

# Akash Gupta

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CONTACT INFORMATION	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 (UCLA)</i> Department of Earth, Planetary, and Space Sciences (EPSS) <b>Research Associate</b> <b>Undergraduate Researcher</b> <i>Indian Institute of Technology (IIT), Kanpur</i> Mechanics & Applied Mathematics Group and Dept. of Aerospace Engineering	Aug 2023 -      2020 - 23 2017 - 23  2016-17 2013-16
EDUCATION	<i>University of California, Los Angeles (UCLA)</i> <b>Ph.D., M.S., Planetary Science</b> <i>Thesis:</i> Unraveling the evolution of super-Earths and sub-Neptunes <i>Advisor:</i> Prof. Hilke E. Schlichting <i>Indian Institute of Technology (IIT), Kanpur</i> <b>B.Tech. - M.Tech. Dual degree, Aerospace Engineering</b> <i>Thesis:</i> Dynamics of rings around minor planets <i>Advisors:</i> Prof. Ishan Sharma and Dr. Sharvari Nadkarni-Ghosh	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><li>• <i>UCLA EPSS Outreach Award</i> for DEI initiatives</li></ul>	2023 - 2023 - 2023 - 2020-23 2023 2023 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
- Secured 99.6+ percentile among ~ 0.5 million candidates in the national exam IIT-JEE<sup>‡</sup> 2011

#### PEER-REVIEWED JOURNAL PUBLICATIONS

##### PUBLICATIONS

*Total citations:* 479 (first-author: 427 — Google Scholar, June 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

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

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

*Escape from a Transient Rock Vapor Atmosphere as the Mechanism for Fractionation of the Moon's Moderately Volatile Elements*

OBSERVING PROGRAMS AWARDED	1. 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
	2. HST 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
CONFERENCES	MIT, <i>Planetary Lunch Seminar</i>	2020
	UCLA, <i>Planetary Science Seminar</i>	2018, '19, '21
	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

	NASA Sagan Summer Workshop, Pasadena, CA, US	2019
	Kepler & K2 Science Conference V, Pasadena, CA, US	2019
	11 <sup>th</sup> Annual EPSS Student Research Symposium, UCLA, Los Angeles, CA, US	2018
	48 <sup>th</sup> DPS Meeting and 11 <sup>th</sup> 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) Project: Planet evolution under core-powered mass-loss around ultra-cool M-dwarfs - Sohanjit Ghosh (IIT Kanpur/IIST undergrad → Ph.D. student at Johns Hopkins U.) Project: Understanding the dynamics of rings around non-spherical minor planets	2020-22 2017-18
	MENTORING (OTHER): - Mentor, EPSS Family Mentorship Program (EFMP), UCLA - Mentor, Counseling Service, IIT Kanpur	2021 - present 2012-13
	TEACHING: - Guest Lecturer, Planetary & Orbital Dynamics (EPS SCI 219), UCLA - Teaching Assistant, Solar System and Planets (EPS SCI 9), UCLA - Teaching Assistant, Solar System and Planets (EPS SCI 9), UCLA - Teaching Assistant, Experiments in Aerospace Engineering III (AE451A), IIT - Teaching Assistant, Experiments in Aerospace Engineering II (AE351A), IIT	Spring 2019 Winter 2019 Winter 2018 Spring 2016 Fall 2015
	REVIEWS: - Reviewer, NASA, European Research Council (ERC) - 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<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.

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