

University of Rochester

Summer 2019 undergraduate research in Physics, Optics, and Astronomy

Jeremy Atkins class of '20 at University of Rochester, with Prof. Miki Nakajima, ran simulations of the protolunar disk and conducted data analysis on the result, to better understand the giant impact that led to its creation. He plans to apply to graduate school in physics.

Carter Ball, class of '20 at the University of Rochester, studied numerically capturing shock waves using the technique of radial basis function interpolation with Prof. Pierre Gourdain. He plans to apply to graduate school for particle physics.

Andrew Balogh, class of '21 at the University of Rochester, designed and built various circuits for firing and diagnostics of the High Amperage Driver for Extreme States (HADES) with the research group of Prof. Pierre Gourdain.

Danielle Bovie, class of '21 at the University of Rochester, did data analysis with the research group of Prof. Judy Pipher on tests run on NEOCam's H2RG-18693 detector when exposed to uniform light. The focus was on a Brighter Fatter effect demonstrated by some pixels, that we believe is caused by charge sharing between pixels. We tried to determine more about how much charge is being shared by making plots using python.

Jayson Calvi, class of '21 at the University of Rochester, worked with Prof. Nicholas Bigelow's Cooling and Trapping group on the construction and use of an external cavity diode laser in the spectroscopy of rubidium gas to design a mount for their new laser heads. He plans on applying to graduate school for physics.

Kurt Cylke, class of '20 at the University of Rochester, worked with Prof. Andrew Jordan's research group to examine topological phase space discrepancies between models based on Bayesian probability and Ito calculus for continuous qubit measurement.

Kaelyn Dauer, class of '21 at California State University Fresno, researched the rate of supernovae in under-dense and dense regions of space to determine if there is an environmental dependence on the initial mass function with the research group of Prof. Segev BenZvi. She plans to apply to graduate school for physics.

Ivan Frantz class of '20 at University of Rochester, performed numerical simulations to aid with the design of an on-chip integrated optical gyroscope using inverse weak value amplification with Prof. Andrew N. Jordan. He plans to apply to graduate school for physics.

Divyanshu Gandhi, class of '20 at the University of Rochester, researched deep learning methods of classification and anomaly detection of supernovae with Prof. Segev BenZvi. He plans on applying to graduate school for philosophy.

Ina Flood class of '20 at Harvey Mudd College, worked with the DESI group at the University of Rochester studying nonlinear effects on the power spectrum of the Lyman Alpha forest to prepare for measurement of the neutrino mass by the DESI survey. She plans to apply to graduate school for physics.

Filippo Iulianelli, class of '22 at U. of Rochester worked with Prof. Regina Demina testing color reconnection models in Top Quark Pair Production on CMS.

Madalyn Johnson, class of '21 at Cal. State East Bay, worked with Prof. Dan Watson studying the effects young stellar objects have on their molecular cloud by deriving mass flow rates, momentum, and the kinetic energy injection rate into the surrounding molecular cloud.

Sean Karg, class of '21 at Stevens Institute of Technology, developed and simulated the theoretical framework for a low-temperature refrigeration powered by the action of quantum measurement with Prof. Andrew Jordan and Sreenath Kizhakkumpurath. He intends to go to graduate school to study physics.

Tyler LaBree, class of '20 at Northern Kentucky University, developed software to simulate the moon-forming collisions with Prof. Miki Nakajima. He plans on applying to graduate school for physics.

Mckenzie Lane, class of '20 at Georgia Institute of Technology, studied past spin states of Mars' satellites Phobos and Deimos with Prof. Alice Quillen. She plans to apply to graduate school for geophysics.

Tyler Mason, class of '20 at the University of Rochester, studied spark gap switches for the application of pulsed power drivers with Prof. Pierre Gourdain. He also constructed high-voltage electronics for general use in the laboratory. He plans to pursue a Ph.D. in materials engineering or applied science.

