Akash Gupta

CONTACT INFORMATION

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Pronouns: he/him/his

RESEARCH INTERESTS

Planet formation & evolution; planet demographics; atmospheric escape; atmosphere-interior interactions; celestial mechanics; ab-initio molecular dynamics; N-body simulations; and habitability.

APPOINTMENTS

51 Pegasi b Fellow, Beginning Fall 2023
Harry H. Hess Postdoctoral Fellow, and
Future Faculty in Physical Sciences Fellow
Princeton University
Department of Astrophysical Sciences & Department of Geosciences

NASA FINESST Grantee 2020 - 23
Graduate Student Researcher 2017 - 23
University of California, Los Angeles (UCLA)
Department of Earth, Planetary, and Space Sciences (EPSS)

Research Associate 2016-17
Undergraduate Researcher 2013-16
Indian Institute of Technology (IIT), Kanpur
Mechanics & Applied Mathematics Group and Dept. of Aerospace Engineering

EDUCATION

University of California, Los Angeles (UCLA)
Ph.D., M.S., Planetary Science (expected) 2017-23
Thesis: Unraveling the evolution of super-Earths and sub-Neptunes
Advisor: Prof. Hilke E. Schlichting

Indian Institute of Technology (IIT), Kanpur
B.Tech. - M.Tech. Dual degree, Aerospace Engineering 2011-16
Thesis: Dynamics of rings around minor planets
Advisors: Prof. Ishan Sharma and Dr. Sharvari Nadkarni-Ghosh

SELECT AWARDS & HONORS

- *51 Pegasi b Fellowship*, Heising-Simons Foundation 2023 -
- *Future Faculty in Physical Sciences Fellowship*, Princeton University 2023 -
- *Harry H. Hess Postdoctoral Fellowship*, Princeton University 2023 -
- *Future Investigators in NASA Earth & Space Science & Technology (FINESST) grant* 2020-23
- *Exoplanet Summer Program Mini Grant* by Heising-Simons Foundation & UC Santa Cruz 2023
- *American Astronomical Society (AAS) Rodger Doxsey Travel Prize* awarded annually to 10 early-career researchers for presenting their PhD dissertation at the AAS meeting 2023
- *UCLA EPSS Outreach Award* for DEI initiatives 2022

- Travel grant from MIAPbP[†] to attend *Planet Formation* Workshop 2022 in Germany 2022
- *Harold and Mayla Sullwold Scholarship* by EPSS, UCLA for excellence in research 2020
- *Constantine and Perina Panunzio Scholarship* by EPSS, UCLA for excellence in research 2019
- *UCLA's University Fellowship* 2017
- *EPSS Scholarship Award*, UCLA 2017

PEER-REVIEWED PUBLICATIONS

Journal Publications

Total citations: 425 (first-author: 379 — Google Scholar, Mar 2023)
Number of papers: 5 first-author (+1 in prep.), 1 second-author and 2 n^{th}-author
Students directly mentored: *

1. **Gupta, A.**, and Stixrude, L. 2023. In prep.
   Investigating the solubility of hydrogen in water using ab initio molecular dynamics: implications to water-rich planets and exoplanets
2. Owen, J. E., Murray-Clay, R. A., Schreyer, E., Schlichting, H. E., David, A., **Gupta, A.**, Loyd, R. O. P., Shkolnik, E. L., Sing, D. K., Swain, M. R., 2022. *MNRAS*. 518, 4357-4371.
   The fundamentals of Lyman-alpha exoplanet transits
3. **Gupta, A.**, *Nicholson, L. and Schlichting, H. E. 2022. *MNRAS*, 516, 4585-4593.
   Properties of the radius valley around low mass stars: Predictions from the core-powered ...
4. Rogers, J. G., **Gupta, A.**, Owen, J. E. and Schlichting, H. E. 2021. *MNRAS*, 508, 5886-5902.
   Photoevaporation vs. core-powered mass-loss: Model comparison with the 3D radius gap
5. **Gupta, A.** and Schlichting, H. E. 2021. *MNRAS*, 504, 4634-4648.
   Caught in the act: Core-powered mass-loss predictions for observing atmospheric escape
6. **Gupta, A.** and Schlichting, H. E. 2020. *MNRAS* 493, 792-806.
   Signatures of the core-powered mass-loss mechanism in the exoplanet population: Dependence on stellar properties and observational predictions
7. Estrada, R. Swain, M., **Gupta, A.**, Sotin, C. and Valio, A.. 2020. *ApJ*. 898, 104-109.
   Evolutionary tracks of H/He envelopes of the observed pop. of sub-Neptunes and super-Earths
8. **Gupta, A.** and Schlichting, H.E. 2019. *MNRAS* 487, 24-33.
   Sculpting the valley in the radius distribution of small exoplanets as a by-product of planet formation: The core-powered mass-loss mechanism
9. **Gupta, A.**, Nadkarni-Ghosh, S. and Sharma, I. 2018. *Icarus* 299, 97-116.
   Rings of non-spherical, axisymmetric bodies

