

Oregon State University Department of Physics

SENIOR THESIS PRESENTATIONS

Zoom: <https://oregonstate.zoom.us/j/92415276467?pwd=dTFsZEp1eG4vQmJtaGxlbXp2elQxQT09>

Part I: 1 June, 2021

3:00 – 3:10

Cade Perizzo: Analyzing Nonaxisymmetric Instabilities in the Formation of Star-Disk Systems

Advised by Kathryn Hadley

Cade grew up in Albany, Oregon and is about to fulfill his dream of graduating from Oregon State with a Bachelor of Science in physics. During his time at OSU, he conducted research with his advisor Dr. Hadley and lab partners Nick and Tucker on star formation. Cade intends to enter the workforce and is pursuing jobs in the energy sector.

3:12 – 3:22

Hunter Nelson: Calculating characteristic timescales for environmental decoherence in the presence of thermal gravitons

Advised by David Craig

Hunter Nelson is an undergraduate at OSU interested in quantum information science and topics in environmental decoherence. Hunter is graduating with a degree in Physics and will continue his studies at Virginia Polytechnic Institute in geometric quantum control.

3:24 – 3:10

Michael Boss: Solving the Cartpole Problem with REINFORCE

Advised by Guenter Schneider

Michael Boss is graduating Oregon State University with a degree in physics. He will be playing poker professionally after graduation while pursuing a career in quantitative trading.

3:36 – 3:46

Milo Sprague: Application of Coupled Oscillator Model to Terahertz and Optical Control of Plasmon Induced Opacity in Coupled Metamaterials

Advised by Yun-Shik Lee

Milo Sprague is a graduating senior at Oregon State University with a Bachelor of Science in Physics. Milo began school at OSU after attending Columbia Gorge Community College in The Dalles, Oregon upon finishing high school. During his time at Oregon State, Milo conducted research under Yun-Shik Lee on the theoretical description of metamaterials. After graduation, Milo will be continuing his physics education at the University of Central Florida in pursuit of a doctoral degree.

3:48 – 3:58:

Jin Kiatvongchareon: Simulating the Dynein Motor Protein: A Monte Carlo Approach to Achieve Coordinated Stepping

Advised by David Roundy

Jin Kiatvongchareon is graduating with a Bachelor of Science in Physics and Mathematics. During his time at Oregon State, he conducted research with Dr. David Roundy on Monte Carlo algorithms for simulating the dynein motor protein. After graduation, Jin will pursue an Applied Physics masters through University of Oregon's Masters Industrial Internship Program.

4:00 – 4:10

Justin Sheetz: Directing Cell Migration via Environmental Anisotropy

Advised by Bo Sun

Justin Sheetz is receiving a Bachelor of Science in Physics with a minor in Mathematics. He conducted his research under the Dr. Bo Sun on the mechanics of cancer cells. Justin plans on furthering his education through a PhD program in Medical Physics beginning in Fall 2022.

4:12 – 4:24

Joshua Ripp: Molecular Motors: Modelling Electrostatics Between Kinesin and Tubulin

Advised by Weihong Qiu

Joshua Ripp is graduating from Oregon State University with a Bachelor of Science degree in physics. As an undergrad, Joshua spent time learning biophysical modelling from Dr. Weihong Qiu of Oregon State University and Dr. Lin Li of the University of Texas at El Paso. After graduating, he plans to enter industry for a year before returning to attend graduate school.

4:24 – 4:34

Richard Puro: Photodimerization of Organic Semiconductors in the Strong Coupling Regime

Advised by Oksana Ostroverkhova

Richard is a physics and mathematics major graduating in June 2021. His main interest is in solid state physics research with applications in electronics. He will be continuing his studies at the University of Colorado in Boulder researching nano-optics.

4:36 – 4:46

Cooper Nicolaysen: Effect of Solar System Models on Pulsar Timing Experiments

Advised by Xavier Siemens

Cooper Nicolaysen is graduating from Oregon State University with a Bachelor of Science in both Physics and Mathematics. During his second year, Cooper focussed on research for the Navier-Stokes Equations. Following that, he moved over to the field of Cosmology to begin gravitational wave research for his senior year thesis. He plans to leave his home of Oregon to pursue a Master's in Astrophysics at the Niels Bohr Institute at the University of Copenhagen in Autumn 2021.

4:48 – 4:58

Jessica Waymire: Illuminating amorphous oxides: Defect states and carrier recombination characterized by photoluminescence

Advised by Matt Graham

Jessica Waymire is graduating with a Bachelor of Science in Physics in June 2021. During her time as an undergraduate, she conducted research in the Micro-Femto Energetics lab under the supervision of Dr. Matt Graham. She will be attending the University of Oregon this summer in pursuit of a Master of Science in Applied Physics.

5:00 – 5:10

Zachary Scroggy: Simulating Brownian Motion Experiments to Replicate Data from Optical Trap Laboratories

Advised by David McIntyre

Zachary Scroggy is graduating from Oregon State University with a Bachelor of Science degree in physics. He grew up near the city of Canby, Oregon before he moved to Corvallis to pursue a higher education in science. After graduation, Zachary plans begin work in the technology industry where he hopes to make an impact in the newest products to reach the market place.

