

# Akash Gupta

---

CONTACT INFORMATION	Peyton Hall, 110 Princeton University Princeton, NJ 08544	<i>Email:</i> akashgpt@princeton.edu <i>Website:</i> www.akashgpt.com
RESEARCH INTERESTS	Planet formation & evolution; planet demographics; atmospheric escape; atmosphere-interior interactions; celestial mechanics; ab-initio molecular dynamics; N-body simulations; and habitability.	
APPOINTMENTS	<b>51 Pegasi b Fellow,</b> <b>Harry H. Hess Postdoctoral Fellow, and</b> <b>Future Faculty in Physical Sciences Fellow</b> <i>Princeton University</i> Department of Astrophysical Sciences & Department of Geosciences <b>NASA Future Investigator (FINESST grantee)</b> <b>Graduate Student Researcher</b> <i>University of California, Los Angeles</i> Department of Earth, Planetary, and Space Sciences (EPSS) <b>Research Associate</b> <b>Undergraduate Researcher</b> <i>Indian Institute of Technology, Kanpur</i> Mechanics & Applied Mathematics Group & Dept. of Aerospace Engineering	2023 -       2020-23 2017-23  2016-17 2013-16
EDUCATION & TRAINING	<b>Princeton University (PU)</b> Postdoctoral Fellow, Astrophysical Sciences & Geosciences <i>Mentors:</i> Prof. Adam Burrows & Prof. Jie Deng <b>University of California, Los Angeles (UCLA)</b> Ph.D., M.S., Planetary Science <i>Thesis:</i> Unraveling the evolution of super-Earths and sub-Neptunes <i>Advisor:</i> Prof. Hilke E. Schlichting <b>Indian Institute of Technology, Kanpur (IIT-K)</b> B.Tech. - M.Tech. Dual degree, Aerospace Engineering	2023-    2017-23   2011-16
SELECT AWARDS & HONORS	<ul style="list-style-type: none"><li><i>51 Pegasi b Fellowship</i>, Heising-Simons Foundation</li><li><i>Future Faculty in Physical Sciences Fellowship</i>, Princeton University</li><li><i>Harry H. Hess Postdoctoral Fellowship</i>, Princeton University</li><li><i>Future Investigators in NASA Earth &amp; Space Science &amp; Technology (FINESST) grant</i></li><li><i>Exoplanet Summer Program Mini Grant</i> by Heising-Simons Foundation &amp; UC Santa Cruz</li><li><i>American Astronomical Society (AAS) Rodger Doxsey Travel Prize</i> awarded annually to 10 early-career researchers for presenting their PhD dissertation at the AAS meeting</li></ul>	2023 - 2023 - 2023 - 2020-23 2023 2023

- *UCLA EPSS Outreach Award* for DEI initiatives 2022
- Travel grant from MIAPbP<sup>†</sup> 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
- Travel grant from IIT - Finnish Consortium of Higher Education program to conduct research with Prof. Heikki Salo, University of Oulu, Finland 2015
- Placed in the top ~ 1% in the Indian national exam GATE<sup>‡</sup> (Aerospace Engineering) 2015
- Secured 99.6+ percentile among ~ 0.5 million candidates in the national exam IIT-JEE<sup>§</sup> 2011

PEER-REVIEWED JOURNAL PUBLICATIONS (*students directly mentored: \**)

PUBLICATIONS

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

<sup>†</sup>Munich Institute for Astro-, Particle and BioPhysics (Garching, Germany)

<sup>‡</sup>Graduate Aptitude Test in Engineering

<sup>§</sup>Indian Institute of Technology - Joint Entrance Examination (for admission to science & engineering colleges in India)