Noah Meyers, class of '20 at University of Rochester, designed and manufactured a Schwarzschild objective to study phase changes at extreme pressures with Prof. Ranga Dias.

Alexander Narouz, class of '20 at California State University Northridge, conducted research with Dr. Suxing Hu on the high-pressure structure of Beryllium using a conjunction of evolutionary algorithm-based structure searches and lattice dynamics for perfect crystals with the hopes of discovering if Beryllium is a possible candidate as a capsule for inertial confinement fusion (ICF).

Katarina Nichols, class of '20 at SUNY Geneseo, studied perceptual decision making biases using a causal inference model with Prof. Ralf Haefner. She plans to apply to graduate school in physics.

Cindy Olvera Perez, class of '20 at Cal State Chico, worked with Dr. Kelly Douglass comparing two leading void finding algorithms to see how voids are classified and how it changes the photometric properties of void galaxies.

Lydia Petricca, class of '20 at the University of Rochester, worked with Prof. Oakes on determining if there is a distinct relationship between a cell's biochemical energy and the amount of mechanical energy it is emitting. She plans on applying to graduate school for biochemistry or biophysics.

Chad Popik, class of '21 at University of Rochester, researched Baryonic Acoustic Oscillation cosmology with Prof. Regina Demina by calculating and analyzing the correlation function in galaxy distributions. He plans on applying to graduate school for astrophysics.

Spencer Ressel, class of '20 at the University of Rochester, worked with Dr. Ryan Rygg and JJ Ruby at the Laboratory for Laser Energetics to build a simulation code of streaked x-ray radiography experiments on the OMEGA laser system.

Pablo Rodriguez, class of '20 at Hartnell College, did research in the Extreme States of Physics Lab of Prof. Pierre Gourdain on a photo detection system for high amperage driver switches. He plans to apply to graduate school for physics.

Marco Romo-Gonzalez, class of '20 at California State University - Stanislaus, worked with Dr. Jessie Shaw and Dr. Dustin Froula on the analysis of charge generated from SM-LWFA experiments conducted on OMEGA EP at the Lab. for Laser Energetics.

Isabel Sacksteder, class of '21 at Willamette University, did research in Prof. Nick Bigelow's cooling and trapping lab to improve the generation of vortex laser beams using a digital micromirror device for future use on a Rubidium Bose-Einstein condensate.

Ethan Savitch, class of '20 at the University of Rochester, alongside Jonathan Carroll and Prof. Adam Frank, explored the coupled relationship that energy harvesting civilizations have with their environments in an attempt to find a series of differential equations that we can use to build a general model describing anthropogenic climate change. He plans to apply to graduate school for computational astrophysics.

John Siu, class of '20 at the University of Rochester, worked with Prof. Alice Quillen and designed, developed, built and improved a vibrational, motor powered boat that is propelled via the leveraged motion of an underwater flexible hydrofoil.

Juliana South, class of '22 at University of Rochester, investigated the effects of low velocity impacts on asteroids through laboratory experiments with Prof. Alice Quillen.

Jonas Smucker class of '20 at Penn State - Behrend, researched and classified self-propelled particle phenomena within an elastic, flexible boundary with Prof. Alice Quillen. He plans on applying to graduate school for physics.

Alenna Streeter, class of '20 at SUNY Geneseo, worked with Prof. John Nichol on the automation of a Rapid Thermal Annealing (RTA) device dedicated for use in the fabrication of Si/SiGe quantum chips. She plans to be the first in her family to pursue a graduate degree in physics.

Heather Tanner, class of '20 at Otterbein University, characterized and simulated the rock muons seen by the MINERvA collaboration at Fermilab for future cavern experiments with Prof. Kevin McFarland. She plans to apply for graduate school for particle physics.

Hayden Woodworth class of '21 at Clarkson University, worked in Prof. Robert Boyd's lab with N. Black to lay groundwork for an optical system capable of generating an incoherent superposition of two Full Poincare beams for the suppression of filamentation.