

NADIE YILUO LITENN

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EDUCATION

University of California, Santa Barbara

Aug. 2017 - Present

Honors Bachelor of Science, Physics, College of Creative Studies

GENERAL RESEARCH INTERESTS

Gravity Theory, Black Hole Thermodynamics, Condensed Matter Theory and Its Relation to Gravity

SELECTED COURSEWORK

Graduate Classes:

Quantum Gravity Path Integral and Baby Universes, QFT in the Curved Space, Many Body Physics, Condensed Matter, Quantum Field Theory, General Relativity, High Energy Astro, Quantum Computing, Quantum Mechanics, Electrodynamics

Undergrad Upper Division Classes

Group Theory, Tensor Analysis, Cosmology, Fluid Dynamics, Graph Theory, Teaching Physics

RESEARCH EXPERIENCES

Gravity Theory Group

May. 2021 - Present

PI: Prof. Xi Dong, Co-mentor: Sean McBride

UCSB

- Worked on numerically calculating the entanglement entropy and negativity in the random tensor network (RTN), and understanding how RTN reproduces features of holography [Slides]
- Working on adding edge mode degrees of freedoms to the RTN to allow an RTN description of the quantum correction to the classical Ryu-Takayanagi area formula in the holographic entanglement entropy

AMO Experimental Group

Apr. 2019 - Jan. 2020

PI: Prof. Andrew Jayich

UCSB

- Worked on quantum error correction code for qudits, specifically for Sr87+ ions; simulated magnetic field insensitive ions by dressing them with radio-frequency magnetic fields, and encoding them into the decoherence free subspaces for quantum information processing [Poster]

Geological and Planetary Science Group

Jun. 2018 - Sep. 2018

PI: Prof. Michael Brown, Co-Mentor: Samantha Trumbo

Caltech

- Applied the simple global thermal diffusion model with our generated surface albedo map of the Galilean satellites to capture the overall expected thermal inertial map and compared with over 300 unpublished Galileo Mission PPR data, which allowed us to identify local internal activities, such as cryovolcanoes, that are not revealed by albedo map, and allowed us to characterize the potential thermal anomalies on Europa [Presentation][Poster][Slides]

Near Earth Asteroid Group

Jun. 2016 - Aug. 2016

Advisor: Prof. Michael Dubson

Sommers Bausch Observatory, University of Colorado, Boulder

- Took original observation data and determined the apparent magnitude and the orbit of the Near-Earth Asteroid 40329 (1999ML) with Gauss's method for calculating preliminary orbit elements and least square method to solve iteratively; results accepted by the Minor Planet Center [Paper]

Experimental Cosmology Group

PI: Prof. Philip Lubin, Co-Mentor: Qicheng Zhang

Jun. 2015 - Aug. 2015

UCSB

- Improved the laser-spacecraft simulation by determining and eliminating laser energy that will back-fire; maximized energy output and minimized time cost by putting laser and spacecraft in orbital resonance; and reduced uncertainty in time cost when varying the spacecraft launching time [Presentation][Paper]Poster

INDEPENDENT STUDIES

High Energy Journal Club

SB Graduate Theory Group

Jun. 2021 - Present

UCSB

- Black hole information paradox
- 2D CFTs [Slides]

Canonical Formulation of General Relativity

Prof. Don Marolf

Mar. - Jun. 2021

UCSB

- Term paper for Quantum Gravity Path Integral, Baby Universes, and Black Hole Information Problem [Paper][Slides]
- First part starts with initial value formulation for Klein-Gordon theory and generalizes up to gravity
- Second part involves actual calculation of the (1+3) split of GR, and explores the role of constraints

Directed Reading on Quantum Field Theory

Prof. Anthony Zee

Dec. 2019 - Jun. 2021

UCSB

Directed Reading on Quantum Field Theory in the Curved Spacetime

Prof. Don Marolf

Jan. - Mar. 2021

UCSB

Hydrodynamics in Astrophysical Accretion Disks

Prof. Anthony Zee

Sep. - Dec. 2020

UCSB

- Term paper for Fluid Dynamics [Paper]
- Explain Bondi accretion and its application for stellar wind and collisionless particles

Entropy, Information, and the Universe

Prof. Anthony Zee

Jan. - Mar. 2020

UCSB

- Term paper for Fly by Night Physics [Paper]
- Explain the origin of entropy and relate to advantages of quantum computers
- Sketch the derivation of Bekenstein bound, show why black holes saturate the upper limit of computational power, and calculate the ultimate computational power of the universe since the Big Bang

Young Tableaux and Its Applications

Prof. Anthony Zee

Mar. - Jun. 2019

UCSB

- Term paper for Group Theory [Paper]
- Explored theoretical properties of including involution and Cauchy identities
- Relate to applications in binary trees, quantum angular momentum additions, and the dimension of decoherence free subspace in quantum error correction