	1. Tang, H., <b>Gupta, A.</b> , Schlichting, H.E. and Young E.D., 2020., 51st Annual Lunar and Planetary Science Conference, 1481 <i>Escape from a Transient Rock Vapor Atmosphere as the Mechanism for Fractionation of the Moon's Moderately Volatile Elements</i>	
OBSERVING PROGRAMS AWARDED	1. W.M. Keck Observatory, 3 nights, Co-I (PI: Erik Petigura) <i>The KPF Disordered Multis Survey</i>	2023
	2. Gemini MAROON-X, 25.7 hrs, Co-I (PI: Erik Petigura) <i>Probing the Role of Mass Loss in the Formation of Super-Earths and Sub-Neptunes with MAROON-X</i>	2022
	3. Hubble Space Telescope Cycle 28, 15 primary spacecraft orbits, Co-I (PI: Paul Cauley) <i>Measuring mass loss via metal lines from the very young planet AU Mic b</i>	2020
SEMINARS	MIT Kavli Institute, <i>Brown Bag Lunch Seminar</i>	2022
	NASA Jet Propulsion Laboratory, <i>Exoplanet Journal Club Seminar</i>	2022
	University of Arizona, <i>Origins Seminar</i>	2022
	University of Texas, <i>Austin Stars and Planets Seminar</i>	2022
	Caltech, <i>Dix Planetary Science Seminar</i>	2022
	Yale, <i>Exoplanets and Stars Seminar</i>	2022
	Cornell, <i>Planetary Lunch Seminar</i>	2022
	UC Berkeley, <i>Center for Integrative Planetary Science Seminar</i>	2022
	Princeton, <i>Exoplanet Discussion Group Seminar</i>	2022
	Carnegie Earth & Planets Laboratory, <i>Astronomy Seminar</i>	2021
	University of Arizona, <i>Disks and Exoplanets Group Seminar</i>	2020
	McMaster University, <i>Astronomy Seminar</i>	2020
	MIT, <i>Planetary Lunch Seminar</i>	2020
	UCLA, <i>Planetary Science Seminar</i>	2018, '19, '21
CONFERENCES	TALKS	
	241 <sup>st</sup> AAS Meeting, Seattle, WA	2023
	<i>Planet Formation Workshop</i> by MIAPbP <sup>‡</sup> , Munich, Germany (invited)	2022
	240 <sup>th</sup> AAS Meeting, Pasadena, CA, US	2022
	<i>Exoplanets IV</i> , Las Vegas, NV, US	2022
	<i>Stars and Planets in the Ultraviolet</i> , virtual conference	2021
	<i>Exoplanet Demographics</i> , virtual conference	2020
	<i>Exoplanets III</i> , virtual conference	2020
	<i>Bay Area Exoplanet Meeting</i> , virtual conference	2020
	<i>New Horizons in Planetary Systems</i> , Victoria, BC, Canada	2019

POSTERS		
	<i>ExSoCal 2020</i> , virtual conference	2020
	<i>Extreme Solar Systems IV</i> . Reykjavik, Iceland	2019
	<i>NASA Sagan Summer Workshop</i> , Pasadena, CA, US	2019
	<i>Kepler &amp; K2 Science Conference V</i> , Pasadena, CA, US	2019
	<i>11<sup>th</sup> Annual EPSS Student Research Symposium</i> , UCLA, Los Angeles, CA, US	2018
	<i>48<sup>th</sup> DPS Meeting and 11<sup>th</sup> EPSC</i> , Pasadena, CA, US	2016
TECHNICAL SKILLS	<i>Programming languages:</i> Python, C, MATLAB, FORTRAN, IDL, Bash. <i>Select softwares/codes:</i> VASP, REBOUND, MESA, emcee, dynesty.	
TECHNICAL WORKSHOPS	<i>OWL Exoplanet Summer workshop</i> by UC Santa Cruz and Heising-Simons	2022
	<i>Planet Formation workshop</i> by MIAPbP in Garching, Germany	2022
	<i>Sagan Exoplanet Workshop: Astrobiology for Astronomers</i> by NExSci at Caltech	2019
	<i>Communicating Science Effectively in Today's World</i> by UCLA and EPSS	2019
	<i>XSEDE HPC Workshop: Summer Boot Camp</i> by XSEDE & PSC at UCLA	2018
	<i>High Performance Computing Workshop</i> 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: <i>Planet evolution under core-powered mass-loss around ultra-cool M-dwarfs</i>	
	- Sohanjit Ghosh (IIT Kanpur/IIST undergrad → Ph.D. student at Johns Hopkins U.)	2017-18
	Project: <i>Understanding the dynamics of rings around non-spherical minor planets</i>	
	MENTORING (OTHER):	
	- Mentor, <i>EPSS Family Mentorship Program (EFMP)</i> , UCLA	2021-23
	- Mentor, <i>Counseling Service</i> , 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 for NASA, <i>European Research Council (ERC)</i>	2022 -

- Referee for *Nature Astronomy*, *PNAS*<sup>¶</sup>, *MNRAS*<sup>||</sup>, *ApJ*<sup>\*\*</sup> 2019 -
- Judge, AAS Chambliss Astronomy Achievement Student Awards 2023

#### OTHER DIVERSITY, EQUITY & INCLUSION ACTIVITIES

- Founder & Organizing Committee Member, *EPSS Family Mentorship Program* 2021-23
- Department Representative, *Mathematics & Physical Sciences Council*, UCLA 2017-19
- Departmental Undergraduate Committee, Aerospace Engr., IIT Kanpur 2012-13

#### OTHER PROFESSIONAL SERVICES AND ACTIVITIES

- Member, *NSF Physics Frontiers Center: Center for Matter at Atomic Pressures (CMAP)* 2023 -
- Member, *American Astronomical Society (AAS)* 2022-
- Member, *Division for Planetary Sciences* of the AAS 2022-
- Founder & Organizer, *Planets & Exoplanets Journal Club*, UCLA 2020-22
- Global Organizing Committee member, *Exoplanets III* conference 2020

#### 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<sup>††</sup> 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.

<sup>¶</sup>Proceedings of the National Academy of Sciences

<sup>||</sup>Monthly Notices of the Royal Astronomical Society

<sup>\*\*</sup>Astrophysical Journal

<sup>††</sup>Society of Automotive Engineers