

Senior Thesis Presentations Part 1

Department of Physics, Oregon State University
Tuesday June 2, 2020

3:00 PM - Ross Dewberry (advisor Umpqua Research Company)

“Gravitational Buoyancy Effects on Plasma Plume Formation”

Speaker Biography: Ross Dewberry is graduating with a Bachelor of Science degree in physics. He plans to continue at Umpqua Research Company working on small business innovative research and water quality testing.

3:12 PM - Clark Embleton (advisor Ethan Minot)

“Towards Molybdenum Disulfide Exciton-Polaritons in Metallic Microcavities”

Speaker Biography: Clark Embleton will be graduating with a BS in Physics with a minor in Mathematics in June 2020. While at OSU, he conducted research with nanomaterials under Dr. Ethan Minot and will continue research in the field of solid state physics as he pursues a Ph.D. at the University of Oregon.

3:24 PM - Acacia Patterson (advisor Janet Tate)

“Variable Temperature Transport Measurements and Conduction Mechanisms of Crystalline and Amorphous Titanium Dioxide Thin Films”

Speaker Biography: Acacia Patterson is graduating with a B.S. in physics with an option in chemical physics. She is interested in solid state physics and plans to pursue a career in research. She transferred from Portland Community College and is originally from northern California, and she will be entering a physics PhD program at Washington State University this fall.

3:36 PM - Cameron Stewart (advisor Janet Tate)

“Optical properties comparison between similar thickness TiO₂ polymorphs

Speaker Biography: Cameron Stewart is graduating with a physics degree with a minor in mathematics from Oregon State University. He began research with Janet Tate in spring of 2019 to analyze the optical properties of titanium dioxide. After graduation he will pursue work in industry and eventually return to school to work towards a PhD in optics or solid-state physics.

3:48 PM - Kasey Yoke (advisor Dr. Ron Shiri, NASA)

“Optical Analysis of IBF Polished Silicon Wafers for Purpose in Direct Imaging of Exoplanets”

Speaker Biography: Kasey Yoke will be graduating in June 2021 with a Bachelor of Science in physics and a minor in mathematics. During her time at OSU, she conducted research with Dr. Heidi Schellman in neutrino physics. Later she conducted research through NASA with Dr. Ron Shiri relating to the direct imaging of exoplanets. She plans to earn a PhD in astrophysics/cosmology and obtain a research position with NASA. Her areas of interest are black holes, dark matter and dark energy, and interstellar propulsion systems.

4:00 PM - Jiadi He (advisor Weihong Qiu)

“Dissecting the directionality mechanism of Kinesin-5/Cut7 by using computational approaches”

Speaker Biography: Jiadi did biophysics research in the Qiu lab at Oregon State University and the Li lab at the University of Texas at El Paso. He wants to receive a BS in Physics and continue on to a Ph.D. in Biophysics at The Ohio State University. His long-term goal is being a professor who can teach in the class as well as perform cutting-edge research in the laboratory. Jiadi likes playing badminton and fishing. He also plays bridge and won some master points from some bridge tournaments.

4:12 PM - Jacob Taylor (advisor Xavier Siemens)

“The Stochastic Background of Gravitational Waves with Pulsar Timing Arrays: Evidence for the Background in Individual Pulsars”

Speaker Biography: Jacob has a strong interest in astrophysics and compact astrophysical objects. At OSU, he conducted research in gravitational wave detection with Dr. Xavier Siemens. He will receive a Bachelor of Science in Physics in 2021 with the hopes of attending a graduate program the following year to continue studying gravitational wave detection or compact object astrophysics.

4:24 PM - Steve Neiman (advisors KC Walsh and Evan Thatcher)

“Effects of independent group work on learning outcomes”

Speaker Biography: Steve is an undergraduate student at the OSU department of physics, graduating in 2020. He first developed an interest in physics at Linn-Benton Community College before transferring to OSU. There, he discovered a passion for education research from the many faculty involved in the field. He intends to pursue a PHD in physics with a focus on education and eventually teach physics at the college level while performing education research.

4:36 PM - Cyrus Oliver (advisor Matt Graham)

“Keeping the Lights On: Measuring the non-blackbody emissions of LEDs under varying conditions at zero bias”

Speaker Biography: Cyrus is graduating with a Bachelor's Degree in Applied Physics. He completed his core classes at Portland Community College before transferring to OSU. Graduate School might be in Cyrus's future, but he first plans to gain experience in industry, using his existing degree, before eventually resuming his studies.

4:48 PM - Jonathan Carney (advisors Cory Simon and David Roundy)

“Practical Mechanically Interlocked Molecules: A Model of Gas Adsorption in Metal Organic Frameworks Harboring Rotaxane Molecular Shuttles”

Speaker Biography: Jon will be graduating in December 2020 with a Bachelor of Science in Physics and a Bachelor of Science in Mathematics. He conducts research under Cory Simon and David Roundy applying statistical mechanical models within material science applications. After graduating Jon hopes to pursue graduate studies in Physics.

