

2007 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 2007, 14 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 diagnostic development and analysis, computational modeling of implosion hydrodynamics and electron transport, database development, materials science, computational chemistry, and solid-state switch 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, holographic optics, fiber optics, liquid crystals, error analysis, and global warming. 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 29 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 it was announced that Mr. Christian Bieg, a physics teacher at Fairport High School, was the recipient of the 11th annual William D. Ryan Inspirational Teacher Award. 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. Mr. Bieg was nominated by Rui Wang, a participant in the 2006 Summer Program and a finalist in the 2007 Intel Science Talent Search.

A total of 218 high school students have participated in the program since it began in 1989. The students this year were selected from approximately 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 two students (Katherine Manfred and Alan She) as among 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. Applications are generally mailed out in early February with an application deadline near the end of March. Applications can also be obtained from the LLE website. For more information about the program, please contact Dr. R. Stephen Craxton at LLE.

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High School Students and Projects (Summer 2007)			
Name	High School	Supervisor	Project Title
Joshua Bell	Churchville-Chili	W. R. Donaldson	Development of a GaAs Photoconductive Switch for the Magneto-Inertial Fusion Electrical Discharge System
Margaret Connolly	Mercy	T. C. Sangster, M. McCluskey, S. Roberts	Response of CR-39 to Heat Exposure
Juraj Culak	Brighton	P. B. Radha	Neutron Imaging of Inertial Confinement Fusion Implosions
Daniel Fleischer	Brighton	R. Boni, P. A. Jaanimagi	ROSS Performance Optimization
Jean Gan	Pittsford Sutherland	K. L. Marshall	Patterned Photoresist Spacers and Photo-Induced Alignment Coatings for Liquid Crystal Waveplates and Polarizers
Roy Hanna	Williamsville	J. A. Delettrez	Extension of the Modeling of Collisional Blooming and Straggling of the Electron Beam in the Fast Ignition Scenario
Katherine Manfred	Fairport	R. S. Craxton	Polar Direct-Drive Simulations for a Laser-Driven HYLIFE-II Fusion Reactor
Richard Marron	Allendale Columbia	R. Kidder	Development of an Ontology for the OMEGA EP Laser System
Alan She	Pittsford Mendon	R. S. Craxton	Thermal Conductivity of Cryogenic Deuterium
Benjamin Smith	Webster Schroeder	L. M. Elasky	Expansion of Search Capabilities for the Target Fabrication Database
Alexander Tait	Allendale Columbia	W. A. Bittle	Data Analysis for Electro-Magnetic Pulse (EMP) Measurements
Ernest Wang	Pittsford Mendon	K. L. Marshall	Computational Modeling of Spectral Properties of Azobenzene Derivatives
Eric Welch	Livonia	J. P. Knauer	Design of an X-Ray Photoconductive Device Spectrometer
Andrew Yang	Fairport	R. Epstein	Unfolding X-Ray Spectra from a Multichannel Spectrometer