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## LLE's Summer High School Research Program

During the summer of 2016, 13 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, experimental modeling and data analysis, physical chemistry, optical design, tritium capture and storage, cryogenic target characterization, and scientific web page development (see Table 148.VIII).

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, optical instruments, and pulsed power. 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.

Three hundred and fifty-three high school students have now participated in the program since it began in 1989. This year's students were selected from approximately 60 applicants.

At the symposium LLE presented its 20th annual William D. Ryan Inspirational Teacher Award to Mrs. Shayne Watterson, a chemistry teacher at Penfield 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. Watterson was nominated by Emma Garcia and Felix Weilacher, participants in the 2014 program. Emma wrote, "Mrs. Watterson inspired me and the rest of her classes every single day, regardless of the difficulty of the topic... Mrs. Watterson's enthusiasm for her subject is unmistakable... Plenty of times she came up with creative and fun ways for us to learn new concepts. For example, she made up an electromagnetic wave dance to show how the electric wave and the magnetic wave combine and move together." She noted that Mrs. Watterson "is concerned with the success of each of her students as individuals" and concluded by saying, "Mrs. Watterson is probably the best teacher I have ever had, and has showed me both how much fun science can be and how I can pursue it as a career." Felix said of Mrs. Watterson, "There are those who choose to make lives out of leading and inspiring future generations, and for their efforts our communities are certainly and greatly enriched." He noted that Mrs. Watterson "spent huge amounts of time with individual students, be it after school or during free periods, helping them steadily through areas they did not understand." He described Mrs. Watterson as "a truly inspirational teacher, who can affect a student in wonderful ways, pushing the student into new experiences, guiding the student through new layers of learning, and unlocking that student's potential."

Table 148.VIII: High School Student and Projects—Summer 2016.

Name	High School	Supervisor	Project Title
Kyle Bensink	Victor	D. W. Jacobs-Perkins	Post-Shot Data Analysis Tools for Cryogenic Target Shots
Lindsay Browning	Penfield	R. S. Craxton	Development of a Standardized Saturn Ring for Proton Backlighter Targets at the National Ignition Facility
James Hu	Brighton	R. W. Kidder	Using Social Media Technologies for Online Scientific Analysis and Collaboration
Webster Kehoe	Wilson Magnet	R. S. Craxton	Beam-Pointing Optimizations for OMEGA Implosions
Grace Lenhard	Prattsburgh	W. T. Shmayda	Characterizing a Cu/Mn Alloy for Extracting Oxygen from Inert Gas Streams
Joseph Mastrandrea	Webster Thomas	W. T. Shmayda	Measuring Hydrogen Pressure over a Palladium Bed
Nathan Morse	Allendale Columbia	M. J. Guardalben	OMEGA Frequency-Conversion Crystal Designs for Improved Power Balance
Sapna Ramesh	Pittsford Mendon	K. L. Marshall	Characterization of the Electrical Properties of Contaminated Dielectric Oils for Pulsed-Power Research
Archana Sharma	Webster Schroeder	A. Kalb	Design and Optimization of a Portable Wavefront Measurement System for Short-Coherent-Length Laser Beams
Jonah Simpson	Brighton	C. Stoeckl	Validating the Fast-Ion Energy Loss Model in the Monte Carlo Simulation Toolkit Geant4 and Simulating Laser-Driven Nuclear Reaction Experiments on OMEGA EP
Matthew Wang	Pittsford Sutherland	C. Stoeckl	Impulse Response Calibration of a Neutron Temporal Diagnostic Using the Multi-Terawatt Laser
Leah Xiao	Webster Schroeder	R. S. Craxton	Simulations of Laser-Driven Magnetized-Liner Inertial Fusion
Joy Zhang	Penfield	R. T. Janezic	Development of a Digital Microscope for the Characterization of Defects in Cryogenic DT-Filled Targets