James Bonadonna (Honeoye Falls-Lima) developed new liquid crystal mixtures for use in circular polarizers employed in the OMEGA laser system. In addition to meeting optical specifications for the existing devices, the new mixtures show significantly improved near-IR laser damage thresholds.

Christopher Bosso (Penfield) optimized the symmetry of a directly driven implosion capsule with multiple material layers for the National Ignition Facility (NIF). He obtained excellent symmetry with pre-designed laser spot shapes, originally designed for only one layer. His work has led to confidence in the versatility of the spot shape designs.

Gabriel Evans (McQuaid Jesuit) measured the vapor pressure of hydrogen gas over palladium as a function of the palladium temperature and hydrogen content. He found that the hydrogen pressure increases initially as the hydrogen goes into solution in the palladium and then remains essentially unchanged as hydrogen combines with palladium to form a palladium hydride.

Ryan Gao (Brighton) developed a set of tools to simulate the propagation of the OMEGA EP laser after reflection off a damaged optic. He used microscope images of actual damage on an OMEGA EP UV mirror as inputs to the simulation. His results were used to assess the damage threat to subsequent optics, as part of ongoing attempts to increase the UV performance on OMEGA EP.

Phoebe Huang (Webster Schroeder) performed hydrodynamic simulations of imploding targets being considered as a source of protons for backlighting experiments on the NIF. She investigated how the amount of unabsorbed laser light (which constitutes a potential threat to the laser optics) depends on the diameter of the target.

Jake Kinney (Pittsford Sutherland) performed similar simulations for imploding targets driven using just those NIF beams located close to the NIF symmetry axis, intended to produce x rays to backlight a primary target driven by other NIF beams. He showed that the implosion uniformity could be dramatically improved by the addition of a plastic “Saturn ring” around the equator of the target.

Nathan Knauf (Harley) developed a web-based interface for scientific data analysis that allows data to be viewed and interpreted in a multi-user online environment. Users of the OMEGA and OMEGA EP lasers can simultaneously view, interact, and compare experimental campaign data.

Peter Mizes (Pittsford Sutherland) worked on software to model the polarization state and energy balance of the OMEGA laser as a single beam goes through four stages to be split into 60 beams. He used the model to simulate specific laser conditions and verified that the model agreed with experimental observations.

Eileen Norris (Brighton) worked on the design of three- and four-lens image relay telescopes whose magnification and total distance are adjustable by changing inter-lens distances only. She arrived at an optimum design using a paraxial ray matrix formalism and ray tracing and experimentally demonstrated a three-lens system.

Alexander Proschel (Pittsford Sutherland) investigated isotopic exchange between elemental deuterium gas and hydrogen bound to water retained within molecular sieve. He found that the displacement of hydrogen by deuterium proceeds rapidly at room temperature until the entire hydrogen inventory contained in the molecular sieve is exhausted.

Ishir Seth (Brighton) investigated the response of chemical-vapor-deposition diamond detectors to neutrons. He analyzed how the detectors respond in time and the average energy deposited per detected neutron. His work represents a significant contribution to the design of the next-generation neutron time-of-flight detectors for OMEGA cryogenic implosions.

Xilin Zhou (Webster Schroeder) carried out Monte-Carlo simulations of relativistic electron motions at the focus of laser beams with extremely high intensities (beyond those that are currently available), including radiation reaction effects. She advocated using a “collision” between a super-intense laser pulse and a counter-propagating relativistic electron pulse to demonstrate these effects.