Select Conference Proceedings

1. Tang, H., **Gupta, A.**, Schlichting, H.E. and Young E.D., 2020., 51st Annual Lunar and Planetary Science Conference, 1481
   Escape from a Transient Rock Vapor Atmosphere as the Mechanism for Fractionation of the Moon's Moderately Volatile Elements

[†]Munich Institute for Astro-, Particle and BioPhysics (Garching, Germany)

OBSERVING PROGRAMS AWARDED

1. Gemini MAROON-X, 25.7 hrs, Co-I (PI: Erik Petigura) 2022
   Probing the Role of Mass Loss in the Formation of Super-Earths and Sub-Neptunes with MAROON-X
2. HST Cycle 28, 15 primary spacecraft orbits, Co-I (PI: Paul Cauley) 2020
   Measuring mass loss via metal lines from the very young planet AU Mic b.

SEMINARS

MIT Kavli Institute, *Brown Bag Lunch Seminar*	2022
NASA Jet Propulsion Laboratory, *Exoplanet Journal Club Seminar*	2022
University of Arizona, *Origins Seminar*	2022
University of Texas, Austin *Stars and Planets Seminar*	2022
Caltech, *Dix Planetary Science Seminar*	2022
Yale, *Exoplanets and Stars Seminar*	2022
Cornell, *Planetary Lunch Seminar*	2022
UC Berkeley, *Center for Integrative Planetary Science Seminar*	2022
Princeton, *Exoplanet Discussion Group Seminar*	2022
Carnegie Earth & Planets Laboratory, *Astronomy Seminar*	2021
University of Arizona, *Disks and Exoplanets Group Seminar*	2020
McMaster University, *Astronomy Seminar*	2020
MIT, *Planetary Lunch Seminar*	2020
UCLA, *Planetary Science Seminar*	2018, '19, '21

CONFERENCES

Talks

241st AAS Meeting, Seattle, WA	2023
Planet Formation Workshop by MIAPbP‡, Munich, Germany (invited)	2022
240th AAS Meeting, Pasadena, CA, US	2022
Exoplanets IV, Las Vegas, NV, US	2022
Stars and Planets in the Ultraviolet, virtual conference	2021
Exoplanet Demographics, virtual conference	2020
Exoplanets III, virtual conference	2020
Bay Area Exoplanet Meeting, virtual conference	2020
New Horizons in Planetary Systems, Victoria, BC, Canada	2019

Posters

ExSoCal 2020, virtual conference	2020
Extreme Solar Systems IV. Reykjavik, Iceland	2019
NASA Sagan Summer Workshop, Pasadena, CA, US	2019
Kepler & K2 Science Conference V, Pasadena, CA, US	2019
11th *Annual EPSS Student Research Symposium, UCLA*, Los Angeles, CA, US	2018

48^{th} *DPS Meeting and* 11^{th} *EPSC*, Pasadena, CA, US 2016

TECHNICAL SKILLS

Programming languages: FORTRAN, C, MATLAB, Python, IDL, Bash.

Select open-source codes used: VASP, REBOUND, MESA, emcee, dynesty.