5:00 PM - Cameron Wiesner (advisor Oksana Ostroverkhova)

“Optoelectronic Properties of a Novel Fungi-derived Pigment”

Speaker Biography: Cameron Wiesner is graduating from OSU with a BS in Physics with a focus in optics and a minor in mathematics. Moving forward, he plans to enter industry for a fresh perspective

before continuing toward higher education or a more permanent position in either applied physics or education.

5:12 PM - Mai Sakuragi (advisor Yun-Shik Lee)

"Analysis of semiconductor microcavity exciton-polaritons with coupled harmonic oscillators"

Speaker Biography: Mai Sakuragi is a senior international student from Japan, graduating with a degree in physics with a minor in mathematics. She entered OSU with a Fisheries and Wildlife major and switched to Physics in her sophomore year. She completed a senior research with Dr. Yun-Shik Lee studying light-matter interactions in semiconductor nanostructures. Mai is proceeding to a PhD program at the University of Waterloo in Ontario, Canada to do research in experimental quantum computing.

5:24 PM - Alex Kuepper (advisor Kathryn Hadley)

"Rossby Wave Instabilities in Hydrodynamic Simulations of 3D Protoplanetary Accretion Disks"

Speaker Biography: Alex Kuepper is graduating June 2020 with a Bachelors of Science in physics and a minor in mathematics. At OSU he conducted computational astrophysics research with Dr. Kathryn Hadley. He also worked a variety of jobs around the physics department, and enjoyed studying atomic/molecular scale and quantum physics. Starting immediately after graduation Alex will be continuing his education at the University of Oregon's industrial masters program in the semiconductor and photovoltaics track.

5:36 PM Duy Nguyen (advisor Ethan Minot)

"Towards an electrically driven quantum single-photon source at room temperature"

Speaker Biography: Duy Nguyen is a senior physics student who is a researcher in the Minot Nanoelectronics Lab. He received the Summer Undergraduate Research Experience program in 2018 for the project: "Electrically driven single-photon source at room temperature". He is pursuing the Bachelor of Science in physics in 3.5 years and continuing research on single-photon emitters, a quantum information project.

5:48 PM Hank Greenburg (advisor Robert Higdon)

"Modeling Biodegradation of Crude Oil Spills on Sea Water Using Partial Differential Equations"

Speaker Biography: Hank Greenburg is graduating with a degree in physics and a emphasis on computational physics in June 2020. Hank is currently works at the National Energy Technology Lab as a computational scientist and wants to go to grad school and work on quantum computing.

6:00 PM Hanna Hansen (advisor Ethan Minot)

"Development of Micro-Electrode Array Sensors for Electrochemical Detection of Dissolved Oxygen"

Speaker Biography: Hanna Hansen is a third-year student, majoring in physics and bioengineering with a minor in mathematics. She completed her physics research with Dr. Ethan Minot studying and testing microelectrode array dissolved-oxygen sensors using electrochemical methods. Although finished with her physics major requirements, Hanna is staying another year to finish her bioengineering degree before planning to continue her studies in medical school.

Senior Thesis Presentations Part 2

Department of Physics, Oregon State University
Tuesday June 9, 2020

3:00 PM Isabella Johnson (advisor Tevian Dray)

“Describing Particles with Lie and Clifford Algebras”

Speaker biography: Isabella is a soon-to-be physics graduate and has plans to continue her exploration of visually representing algebras on her own time. Over the summer of 2020 she will work on an online curriculum for parents and kids to learn science and history together. She hopes to get a technician job, work in science communication, or work with people in crisis situations.

3:12 PM Ian Wilson (advisor David Craig)

“The Consistent Histories Approach to the Stern-Gerlach Experiment”

Speaker biography: Ian Wilson is receiving a Bachelor of Science in Physics with a minor in Mathematics. He is a member of the Gravity and Quantum Foundations Research Group lead by Dr. David Craig. Ian will be spending a year as a mechanic at a community bicycle shop in Portland, Oregon before continuing further studies.

3:24 PM Yuantao Shen (advisor Davide Lazzati)

“The Polar Energy Distribution of Short Gamma-Ray Burst Outflows from Binary Neutron Star Mergers”

3:36 PM Hao-Tung Chuang (advisor Davide Lazzati)

“Behind The Veil: Numerical Solution to Finding The Initial Conditions of Gamma-Ray Bursts using Fireball Model”

Speaker biography: Hao-Tung Chuang is graduating with a degree in Physics. He conducted research with Dr. Davide Lazzati in gamma-ray bursts dynamics, and will be continuing research in high energy astrophysics.

