

Appendix A: Executive Summary Tables

Table I: LLE-funded University of Rochester Frank Horton Fellowship Program supported 63 graduate students in FY21.

Student Name	Dept.	Faculty Advisor	LLE Advisor	Research Area	Notes
M. V. Ambat	ME	D. H. Froula		Dephasing laser wakefield accelerator	
A. Armstrong	PA	P. Tzeferacos		Relative, HED magnetized turbulence: Charting the uncharted plasma regimes of fluctuation dynamo	
V. Anand	PA	J. Carroll-Nellenback		The role of exoplanetary magnetic fields in atmospheric evolution and habitability	
J. Baltazar	ME	S. P. Regan	R. C. Shah	ICF implosion physics	
Z. Barfield	PA	D. H. Froula		Lateral transport with and without magnetic fields	
D. T. Bishel	PA	G. W. Collins	P. M. Nilson	Mapping the atomic physics of complex ions with detailed nonlocal thermodynamic equilibrium spectroscopy	
G. Bruhaug	ME	G. W. Collins	J. R. Rygg/ H. G. Rinderknecht/ M. S. Wei	Advanced x-ray particle sources for HED and ICF diagnostic applications	
S. Cao	ME	C. Ren		Large-scale fluid and kinetic simulation study of laser-plasma instabilities and hot-electron generation in shock ignition	
K. Churnetski	ME	S. P. Regan	W. Theobald	Three-dimensional analysis of the time-gated x-ray emission from the hot spot of DT cryogenic implosions in the polar-direct-drive configuration on OMEGA	New
A. Debrecht	PA	A. Frank		Radiation magnetohydrodynamics of exoplanet winds and evaporation	
R. Dent	CH	A. Shestopalov	S. G. Demos	Optimization of coating properties and processing steps in optical grating manufacturing for high-intensity laser applications	
R. Ejaz	ME	R. Betti		Understanding the physics of areal-density degradation in direct-drive OMEGA implosions through dedicated experiments and statistical modeling	New
M. Evans	PA	P.-A. Gourdain		The study of warm dense matter generated by pulsed-power generators	

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C. Fagan	CH	W. U. Schröder	W. T. Shmayda	The role of surface chemistry and microstructure on the retention of tritium in structural metals	Graduated in 2021
P. Farmakis	ME	R. Betti	R. Betti/ P. Tzeferacos	Three-dimensional reconstruction of the compressed core in OMEGA direct-drive implosions	New
P. Franke	PAS	D. H. Froula		Measuring the dynamics of electron plasma waves with Thomson scattering	
M. Ghosh	CH	P. Huo	S. Zhang	High pressure chemistry: How are diamonds formed from hydrocarbons?	
M. K. Ginnane	ME	G. W. Collins	J. R. Rygg	Characterization and melting of platinum at high pressures	
X. Gong	ME	G. W. Collins	J. R. Rygg	Structure and electronic properties of sodium and potassium at high pressure	
V. Gopaldaswamy	ME	R. Betti		Statistical analysis of OMEGA direct-drive cryogenic DT implosions	Graduated in 2021
S. Gupta	OPT	P. S. Carney	M. D. Wittman	Quantitative confocal phase imaging for the inspection of target capsules	
A. M. Hansen	PA	D. H. Froula		Electron plasma wave dynamics	Graduated in 2021
L. E. Hansen	PA	G. W. Collins	J. R. Rygg	Equation of state of planetary fluids	Graduated in 2021
B. J. Henderson	PA	G. W. Collins	J. R. Rygg	Broadband reflectivity of shock-compressed materials	
J. Hinz	PA	S. G. Rajeev	V. V. Karasiev	Developing accurate free-energy density functionals via machine learning for warm-dense-matter simulations	
R. Holcomb	OPT	J. Bromage		Machine-learning control of high-average-power lasers for ultrafast applications	
M. Huff	PA	G. W. Collins	J. R. Rygg	Sound-speed measurements on shocked material	
G. W. Jenkins	OPT	J. Bromage		Divided-pulse coherent combination for scaling high-power nonlinear processes	
M. Jeske	CH	M. Anthamatten	D. R. Harding	Direct laser writing of high-resolution shape memory networks for mechanical interlocking	
R. Jia	CH	A. Shestopalov	S. G. Demos	Effects of organic monolayer coatings on optical substrates	
A. Kish	PA	A. B. Sefkow		Development and implementation of energy-conserving particle pushing algorithms for hybrid fluid-kinetic simulations	
M. Lavell	ME	A. B. Sefkow		Hybrid fluid-kinetic models for plasma simulations	

