Abigail Lee

Personal Data

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Education

2019 – Present Ph.D. Student, Astronomy & Astrophysics, **University of Chicago**
Advisor: Prof. Wendy Freedman

2019 B.A., Physics, **University of Pennsylvania**, *summa cum laude*
Thesis: "Reconstructing Log-normal Dark Matter Density Fields using Hamiltonian Monte Carlo Techniques" | Advisor: Prof. Gary Bernstein
Minors: Mathematics, Classical Studies

Research

Oct 2019 – Present | Measuring the Hubble Constant based on the TRGB
Advisor: Wendy Freedman
Measuring distances to galaxies using the TRGB method to improve measurements of the Hubble Constant

Aug 2017 – July 2019 | Reconstructing Dark Matter Distributions
Advisor: Gary Bernstein
Reconstructed dark matter density maps from simulated galaxy catalogs using Hamiltonian Monte Carlo techniques
Used machine learning techniques to model a halo abundance relationship in dark matter simulations

Summer 2018 | Dark Matter Subhalo Dynamics in Galaxy Clusters
Advisor: Risa Wechsler | Stanford University KIPAC
Modeled dark matter subhalo disruption in high-resolution simulations and showed that there are universal features that predict whether a subhalo will disrupt or survive

Jul 2017 – Aug 2017 | Analyzing Glitches in LIGO GW detectors
Max Planck Institute for Gravitational Physics
Used gravitational-wave parameter estimation tools of LIGO collaboration to analyze and quantify effects of known "glitches," instrumental or environmental artifacts not of astrophysical origin present in data of LIGO gravitational-wave detectors

Summer 2017 | Characterizing temporal varability of L-band backscatter
Summer Intern, NASA Jet Propulsion Laboratory
Developed statistical models for terrestrial remote sensing with focus on biomass and vegetation parameter estimation
Executed radar processing software to create time series estimates of backscatter variability using UAVSAR data to refine NISAR performance models

May 2016 – May 2017	Improving Graphene Field-Effect Transistors *Advisor: A.T. Charlie Johnson* Studied effects of using boron nitride as a protectant layer for graphene field-effect transistors Assisted in bio-sensing and chemical-sensing for detection of drugs and diseases using ssDNA

Fellowships & Awards

2019 – 2021	McCormick Fellowship, UChicago
2019	Elaine K. Bernstein Women in Science Award, UChicago
2019	Graduated with Departmental Honors, Penn
2018	NASA Pennsylvania Space Grant Undergraduate Scholarship, NASA
2016 – 2018	University Scholar Research Grant, Penn

Teaching Experience

Guest Lecturer
Galaxies Feb 20
Guest lectured on the expansion of the universe and different types of distance measurements for application in measuring the Hubble Constant

Teaching Assistant
University of Chicago
- ASTR 12710, *Galaxies* — Winter 20
- ASTR 12700, *Stars* — Fall 19

University of Pennsylvania
- PHYS 150, *Principles of Physics I* — Spring 19
- ASTR 001 Observing Lab, *Survey of the Universe* — Fall 18, Spring 19
- PHYS 102, *E&M, Optics, and Modern Physics* — Spring 18
- PHYS 101 Lab, *General Physics* — Fall 17

Physics Tutor, Penn — Fall 16 – Spring 17

Outreach

Mentor, Society of Women in Physics Peer Mentorship Program, UChicago — 2019 – Present
Instructor, Space Explorers Winter Institute, UChicago — Jan 2020
Astronomy Observing Nights Organizer, Penn — 2018 – 2019
Astronomy Tutor, Veterans Upward Bound Training, Penn — 2018 – 2019

Service

Marathon Charity Runner, Lupus Society of Illinois — 2019 – Present
Faculty Meeting Representative, UChicago — 2019 – Present
Social Chair, Society of Physics Students, Penn — 2018 – 2019

Publications

R. Vishnubhotla, J. Ping, Z. Gao, **A. Lee**, O. Saouaf, A. Vrudhula, A. T. Johnson. *Scalable Graphene Aptasensors for Drug Quantification*. 2017, AIP Advances 7, 115111.

Talks & Poster Presentations

Dark Matter Subhalo Disruption 2018
Stanford University, Stanford Summer Research Program Undergraduate Talks

Characterizing Backscatter Variability using UAVSAR 2017
Accepted at 2017 AGU Fall Meeting (could not attend)
Rice University, 2017 Gulf Coast Undergraduate Research Symposium
NASA JPL, NASA JPL Final Summer Intern Presentation

Improved Performance in Graphene & MoS2 FETs using a BN Isolation Layer 2017
2017 Emerging Researchers National Conference in STEM

Skills

Computer Languages:	Python, Mathematica, SQL, LaTeX, bash, git
Data Analysis:	DAOPhot, ALLFrame, TOPCAT
Language:	English (native), Spanish (conversational)

Media

Penn Today 2019
WiP Group inspires the next generation of physicists and astronomers