HYUNSU KONG

Department of Physics
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EDUCATION

The University of Texas at Austin 2018 – Present
Ph.D. in Physics, Advisor: Michael Boylan-Kolchin

The University of Texas at Austin 2014 – 2017
B.S. in Physics

Houston Community College 2009 – 2011
A.S. in Physics, Highest Honors

RESEARCH EXPERIENCE

Research Interests
- Cosmology, dark matter, galaxy formation/evolution, numerical simulations
- Investigating the statistical properties of dark matter subhalos in Milky Way-mass halos to validate the ΛCDM cosmological model or propose alternative theories.
- Predicting the abundance of ultra-faint satellite galaxies around the Milky Way.
- Lead developer of Bloodhound: a novel subhalo-tracking algorithm designed to efficiently track subhalos in cosmological simulations.
- Managing data for the Phat ELVIS cosmological simulation project, which includes 12 dark matter-only (DMO) simulations of Milky Way-mass dark matter halos and 12 Disk simulations with an embedded galaxy potential.

Visiting Scholar Aug 2017 – Aug 2018
The University of Texas at Austin
- Investigated the mutual influence of Milky Way and M31 analogues within the Cosmic Dawn (CoDa) simulation, exploring their role in accelerating reionization and galaxy formation in the local universe.
- Supervisor: Paul Shapiro

MENTORSHIP

Directed Reading Program (DRP) - Physics 2022 – Present
Ashley Garcia, Ananya Gupta
- **Personalized Guidance:** Provided tailored mentorship to undergraduate students lacking prior research experience, guiding them through a directed reading project focused on mutually selected topics.
- **Comprehensive Support:** Developed extensive project materials to facilitate a deep understanding of the latest developments and tests of ΛCDM, enabling mentees to deliver impactful end-of-program presentations.

UT Austin GUMMY mentor 2022 – present
Rutajit Bharadwaj, Ananya Gupta, Mahan Mirza Khanlari, Sabiha Younus
- **Academic and Personal Support:** Offered guidance and support to undergraduate mentees, assisting in their academic and personal development at UT Austin.
- **Career Mentorship:** Provided advice on course selection, research opportunities, and career aspirations, serving as a mentor and resource for their success in academia and preparation for graduate studies.

UT Austin TAURUS research mentor 2022
Courtney Reed
- **Collaborative Support:** Assisted Postdoctoral Mentor, Jenna Samuel, in mentoring an undergraduate student from a traditionally marginalized group, focusing on a research project concerning the formation of ultra-diffuse satellite galaxies using the Feedback in Realistic Environments (FIRE) simulations.

- **Extended Engagement:** Continued involvement beyond the program, contributing to an AAS research note.

NSF REU & UT Austin TAURUS informal mentor   Summer 2022, 2023
Jaden Levine, Alfonso Melendez
- **Summer Mentorship:** Provided weekly mentorship to undergraduate mentees throughout the summer, guiding them in research projects, graduate school applications, and departmental engagement.

TEACHING

Teaching Assistant   Fall 2018, Spring 2019
The University of Texas at Austin
- PHY 103M: Physics Laboratory I-Mechanics
- Sole instructor for three 2-hour introductory mechanics laboratory classes each semester.
- Prepared and conducted lectures at the beginning of each lab session, designed quizzes to help/assess student understanding, and provided thorough feedback on graded lab reports.
- Offered support and guidance during office hours.
- Gained experience as both a course instructor and a traditional graduate teaching assistant.

Undergraduate Learning Assistant   2015-2017
The University of Texas at Austin
- Courses within Department of Physics: Waves and Optics, Modern Physics, Modern Physics Laboratory
- Courses within Department of Mathematics: Differential Calculus, Integral Calculus, Differential & Integral Calculus for Sciences
- Conducted office hours and led weekly discussion sections to aid students with course material and assignments.
- Assisted the course instructor and students during class sessions.

PRESENTATIONS

Invited Talk	**Physics Concerto: peer to peer seminar series, Physics Dept.**	Oct 2023
	Testing ΛCDM with Dark Matter Subhalos	*UT Austin*
Conference Talk	**Self-Interacting Dark Matter: Models, Simulations and Signals**	June 2023
	Bloodhound: Tracking the Evolution of Substructures	*Pollica, Italy*
Seminar Talk	**Galaxies and Cosmology Seminar, Astronomy Dept.**	
	Oct 2020, Oct 2022, Feb 2023, April 2024 (Upcoming)	*UT Austin*

OUTREACH AND SERVICE

Invited Talk	**NSF REU Seminar**	July 2023
	How do you study cosmology with cosmological simulations?	*UT Austin*
Invited Panelist	**Undergraduate Gender Minorities in Physics**	Nov 2022
	Graduate student panelist for Undergraduate GMiP's graduate school Q&A event	*UT Austin*

Awards & Honors

ACCESS Explore project, PI, Stampede3-2817 SU, Ranch-20038 GB
PHY240063: Testing Lambda-CDM with dark matter subhalos of Milky Way-mass halos

OTHER WORK EXPERIENCE

Republic of Korea Army, Sergeant   Jan 2012 – Oct 2013