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L. S. Leal	PA	R. Betti	A. V. Maximov	Simulations and studies of ICF relevant laser-generated plasma in external magnetic fields	
A. Lees	PA	H. Aluie	R. Betti	Understanding the fusion yield dependencies in OMEGA implosions using statistical modeling	
O. M. Mannion	PA	S. P. Regan	C. J. Forrest	Measurements of the bulk fluid motion in direct-drive experiments	Graduated in 2021
M. McKie	PA	D. H. Froula		Wave breaking of electron plasma waves as it applies to hot-electron generation and laser-plasma amplifiers	
K. R. McMillen	PA	D. H. Froula	J. L. Shaw	Investigate the effects of the far-field laser profile on laser-wakefield acceleration	New
B. McLellan	PA	P. Tzeferacos	S. Zhang/ S. X. Hu	Theoretical study of structural transformation, transition pathways, and optical properties of crystals and amorphous solids under pressure	
A. L. Milder	PA	D. H. Froula		Measurement of electron distribution function using collective Thomson scattering	Graduated in 2021
S. C. Miller	ME	V. N. Goncharov	P. B. Radha	Hydrodynamic instabilities in ICF implosions	
K. Moczulski	ME	P. Tzeferacos		Characterization of magnetized turbulence and fluctuation dynamo through <i>FLASH</i> simulations and OMEGA experiments	New
Z. L. Mohamed	PA	D. H. Froula	J. P. Knauer	Gamma emission from fusion reactions	Graduated in 2021
K. L. Nguyen	PA	D. H. Froula	J. P. Palastro	Nonlinear saturation of cross-beam energy transfer	
K. Nichols	PA	S. X. Hu	S. X. Hu	<i>Ab initio</i> investigations into material properties under planetary mantle/core boundary and ICF conditions	New
S. F. Nwabunwanne	ECE	W. R. Donaldson	W. R. Donaldson	Design, fabrication, and characterization of AlGaIn-based ultrafast metal–semiconductor–metal photodiodes	
H. Pantell	PA	G. W. Collins	M. Zaghoo	Thermodynamic and mass transport properties of silicate at extreme conditions	
H. Pasan	PA	R. Dias	G. W. Collins	Novel hydrogen rich materials at HED conditions: Route to “hot” superconductivity	
D. Patel	ME	R. Betti		High and mid-mode number stability of OMEGA cryogenic implosions	
R. Paul	ME	S. X. Hu		High pressure phase diagram of ramp-compressed materials	

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Student Name	Dept.	Faculty Advisor	LLE Advisor	Research Area	Notes
D. Ramsey	PA	D. H. Froula	J. P. Palastro	Nonlinear Thomson scattering from spatiotemporally shaped laser pulses	
J. Ruby	CH	W. U. Schröder	W. T. Shmayda	Asymmetric permeation	New
J. J. Ruby	PA	G. W. Collins	J. R. Rygg	Understanding the thermodynamics of spherically imploding shocks	Graduated in 2021
A. Schwemlein	PA	W. U. Schröder	J. P. Knauer/ W. T. Shmayda	Thermonuclear fusion and breakup reaction between light nuclei	Graduated in 2021
T. T. Simpson	PA	D. H. Froula	J. P. Palastro	A flying focus driven by self-focusing	
E. Smith	PA	G. W. Collin/ J. R. Rygg		Understanding materials assembled to extreme states via laser-driven implosions using Bayesian inference	New
Z. K. Sprowal	PA	G. W. Collins		Off-Hugoniot studies in hydrogen and hydrocarbons	
G. Tabak	PA	G. W. Collins/ J. R. Rygg	M. Zaghoo	Experimental investigation of warm dense matter	
M. Vandusen-Gross	PA	D. H. Froula	H. G. Rinderknecht	Electron and gamma diagnostics for relativistically transparent magnetic filament experiments	New
M. Wang	CHE	D. R. Harding		Use of two-photon polymerization to “write” millimeter-size structures with micron resolution	
C. A. Williams	PA	J. R. Davies	R. Betti	High-fusion-yield target designs for direct-drive ICF on OMEGA and the NIF	
J. Young	PA	P.-A. Gourdain		Laser-triggered X pinches on MTW	
Y. Zhang	ME	J. R. Davies		Kinetic simulation study of magnetized collisionless shock formation and reformation	New
Y. Zou	PA	A. Frank		Common envelope evolution: HEDP studies of gravitational wave merger properties: The role of EOS and radiation transport	

ME: Mechanical Engineering; PA: Physics and Astronomy; CH: Chemistry; CHE: Chemical Engineering; OPT: Institute of Optics; ECE: Electrical and Computer Engineering

Table II: Fifteen students completed their Ph.D. theses in calendar year 2021.

Name	Ph.D. Institution	Current position employer
Zaarah L. Mohamed	University of Rochester	Postdoc, LANL
Varchas Gopalswamy	University of Rochester	Assistant Scientist, LLE
Linda E. Hansen	University of Rochester	Postdoc, SNL
Owen M. Mannion	University of Rochester	Postdoc, SNL
Aaron M. Hansen	University of Rochester	Postdoc, SNL
Avram L. Milder	University of Rochester	Postdoc, University of Alberta
Arnold Schwemmlin	University of Rochester	Postdoc, UR CMAP
Cody E. Fagan	University of Rochester	Lead Engineer, SHINE Medical Technologies
John J. Ruby	University of Rochester	Lawrence Fellow, LLNL
Yunus Akbas	University of Rochester	Seismic Imaging Analyst, CGG
Neel V. Kabadi	MIT	Assistant Scientist, UR-CMAP
Victorien Bouffetier	University of Bordeaux	Postdoc, Eu-XFEL
Abraham Chien	Princeton University	Private Industry
Heath LeFevre	University of Michigan	NSF Postdoc Fellow, University of Michigan
Brandon Lahmann	MIT	Postdoc, LLNL