

Kaustub Anand

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RESEARCHER

I am a graduate student at Purdue University with research interests in rings around non-planetary bodies, comets, and a variety of Solar System dynamics. I have experience with numerical simulations and observations in Planetary Sciences and Astronomy.

TECHNICAL SKILLS

Programming Languages : Python, FORTRAN, Java, IDL, \LaTeX , SAOImage DS9, C, C++, Matlab, IRAF

Pertinent Course-work: Computational Physics Lab, Solar System Astronomy, Numerical Modelling of Orbital Dynamics, Quantum Mechanics 1 & 2, Observational Astronomy Techniques, Fourier Analysis, Stellar Evolution, General Relativity

Languages : English, Hindi, French

Telescopes Used : DECCam

RESEARCH EXPERIENCE

Simulations of Deimos, Phobos, and the Mars debris disk

Advisor: Dr. David Minton and Dr. Matija Ćuk

Developing numerical simulations to constrain the origin mechanism of Deimos and Phobos, and their related dynamics with the Mars debris disk and sesquinary impacts.

Jan 2024 – Present

Purdue University

Numerical Simulations of Solar System Ring Systems

Advisor: Dr. David Minton

Developing numerical simulations of ring systems around non-planetary objects such as Centaurs and Trans-Neptunian Objects (TNOs) to understand their origin, evolution, and physical interactions. Added gravitational harmonics capabilities to Swiftest.

Aug 2022 – Present

Purdue University

Hydro Codes for Accretion disks in a Binary system

Advisor: Dr. Paul Duffell

Understood the basic principles and worked on the creating a hydro code for analysis of Accretion Disks around binary systems.

May 2022 – Jun 2022

Purdue University

Protoclusters in Simulation

Advisors: Dr. Kyoung-Soo Lee and Dr. Maria Celeste Artale

Analysed and extracted various features such as Stellar Mass Functions, Luminosity Functions, and Correlation Functions of Lyman-Alpha galaxies and galaxy clusters from IllustrisTNG boxes in concurrence with ODIN observational data.

May 2021 – May 2022

Purdue University

Dust-obscured Galaxy Clusters in far-IR

Advisor: Dr. Kyoung-Soo Lee

Identified, refined, and stacked Herschel/SPIRE archival data in MaDCoWS and SPT clusters in SPIRE far-IR bands to obtain star formation rates for dust-obscured galaxy clusters that are modeled as a function of redshift and mass.

May 2019 - May 2022

Purdue University

Fluid Simulation in XENON1T

Advisor: Dr. Rafael Lang

Aided in the development of an ANSYS Fluent program designed to simulate the convection flow in the liquid Xenon tank due to a temperature gradient for the dark matter research (XENON1T) project.

January 2018 - May 2018

Purdue University

EDUCATION

Purdue University

Bachelor of Science in Physics Honors.

Minors in Astronomy and Math. Graduated with Distinction.

Cum. GPA: 3.92/4.00; Major GPA: 3.96/4.00

West Lafayette, IN, USA

Aug 2017 – May 2021

Purdue University

Doctor of Philosophy in Physics.

GPA: 3.60/4.00

West Lafayette, IN, USA

Aug 2021 – Present

LEADERSHIP AND PROFESSIONAL EXPERIENCE

Physics Teaching Assistant

Teaching Assistant

Purdue University

Aug 2018 – Mar 2020 & Aug 2021 – Dec 2022

Aided students in group labs and recitations including python programming for modern mechanics (PHYS 172), electricity and magnetism (PHYS 272), senior-level Computational Physics Lab (PHYS 580), and Optics Lab (PHYS 450). Started as a Graduate Teaching Assistant in Aug 2021.

Saturday Morning Astrophysics

Undergrad teacher

Purdue University

Jan 2020 – Mar 2020 & Jan 2021 – May 2022

Teach and introduce common astronomy and physics concepts to elementary & middle school students through hands-on experiments monthly on Saturdays. Cut short due to COVID-19.

Peer Success Coach

Tutor

Purdue University

Jan 2021 – May 2021

Tutor and coach students at the Purdue Academic Success Center to improve their studying behaviour and motivate them to work towards achieving their current and new academic goals.

Protect Purdue Ambassador

Ambassador

Purdue University

Jan 2021 – May 2021

Educate, unify and encourage Purdue students to protect themselves, others and the entire Purdue community as they adjust to the new COVID-19 rules by creating social media content, presenting to campus organizations, etc.

International Student Ambassador

Ambassador

Purdue University

May 2020 – May 2021

Aid the Purdue International Students and Scholars (ISS) office as a student ambassador in organizing events for the international student community on campus including new student orientations, cultural mixers, Q&A sessions, etc.

Global Science Partners Leadership

Team Leader

Purdue University

Aug 2019 – May 2021

Organized and led events and discussions based on intercultural interactions in professional scientific settings among members of Global Science Partners learning community (~160 students) to stimulate conversations about the effects of culture on behaviour and scientific collaborations.

PAPERS

Swiftest: An N-body Integrator for Gravitational Systems

Carlisle Wishard, Jennifer Pouplin, Jacob Elliott, Dana Singh, **Kaustubh Anand**, David Minton

doi:10.21105/joss.05409

PRESENTATIONS

Division of Planetary Sciences-Europlanet Science Congress 2023

Presented a poster about my research on Centaur rings at the 2023 DPS-EPSC combined meeting

San Antonio, TX

Oct 2023

Department of Physics and Astronomy annual poster symposium

Presented a poster about my research on Centaur rings with Dr. Minton.

Purdue University

Fall 2023

Department of Physics and Astronomy 1-minute colloquium

Presented a 1-minute summary of my research on small body ring systems with Dr. Minton.

Purdue University

Dec 2022 & 2023

Purdue Fall 2020 Research Expo

Presented a poster about my galaxy cluster research with Dr. Lee at the Fall 2020 Research Exposition.

Purdue University

Fall 2020

AWARDS & CERTIFICATES

- Dean's List. 2017 – 2021
- Semester Honors. 2017 – 2021
- Honors College. 2018 - 2021
- Arthur N. Pozner Memorial Scholarship for academic excellence in Physics. 2020
- Learning Beyond the Classroom Certificate for intercultural learning in Science. 2021
- Martin C. Jishcke Outstanding International Student Award. 2021