

**2001 SUMMER RESEARCH PROGRAM FOR HIGH SCHOOL JUNIORS**

**AT THE**

**UNIVERSITY OF ROCHESTER'S**

**LABORATORY FOR LASER ENERGETICS**

**STUDENT RESEARCH REPORTS**

**PROGRAM COORDINATOR**

**Dr. R. Stephen Craxton**

**LABORATORY FOR LASER ENERGETICS**

University of Rochester

250 East River Road

Rochester, NY 14623-1299

During the summer of 2001, 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 scientific staff. The projects were related to current research activities at LLE and covered a broad range of areas of interest including optics modeling, laser characterization, cryogenic materials properties, liquid crystal chemistry, laser damage, electro-optic sampling, and the development, modeling, and control of laser fusion diagnostics. 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 lasers, fusion, holography, the OMEGA Cryogenic Target System, laboratory astrophysics, experimental error analysis, and scientific ethics. 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 the William D. Ryan Inspirational Teacher award was presented to Mr. David Dussault, a mathematics and computer science teacher at Livonia High School. This annual award honors a teacher, nominated by alumni of the LLE program, who has inspired outstanding students in the areas of science, mathematics, and technology.

A total of 130 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.

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. For more information about the program or an application form, please contact Dr. R. Stephen Craxton at LLE.

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### High School Students and Their Projects (2001)

Student	High School	Supervisor	Project
David Bowen	Greece Arcadia	C. Stoeckl	Controlling Scientific Instruments with JAVA
Matthew Fiedler	Brighton	W. Donaldson	Modeling Streak Camera Sweep Speeds
Melisa Gao	Brighton	J. Marozas	Two-Dimensional Phase Unwrapping for the Design of Distributed Phase Plates
Brian Ha	Gates Chili	R. Sobolewski	Optical Characterization of GaAs with MSM Structures
Gabrielle Inglis	Honeoye Falls-Lima	R. Boni	Building and Characterizing 14-GHz InGaAs Fiber-Coupled Photodiodes
Jennifer Jung	Victor	K. Marshall	Guest-Host Dye Systems for Liquid Crystal Electro-Optical Device Applications
Joshua Keegan	Aquinas Institute	M. Guardalben	Numerical Modeling of Optical Parametric Chirped Pulse Amplification to Design a Petawatt Laser Front End
Kevin Monajati	Pittsford-Sutherland	K. Marshall	Computational Modeling of Physical Properties in Liquid Crystalline Polymer Systems
Christopher Piro	Honeoye Falls-Lima	R. S. Craxton	Modeling the LCPDI with Refraction and Diffraction
Abigail Rhode	Brockport	J. Taniguchi	Experimental Simulation of Damage in Spatial Filter Lenses
Uyen Tran	Wilson Magnet	S. Regan	Experimental Investigation of the Far Field on OMEGA with an Annular Apertured Near Field
James Wang	McQuaid Jesuit	D. Harding	Cryogenic Permeability of Polyimide Shells
Jeffrey Wilbur	Victor	J. Lambropoulos	Inclusion Models of Laser Damage