TECHNICAL WORKSHOPS

OWL Exoplanet Summer workshop by UC Santa Cruz and Heising-Simons 2022

Planet Formation workshop by MIAPbP in Garching, Germany 2022

Sagan Exoplanet Workshop: Astrobiology for Astronomers by NExSci at Caltech 2019

Communicating Science Effectively in Today's World by UCLA and EPSS 2019

XSEDE HPC Workshop: Summer Boot Camp by XSEDE & PSC at UCLA 2018

High Performance Computing Workshop by Intel at IIT Kanpur 2015

MENTORING, TEACHING, OUTREACH & PROFESSIONAL SERVICES

Mentoring (research):

- Lorraine Nicholson (UCLA undergrad/UC LEADS fellow → NSF GRFP fellow and Ph.D. student at U. of Florida) 2020-22
  Project: *Planet evolution under core-powered mass-loss around ultra-cool M-dwarfs*
- Sohanjit Ghosh (IIT Kanpur/IIEST undergrad → Ph.D. student at Johns Hopkins U.) 2017-18
  Project: *Understanding the dynamics of rings around non-spherical minor planets*

Mentoring (other):

- Mentor, *EPSS Family Mentorship Program (EFMP)*, UCLA 2021 - present
- Mentor, *Counseling Service*, IIT Kanpur 2012-13

Teaching:

- Guest Lecturer, Planetary & Orbital Dynamics (EPS SCI 219), UCLA Spring 2019
- Teaching Assistant, Solar System and Planets (EPS SCI 9), UCLA Winter 2019
- Teaching Assistant, Solar System and Planets (EPS SCI 9), UCLA Winter 2018
- Teaching Assistant, Experiments in Aerospace Engineering III (AE451A), IIT Spring 2016
- Teaching Assistant, Experiments in Aerospace Engineering II (AE351A), IIT Fall 2015

Reviews:

- Reviewer, *European Research Council (ERC) Starting Grant*
- Referee: *Nature Astronomy*, *Monthly Notices of the Royal Astronomical Society*, *American Astronomical Society* journals
- Judge, AAS Chambliss Astronomy Achievement Student Awards 2023

Other Diversity, Equity & Inclusion activities

- Founder & Organizing Committee Member, *EPSS Family Mentorship Program* 2021 - present
  Beginning 2022-23 AY, has an annual budget allocated by the Department Chair and has been awarded ~$2500 to-date (Sep, 2022)
- Department Representative, *Mathematics & Physical Sciences Council*, UCLA 2017-19

- Departmental Undergraduate Committee, Aerospace Engr., IIT Kanpur 2012-13

Other Professional Services and Activities

- Member, *American Astronomical Society* 2022 - present
- Member, *Division for Planetary Sciences* of the AAS 2022 - present
- Founder & Organizer, *Planets & Exoplanets Journal Club*, UCLA 2020 - 2022
  In effort to promote interdisciplinary dialogue; now also financially supported by Prof. David Jewitt/iPLEX institute
- Global Organizing Committee member, *Exoplanets III* conference 2020
- Co-founder and Manager of the *UCLA Planets & Exoplanets mailing list* 2019 - present
  In effort to promote interdisciplinary dialogue; currently has 130+ members from across three UCLA departments

Other Select Outreach Activities

- Invited speaker, *Planning for Graduate School*, IIT Bombay, India 2021
- Invited speaker, Wildwood Institute for STEM Research and Development Poster Presentation and Lecture Series, Wildwood School, Los Angeles, CA 2019
- Volunteer, International Observe the Moon Night, UCLA 2019
- Participant, *Exploring Your Universe* - UCLA's Annual Science Outreach Festival 2017-20
- Panelist, Key to Success: Life and Physical Sciences. Grad Student Orientation, UCLA 2018

OTHER SELECT ACHIEVEMENTS

Member of the first IIT Kanpur team (*IITK Motorsports*) to 'conceive, design and fabricate a small, Formula-style racing car to compete' at the *Formula SAE*, Italy'13 org. by the SAE[‡] International.

'*Sangeet Bhushan*' (equiv. to Diploma in Music) in playing Harmonium, an Indian classical instrument, from *Pracheen Kala Kendra*, India; 9-10 years of training in playing the instrument.

'*Sangeet Bhushan/Visharad II*' (equiv. to Diploma in Music) in playing Tabla, an Indian classical instrument, from *Pracheen Kala Kendra*, India; 6-7 years of training in playing the instrument.

[‡]Society of Automative Engineers