Part II: 8 June, 2021

3:00 – 3:10

Dylan Walker: Investigating gamma ray bursts using tracer particles

Advised by Davide Lazzati

Dylan Walker is graduating from Oregon State University with a Bachelor of Science degree in Mathematical Physics, with a minor in mathematics. At OSU Dylan studied computational

astrophysics under the tutelage of Dr. Lazzati. After graduation Dylan plans on moving to the state of Washington to enter industry for some time, but may consider graduate school.

3:12 – 3:22

Elena Wennstrom: Development of a Brownian Motion Experiment for an Undergraduate Laboratory Course

Advised by Janet Tate

Elena Wennstrom is graduating from Oregon State University in June 2021 with a Bachelor of Science degree in physics. Elena plans on taking time off before deciding what she wants to focus on.

3:24 – 33:4

Tyler Schimleck: The Geometry of Symmetry: An Application of Symplectic Geometry in Understanding Noether's Theorem

Advised by David Craig

Tyler Schimleck is graduating from Oregon State with degrees in mathematics and physics. He is interested in differential geometry and mathematical physics. In fall he will be attending the University of California, Santa Barbara's mathematics graduate school, where he intends to do research in general relativity.

3:36 – 3:46

Julian Wulf: Optical Modeling of Thin Films: Applying Effective Medium Theory to Mixtures of TiO₂ and SnO₂

Advised by Janet Tate

Julian Wulf is graduating with a Bachelor of Science in Physics. As an undergraduate student at OSU, he researched the optical properties of thin film semi-conductors under the guidance of Doctor Janet Tate. Following graduation, Julian will pursue a career in industry with the goal of obtaining some real world experience before continuing his education.

4:00 – 4:10

Fangyi Zhu: A lower Limit for the Mass of Stellar Gamma-Ray Burst Progenitors

Advised by Davide Lazzati

4:12 – 4:22

Ian Diaz: Locating and Observing Pulsars for Use in Gravitational Wave Detection

Advised by Xavier Siemens

4:24 – 4:34

Brandon Nye: Detecting Nanohertz Gravitational Waves by Searching for and Timing Millisecond Pulsars

Advised by Xavier Siemens

Brandon Nye is graduating with a Bachelor of Science in Physics. He spent the last two years as a part of the pulsar timing research group under advisor Xavier Siemens. After graduation, he will be finding an position in a research lab with the intent of pursuing a higher education in Astrophysics.

4:36 – 4:46

Rohal Kakepoto: Scattering Mechanisms and Transport Properties of Semiconductors at Low Temperatures

Advised by Janet Tate

Rohal Kakepoto is graduating with a Bachelor's in Physics from OSU. He has done research under Dr. Janet Tate during his junior and senior year. His undergraduate research and physics

coursework has helped him obtain a local engineering job doing silicon wet etching and stripping at HP.

4:36 – 4:46

Benjamin Hanson: A Generalized Scheme for Creating Regge Calculus Models of General Relativity

Advised by David Craig

Ben Hanson will be graduating from Oregon State University with degrees in mathematics and physics in 2022. He grew up in Bloomington, MN, before moving to Corvallis, OR, where he has lived since 2008. During his time at OSU he has worked on developing a numerical approach to general relativity. After graduation, he plans on pursuing graduate study in the field of theoretical astrophysics.

Class of 2021 Presentations at previous or future times:

Genevieve Connolly (Honors College): Searching for Pulsars for Use in Gravitational Wave Detection

Advised by Xavier Siemens

Genevieve Connolly is graduating this year with a Bachelor of Science in Physics and a minor in Mathematics. After graduation she intends to work in a research lab and eventually pursue a Masters degree.

Trevor Reid (Honors College): Twist in a Torus: Minimization of Nematic Configurations with Discontinuous Director Fields in Toroidal Coordinates

Advised by Pavel Kornilovich

Trevor Reid is graduating with an Honors Bachelor of Science, majoring in both physics and mathematics. He conducted research under Dr. Pavel Kornilovich by studying numerical simulations of defects in nematic liquid crystals. After graduating, Trevor will continue his education at OSU in the pursuit of a PhD in physics, which begins in Fall 2021.

YiPeng Teo: (Honors College): Isolating Non-Blackbody Radiation Spectra from Low-Bandgap LEDs near Zero Bias

Advised by Matt Graham

YiPeng is an undergraduate at OSU majoring in physics and minoring in finance. During his time at OSU, he conducted research with Dr. Matt Graham from the Micro-Femto Energetics Lab with a research focus on carrier transport in low-bandgap materials. After graduation, he plans to return to Singapore and either enter R&D or the finance industry to better utilize the knowledge he has gained over the four years of obtaining his bachelor's degree.

Rosemary Williams (Honors College): E+A galaxy and spiral E+A galaxy candidates in the Hercules supercluster

Advised by Charles Liu

Ryan Wong (Honors College): Cancer Cell Detection with Mask R-CNN

Advised by Bo Sun

Ryan Wong is an OSU senior studying physics and minoring in mathematics. As an undergraduate he studied physiology, soft matter physics, and cellular biophysics. He aspires to apply his skills to the health and biological sciences and is interested in topics such as cancer and Alzheimer's disease. In Fall 2021, Ryan will continue his studies at the University of Chicago to pursue his doctorate in physics.