Sensitivity of a Hard X-Ray Detector Using Monte Carlo Methods