SELECTED TALKS AND PRESENTATIONS

N.Y. LiTenn (2021), “Ryu-Takayanagi, Lewkowycz-Maldacena, and Quantum Extremal Surfaces”, High Energy Journal Club - Black Hole Information Problem, UC Santa Barbara, California

N.Y. LiTenn (2021), “Black Hole, Entropy, Holography: Then and Now with Random Tensor Network”, Undergraduate Physics Research Symposium, UC Santa Barbara, California

N.Y. LiTenn (2021), “What the heck is CFT, I”, High Energy Journal Club - 2D CFTs, UC Santa Barbara, California

N.Y. LiTenn (2021), “Canonical Formulation of General Relativity”, PHYS 231C Quantum Gravity Path Integral, Baby Universes, and Black Information Problem, UC Santa Barbara, California

N.Y. LiTenn (2020), “Black Hole Information Paradox - A Pedestrian’s Roadmap”, SPS Undergraduate Seminar, UC Santa Barbara, California

N.Y. LiTenn (2020), “Entropy and Computational Power of the Universe”, SPS Undergraduate Seminar, UC Santa Barbara, California

N.Y. LiTenn (2020), “Introduction to Theoretical Quantum Error Correction”, Guest lecture at INT CS 10, Full Stack Quantum Computing class, UC Santa Barbara, California

N.Y. LiTenn, M. Fan, A.M. Jayich (2019), “Magnetic Field Insensitive Radio-Frequency Dressed Qubit”, Research and Creative Activities Conference, UC Santa Barbara, California

N.Y. LiTenn, S. Trumbo, M.E. Brown (2018), “Temperatures of the Galilean Satellites”, KITP Undergraduate Physics Research Symposium, UC Santa Barbara, California

N.Y. LiTenn, Q. Zhang, P. Lubin (2015), “Push that Craft Faster Every Single Time - Optimization for Laser-Propelled Spacecraft at All Launching Times”, Research Mentorship Program Symposium, UC Santa Barbara, California

TEACHING EXPERIENCES

Learning Assistant	<i>UCSB</i>
PHYS 120, California Physics (Fluid Dynamics), with Prof. Anthony Zee	Sep. - Dec. 2021
PHYS 8, Intro to Math Methods for Physics, with Dr. Tengiz Bibilashvili	Sep. - Dec. 2021
PHYS 131, General Relativity, with Prof. Steve Giddings	Apr. - Jun. 2021
PHYS 150, Group Theory, with Prof. Anthony Zee	Apr. - Jun. 2021
PHYS 21, Mechanics and Waves, with Dr. Tengiz Bibilashvili	Jan. - Mar. 2021
PHYS 150, Fly by Night Physics, with Prof. Anthony Zee	Jan. - Mar. 2021
PHYS 20, Newtonian Mechanics, with Prof. Don Marolf	Sep. - Dec. 2020
PHYS 101, Complex Analysis, with Prof. Jean Carlson	Jan. - Mar. 2020
INT 84AH, Honors Special Relativity, with Dr. Tengiz Bibilashvili	Jan. - Mar. 2019
PHYS 24, Electricity and Magnetism, with Prof. Paula Popescu	Jan. - Mar. 2019
Grader	Aug. - Sep. 2019
PHYS 104, Advanced Mechanics, with Eric Jones	<i>UCSB</i>

PROFESSIONAL SERVICES

Research Mentor, Jayich Lab Jun. - Aug. 2019
Research Mentorship Program (mentors are usually at least graduate students) UCSB

- Student: Brian Ji from Burnaby North Secondary School
- Project: Characterization of Collimated Atomic Beaming for Ra-225 Qubit Isolation

Student Director Oct. 2018 - Present
KITP Undergraduate Physics Research Symposium UCSB

Chair of Journal Club Oct. 2020 - Mar. 2021
Society of Physics Student UCSB

Invited Juror Jan. 2019 & 2021
US Invitational Young Physicists' Tournament Rye Country Day School & UCSB

AWARDS AND FELLOWSHIPS

Summer Undergraduate Research Fellowship (SURF) Dean's Fellow, UCSB, 2019
Traveling Undergraduate Research Fellowship (TURF) UCSB, 2019
Visiting Undergraduate Research Program (VURP) Caltech, 2018
Goldman Sachs Best Data Visualization MHacks X, University of Michigan, 2017

REFERENCES

Prof. Anthony Zee
zee[at]kitp.ucsb.edu

Prof. Don Marolf
marolf[at]ucsb.edu

Prof. Xi Dong
xidong[at]ucsb.edu