Akash Gupta

CONTACT INFORMATION

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RESEARCH INTERESTS

Planet formation and evolution; atmospheric escape; atmosphere and interior interactions; *ab-initio* simulations; planetary dynamics and celestial mechanics; planetary habitability.

EDUCATION

University of California, Los Angeles (UCLA)
Ph.D. in *Planetary Science*[†] 2017 - present
Master of Science in *Planetary Science*[†] 2019
Advisor: Prof. Hilke E. Schlichting

Indian Institute of Technology (IIT), Kanpur
Bachelor's and Master's (Dual degree) in *Aerospace Engineering* 2016
Advisors: Prof. Ishan Sharma and Dr. Sharvari Nadkarni-Ghosh

RESEARCH EXPERIENCE

NASA *Future Investigator* 2020 - present
Graduate Student Researcher 2017 - present
Advisor: Prof. Hilke E. Schlichting (2017-) and Prof. Lars Stixrude (2021-)
Department of Earth, Planetary, and Space Sciences (EPSS), UCLA

Research Assistant 2016-17
Advisor: Prof. Ishan Sharma
Mechanics & Applied Mathematics Group, IIT Kanpur

Summer Research Student Summer 2015
Advisor: Prof. Heikki Salo
Astronomy Research Unit, Department of Physics, University of Oulu

Undergraduate Researcher 2013-16
Advisors: Prof. Ishan Sharma & Dr. Sharvari Nadkarni-Ghosh
Mechanics & Applied Mathematics Group and *Dept. of Aerospace Engr., IIT Kanpur*

SELECTED SCHOLASTIC ACHIEVEMENTS

Selected for the OWL Summer Exoplanet Program 2022 at UC Santa Cruz 2022
Travel grant from MIAPP[‡] to attend *Planet Formation* workshop 2022 in Germany 2022
Harold and Mayla Sullwold Scholarship by EPSS[§], UCLA for excellence in research 2020
Future Investigators in NASA Earth and Space Science and Technology (FINESST) grant 2020-23
Constantine and Perina Panunzio Scholarship by EPSS, UCLA for excellence in research 2019
UCLA's University Fellowship for three Quarters 2017-19
EPSS Department Scholarship Award, UCLA 2017
Travel grant for research from IIT to work with Prof. Heikki Salo, U. of Oulu, Finland 2015
Secured 99.61 percentile among $\sim$ 0.5 million candidates in the national exam IIT-JEE[¶] 2011

PUBLICATIONS

FIRST- AND SECOND-AUTHOR (total citations: 286, as of May 2022; *: students advised)

1. **Gupta, A.**, *Nicholson, L. and Schlichting, H. E. 2022. In review. *MNRAS*. arXiv:2205.14020. *Properties of the radius valley around low mass stars: Predictions from the core-powered mass-loss mechanism*
2. Rogers, J. G., **Gupta, A.**, Owen, J. E. and Schlichting, H. E. 2021. *MNRAS*, 508, 5886. *Photoevaporation Vs. core-powered mass-loss: Model comparison with the 3D radius gap*

[†] formally, *Geophysics & Space Physics*
[‡] Munich Institute of Astro- and Particle Physics
[§] EPSS stands for Department of Earth, Planetary, and Space Sciences
[¶] Indian Institute of Technology - Joint Entrance Examination

3. **Gupta, A.** and Schlichting, H. E. 2021. *MNRAS*, 504, 4634.
   Caught in the act: Core-powered mass-loss predictions for observing atmospheric escape
4. **Gupta, A.** and Schlichting, H. E. 2020. *MNRAS* 493, 792.
   Signatures of the core-powered mass-loss mechanism in the exoplanet population: Dependence on stellar properties and observational predictions
5. **Gupta, A.** and Schlichting, H.E. 2019. *MNRAS* 487, 24.
   Sculpting the valley in the radius distribution of small exoplanets as a by-product of planet formation: The core-powered mass-loss mechanism
6. **Gupta, A.**, Nadkarni-Ghosh, S. and Sharma, I. 2018. *Icarus* 299, 97.
   Rings of non-spherical, axisymmetric bodies

OTHERS (total citations: 5, as of May 2022)

