2021 SUMMER RESEARCH PROGRAM FOR HIGH SCHOOL JUNIORS

AT THE

UNIVERSITY OF ROCHESTER'S

LABORATORY FOR LASER ENERGETICS

STUDENT RESEARCH REPORTS

PROGRAM DIRECTOR

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During the summer of 2021, eight students from Rochester-area high schools participated in the Laboratory for Laser Energetics' Summer High School Research Program. This was the 32nd year of the program, which started in 1989. The 2020 program was unfortunately canceled because of the COVID-19 pandemic. In 2021, LLE held a fully virtual program for students who had applied and been interviewed for the 2020 program. The program started earlier than usual (in the middle of June rather than after July 4) and finished earlier (in the middle of August) to meet the schedules of the graduating seniors. The program comprised nine weeks rather than the usual eight. The goal of LLE's 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, computer modeling of implosion physics, experimental design, plasma-physics simulations, physical chemistry, future laser system design, and scientific data management. The students, their high schools, their LLE supervisors, and their project titles are listed in Table I. Their written reports are collected in this volume. By working through several iterations of their project reports, incorporating feedback from their supervisors and the Program Director, the students experience most of the steps involved in preparing a scientific paper for publication.

The students attended weekly seminars on technical topics associated with LLE's research. Topics this year included laser physics, fusion, nonlinear optics, nuclear physics, pulsed power, fiber optics, and LLE's cryogenic target program. The students also learned how to give scientific presentations, were given guidance on writing scientific reports, and were introduced to LLE's computational resources. The program culminated on 11 August with the virtual "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 15 minutes including two minutes for questions.

A total of 399 high school students have participated in the program from its inception through 2021. The students in 2021 were selected from nearly 70 applicants to the canceled 2020 program. Each applicant submitted an essay describing his or her interests in science and technology, a copy of his or her 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. Application information is mailed to schools and placed on the LLE web site in January with an application deadline near the middle of March. For more information about the program, please contact Dr. R. Stephen Craxton at LLE.

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Name	High School	Supervisor	Project Title
Semma Alfatlawi	Victor	C. J. Forrest	Inferring a Neutron Yield from Nuclear
			Activation Techniques
Felix Huang	Webster Schroeder	H. G.	Uniformity of X-Ray Prepulses for Imprint
		Rinderknecht	Mitigation in Directly Driven Implosions
Audrey Kohlman	Churchville-Chili	R. S. Craxton	Polar-Direct-Drive Designs for the Laser
			Megajoule
Meghan Marangola	Brighton	R. S. Craxton	Optimization of Direct-Drive Designs for a
			Proposed Dual Direct-/Indirect-Drive Laser
Tyler Petrillo	Webster Schroeder	R. S. Craxton	Development of a Polar-Direct-Drive Design for
			Large-Diameter Beryllium and Plastic Targets on
			the National Ignition Facility
Leo Sciortino	School of the Arts	R. W. Kidder	Data Services to Improve Access to Scientific
			Image Data
Aditya Srinivasan	Pittsford Sutherland	A. B. Sefkow	Exploration of Conduction and Stopping-Power
		and M. Lavell	Models for Hybrid Fluid-Kinetic Simulations
Andrew Wu	Pittsford Mendon	K. L. Marshall	Computational Modeling of the Polarizability of
			Liquid Crystals

Table I: High School Students and Projects—Virtual Program, Summer 2021.