3:48 PM Garrett Jepson (advisor David Craig)

“Standard methods in general relativity and their underlying geometric structure”

Speaker Biography: Garrett Jepson is a Senior in Physics and Mathematics. He conducted research in general relativity under David Craig and plans to continue in that field. Garrett will be staying at OSU to finish his math degree in the fall, after which he plans to take time off and then pursue a graduate degree in differential geometry.

4:00 PM Alex Eisenhauer (advisor Hoe Woon Kim)

“A Solution to the Linearized, Incompressible Navier-Stokes Equation with a Spherical Boundary”

Speaker Biography: Alex Eisenhauer is an undergraduate enrolled in the OSU Physics-Education Double Degree program. While earning his Physics degree at OSU he spent three years studying the linearized Navier-Stokes equation with Dr. Hoe Woon Kim. After earning his teaching license through OSU, he hopes to inspire a passion for math and physics in his high school students.

4:12 PM Kira McCoy (advisor Kathy Hadley)

“Mode Formation of Protostellar Disks With Keplarian Rotation”

Kira McCoy is a senior graduating in 2020 with a degree in physics and a computational option. She completed her research in computational astrophysics with Dr. Kathryn Hadley. After graduation she plans to pursue work in industry before returning to work towards a PhD at a later date.

4:24 PM Jacob Vande Griend (advisor David Roundy)

“Simulating Fluids: Testing a New Grand Canonical Histogram Method on the Square-Well Fluid”

Speaker biography: Jacob Vande Griend is graduating with a B.S. in Physics and a minor in Aerospace Studies. While at Oregon State, Jacob conducted research in Dr. Roundy’s lab related to computational condensed matter physics. Following graduation, Jacob will commission into the Air Force, where he will work as a physicist.

4:36 PM Zach Colbert (advisor Matt Graham)

“Development of a Visible Light Photoluminescence Microspectrometer”

Speaker biography: Zach Colbert came to OSU in 2015 from Lincoln City, OR. He is graduating this spring with a degree in physics and minor in computer science. He completed a project with Dr. Matt Graham designing and building a photoluminescence spectrometer, the subject of his senior thesis. Zach has also worked with the University Information and Technology division for over three years. He is currently searching for career opportunities in computer science and information security.

4:48 PM Jasper Spafford (advisor Oksana Ostroverkhova)

“Fungal Photonics”

5:00 PM Pu Yang (advisor Weihong Qiu)

“Single-molecule studies of kinesin-5/Cut7 motility”

Speaker Biography: Pu is interested in using physics tools to solve biological problem, and for his senior thesis, Pu is using single-molecule microscopy to understand the motility of a biological motor protein called kinesin/Cut7. After graduating from Oregon State University, Pu plans to attend graduate school and study Business and Economics.

5:12 PM Sara Leathers (Greg Mulder, LBCC)

“Designing and Building a Radio Direction Finder for an Autonomous Vehicle”

Speaker Biography: Sara Leathers is graduating in June 2020 with a Bachelor of Science in Physics and Biology and a minor in chemistry. Her involvement with the LBCC Remotely Operated Vehicle team fueled an interest in robotics and led to the project of building a radio direction finder. She plans to enter industry but may attend graduate school, likely for robotics, in the future.

5:24 PM Dustin Treece (Liz Gire)

“Developing a Learning Progression on Units and Dimensions”

Speaker Biography: Dustin Treece is graduating physics major at OSU with an interest in Physics Education Research and Gravitational Physics. Dustin has a passion for teaching physics, being a

learning assistant for the Sophomore and Junior level physics courses at OSU. He hopes to become a physics professor one day and will be continuing his studies at Oregon State University's Physics PhD program next year.

5:36 PM Steve Nieman (advisor KC Walsh)

"Effects of independent group work on learning outcomes"

Speaker Biography: Steve first developed an interest in physics at Linn-Benton Community College before transferring to OSU. There, he discovered a passion for education research from the many faculty involved in the field. He intends to pursue a PHD in physics with a focus on education and eventually teach physics at the college level while performing education research.

5:48 PM Reid Center (advisor Oksana Ostroverkhova)

"The interaction of bulk heterojunction donor/acceptor blends with polaritonic state creation in organic crystalline films"

Speaker Biography: Reid Center is a senior graduating with a degree in physics, with an option in optics, and a music performance minor. Reid worked in Dr. Oksana Ostroverkhova's organic semiconductor photonics lab studying donor/acceptor blend interaction with optical microcavities. Reid is looking to go into an industry that allows him to continue researching optical systems.

6:00 PM Micahel Maurer (advisor KC Walsh)

"Using Supervised Machine Learning to Predict Student Grades"

Speaker Biography: Michael Maurer is a senior graduating in Physics. He started at OSU as a Computer Science major, switching his sophomore year to physics. After switching, Michael began research with Dr. KC Walsh in an attempt to use machine learning to predict student's grades. Michael is continuing his schooling at University of Oregon for a Masters in Optics.