

2011 SUMMER RESEARCH PROGRAM FOR HIGH SCHOOL JUNIORS

AT THE

UNIVERSITY OF ROCHESTER'S

LABORATORY FOR LASER ENERGETICS

STUDENT RESEARCH REPORTS

PROGRAM COORDINATOR

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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 scientific 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. The students, their high schools, their LLE supervisors, and their project titles are listed in the table. Their written reports are collected in this volume.

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. Each student spoke for approximately ten minutes and answered questions. At the symposium the 15th annual William D. Ryan Inspirational Teacher Award was presented to Mrs. Deborah Reynolds, a chemistry teacher at Brighton High School. This award honors a teacher, nominated by alumni of the LLE program, who has inspired outstanding students in the areas of

science, mathematics, and technology. Mrs. Reynolds was nominated by Andrew Chun and Connie Jiang, participants in the 2010 Summer Program.

A total of 281 high school students have participated in the program since it began in 1989. The students this year were selected from over 50 applicants. Each applicant submitted an essay describing their interests in science and technology, a copy of their transcript, and a letter of recommendation from a science or math teacher.

In the past, several participants of this program have gone on to become semifinalists and finalists in the prestigious, nationwide Intel Science Talent Search. This tradition of success continued this year with the selection of Patricia Olson as one of the 300 semifinalists nationwide in this competition.

LLE plans to continue this program in future years. The program is strictly for students from Rochester-area high schools who have just completed their junior year. Application information is mailed to schools and placed on the LLE website in early February with an application deadline near the end of March. For more information about the program, please contact Dr. R. Stephen Craxton at LLE.

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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	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 and 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 and Design of Magnetic Coils for the Magneto-Inertial Fusion Electrical Discharge System (MIFEDS)
Jefferson Lee	Canandaigua Academy	W. T. Shmayda	Modeling Tritium Removal from Metal Surfaces
Kevin Mizes	Pittsford Sutherland	R. Boni, D. H. Froula, and S. Ivancic	Modeling and Testing Array Generation Techniques for Grid Image Refractometry on OMEGA EP*
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, and S. D. Jacobs	The Use of Surface Grinding and Polishing to Remove Etch Induced Noise Pitting in CR-39 Samples
Madeline Rutan	Penfield	K. L. Marshall	Abrasion Resistant Anti-Reflective Sol-Gel Coatings
Michael Statt	School of the Arts	C. Dorrer and K. L. Marshall	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, and S. Ivancic	Modeling and Testing Array Generation Techniques for Grid Image Refractometry on OMEGA EP*

*Joint report between Kevin Mizes and Andrew Zhao.