

University of Rochester
Summer 2017 undergraduate research in Physics, Optics, and Astronomy

Natalie Allen, class of '20 at the University of Rochester, analyzed outflow jets from stars to determine characteristics of star formation and match models with observed data with Prof. Dan Watson. She plans to apply to graduate school for astronomy.

Diarra Bell, class of '20 at the University of Rochester, analyzed the efficiency of infrared imaging of near-earth objects in the research group of Prof. Judy Pipher. She studied noise pixels and how to improve the quality of images.

Brian Carvajal, class of '19 at Penn State, worked with Prof. Segev BenZvi on improving the efficiency of silicon photomultipliers to detect high energy particles through the addition of wave-shifting optical fibers. He plans to apply to graduate school.

Greg Costello, class of '18 at Stonehill University, worked with Profs. Tom Brown and Miguel Alonso studying a process for obtaining the mutual intensity function of a source at low light levels. The mutual intensity function holds all the information about the spatial coherence properties of a source.

Jonathan Dietz, Class of '18 at the University of Rochester studied and designed 2D materials for use in quantum computing applications with the research group of Prof. Nicholas Vamimakas.

Michiko Feehan, class of '18 at University of Rochester, worked on the multidisciplinary effort to develop and experiment with biodegradable miniature skimmers and their locomotion in complex media with Prof. Alice Quillen.

Andrew Fisher, class of '18 at Xavier University, worked with Dr. Chunlei Guo's optics research group on 3 projects. First, deposition of polystyrene nanospheres into monolayers using ethanol dilution; second, summary and collection of literature relating to biomimetics; third, construction of laser beam profiler to measure beam intensity across cross-sectional area hitting a sensor.

Tanner Garcia, class of '18 at the University of Illinois, Urbana, worked with Prof. John Nichol setting up cryogenic equipment to be used in quantum dot experiments. He is building a digital-analog-converter four channel voltage source and potentially scaling that up to 24 channels.

Zachary Garrett, class of '18 at the University of Arizona, worked with the biomedical optics research group of Prof. Andrew J. Berger, implementing a quantitative phase imaging system into an existing integrated Raman and angular scattering microscope system to extract both chemical and size distribution information of intracellular structures, such as organelles. He plans to apply to graduate school for optics.

Rob Holcomb, class of '19 at SUNY Geneseo, worked with Prof. Yongli Gao on developing a process for spin coating and analyzing thin films used in the various layers of perovskite solar cells. He plans to apply to graduate school in engineering or physics.

Jonathan Kunjummen, class of '18 at the University of Oklahoma, did theoretical research with Prof. Joseph Eberly on entanglement as a means of characterizing polarization of three-dimensional classical light fields. He plans to apply to graduate school for physics.

Emily Law, class of '18 at Ashland University, worked with the optics research group of Prof. N. Vamivakas trapping nanoparticles in a free-space gradient force trap. She plans to apply to graduate school for optics.

Jay Marshall, class of '18 at Cornell College worked with the research group of Prof. Regina Demina testing silicon strip detectors for the next upgrade to the CMS detector at CERN.

Morgan McCarthy, class of '19 at the University of Rochester, studied the lifetimes of small particles in a restricted three-body system with Prof. Alice Quillen. She plans to apply to graduate school in astronomy.

Amanda Mietus, class of '19 at the University of Rochester, worked with Changsik Yoon, Yue Qi, and Andrew Przysinda of the optics imaging research group of Prof. Jannick Rolland to demonstrate that the GD-OCM can take better resolved images of the corneal endothelium than spectral microscopy. She plans to apply to graduate school.

Tri Nguyen, class of '19 at the University of Rochester, worked with Prof. Demina on extracting BAO signal from DESI (Dark Energy Spectroscopic Instrument) data challenge simulation and laying the foundation for DESI surveys large-scale structure analysis in the near future, and worked with Prof. BenZvi on IceCube, the world's largest neutrino detector at the South Pole, to do fast supernova simulations/analysis and develop statistical method to distinguish between two different supernova events. He plans to apply to graduate school for physics/astronomy.

Eric Nolting, class of '18 at the University of Rochester, studied the dissolution of stellar clusters in the reference frame of the shearing sheet with Prof. A. Quillen as a part of her research group. He plans to apply to graduate school for physics/astronomy.

Stone Oliver, class of '18 at Miami University of Ohio, worked with Prof. Robert Boyd's optics group constructing a radial mode sorter in order to make a quantum key distribution. He intends to apply to graduate school.

Will Parker, class of '18 at Chapman University studied coherence properties of blackbody radiation and other signals such as ultrashort pulses with the research group of Prof. Joseph Eberly.

Terrence Pierre Jacques, class of '18 at Oberlin College, worked with Prof. Dan Watson on fitting for pre-shock parameters for outflows from young stellar objects, using simulations from MAPPINGS V and observed [Fe II] emission from NGC 1333. He plans to apply to graduate school for gravitational physics.

Bo Peng, class of '18 at the University of Rochester, worked with the research group of Prof. Eric Blackman using the AstroBear AMR code, constructing simulations of stars moving through a common envelope, to study the late-stage evolution of binary systems.

Nicholas Romano, class of '20 at the University of Rochester did research with Prof. Regina Demina on extracting BAO structure from DESI (Dark Energy Spectroscopic Instrument) data challenge simulation and laying the foundation for DESI surveys in the near future. He plans to apply to graduate school.

Ryan Rubenzahl, class of '18 at the University of Rochester, worked with Prof. Segev BenZvi to calculate limits on the emission of gamma-rays from the M31 Andromeda Galaxy using observations from the HAWC Observatory in Mexico. He plans to apply to graduate school for astrophysics.

Annalise Slattery, class of '18 at Bethel University, did research in Prof. N. Bigelow's Cooling and Trapping group, using a digital multi-mirror device to create and characterize optical beams that contain singularities. These singularities are to be imprinted on a rubidium spinor Bose-Einstein condensate to create complex spin textures. She plans to apply to graduate school for physics.

Pouya Tanouri, class of '18 at the University of Rochester, has been working with Prof. Segev BenZvi's research group on IceCube to do fast supernova simulations and develop statistical methods to distinguish between different supernova models. He plans to apply to graduate school for astrophysics.

Samantha Tetef, class of '19 at the University of Rochester, researched a part of the Deep Underground Neutrino Experiment (D.U.N.E.), Near Detector Task Force (N.D.T.F.) with Prof. Steve Manly and used ART/ ROOT to analyze Monte Carlo data simulations to help determine the best design for the near detector.

Andrew Van Avery, class of '19 at University of Rochester, worked with the extreme state physics research group of Prof. Pierre Gourdain, developing a low-inductance gas switch and a linear transformer driver to analyze warm dense matter.

Sonya Paola Vidal, class of '18 at the College of William and Mary, worked with Prof. Kevin McFarland on the data-Monte Carlo simulation discrepancy in the flux present in the medium energy data with the MINERvA experiment that is located at Fermilab National Accelerator Laboratory. She plans on applying to graduate school for particle physics.

Hayden Wisniewski, class of '18 at Whitworth University, assisted Prof. Pierre Gourdain's Extreme State Physics research group by creating an online plasma parameter calculator and assisting in the construction of a Linear Transformer Driver.

Adam Wright, class of '18 at Willamette University, worked with Prof. Dustin Froula studying an image recovery technique that can be applied to high speed microscopy imaging of CR39 nuclear track detectors.