1. 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., 2021., In review. arXiv:2111.06094
   The fundamentals of Lyman-alpha exoplanet transits
2. Estrada, R. Swain, M., **Gupta, A.**, Sotin, C. and Valio, A.. *ApJ.* 898, 104.
   Evolutionary tracks of H/He envelopes of the observed pop. of sub-Neptunes and super-Earths

SELECTED CONFERENCE PROCEEDINGS

1. Haolan T., **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

SEMINARS	*Astronomy Seminar*, Carnegie Earth & Planets Laboratory	2021
	Disks and Exoplanets Group Seminar, University of Arizona	2020
	Astronomy Seminar, McMaster University	2020
	Planetary Lunch Seminar, Massachusetts Institute of Technology	2020
	Planetary Science Seminar, UCLA	2019, '18
CONFERENCES	*240^{th} AAS Meeting*, Pasadena, CA, US. Talk.	2022
	Exoplanets IV, Las Vegas, NV, US. Talk.	2022
	Stars and Planets in the Ultraviolet. Talk.	2021
	Exoplanet Demographics. Talk.	2020
	Exoplanets III. Talk.	2020
	Bay Area Exoplanet Meeting. Talk.	2020
	Extreme Solar Systems IV. Reykjavik, Iceland. Poster.	2019
	NASA Sagan Summer Workshop. Pasadena, CA, US. Poster.	2019
	New Horizons in Planetary Systems. Victoria, BC, Canada. Talk.	2019
	Kepler & K2 Science Conference V. Pasadena, CA, US. Poster.	2019
	11^{th} *Annual EPSS Student Research Symposium, UCLA*. Los Angeles, CA, US. Poster.	2018
	48^{th} *DPS Meeting and* 11^{th} *EPSC*. Pasadena, CA, US. Poster.	2016
OBSERVING PROGRAMS	Gemini MAROON-X, 25.7 hrs, Co-I (PI: Erik Petigura) *Probing the Role of Mass Loss in the Formation of Super-Earths and Sub-Neptunes with MAROON-X*	2022
	HST Cycle 28, 15 primary spacecraft orbits, Co-I (PI: Paul Cauley) *Measuring mass loss via metal lines from the very young planet AU Mic b.*	2020
OTHER MAJOR PROJECTS	Asymmetry in Lunar 'cold-spot' craters; now led by Sophie Taylor (UCLA)	2017 - present
	Rings around irregularly shaped minor-planets; now led by Shri B. Bharath (IITK)	2016 - present
	Understanding the dynamics of Saturn's F-ring	2015
	Adaptively optimized trajectories for rendezvous with an asteroid	2013-14

Technical Skills

Programming languages: FORTRAN, C, MATLAB, Python, IDL, Shell Script.
Selected open-source codes used: VASP, REBOUND, MESA, emcee, dynesty.

Technical Workshops

Planet Formation workshop by MIAPP 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, Services and Outreach

Mentoring (research):

- Lorraine Nicholson, (UC LEADS scholar; currently NSF GRFP fellow at U. Florida) 2020 - 22
  Project: *Planet evolution under core-powered mass-loss around ultra-cool M-dwarfs*
- Sohanjit Ghosh (IITK undergraduate; currently Ph.D. student at U. Maryland) and 2017-18
  Project: *Understanding the dynamics of rings around non-spherical minor planets*

Mentoring (other):

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

Teaching:

- Solar System and Planets (EPS SCI 9), UCLA Winter 2019
- Solar System and Planets (EPS SCI 9), UCLA Winter 2018
- Experiments in Aerospace Engineering III (AE451A), IIT Kanpur Spring 2016
- Experiments in Aerospace Engineering II (AE351A), IIT Kanpur Fall 2015

Other Diversity, Equity & Inclusion activities

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

Other professional services and activities

- Referee: *Nature Astronomy*, *MNRAS*, *AAS* journals 2020 - present
- Member, *American Astronomical Society* and *Division for Planetary Sciences* 2022 - present
- Founder & Organizer, *Planets & Exoplanets Journal Club*, UCLA 2020 - 2022
- Global Organizing Committee Member, *Exoplanets III* conference 2020
- Founded and managed the *UCLA Planets & Exoplanets mailing list* for promoting inter-departmental communication at UCLA 2019 - 2022

Other 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
- Panelist, EPSS Graduate Student Panel, UCLA 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
- Executive, Society of Automotive Engineers (SAE) Chapter, IIT Kanpur 2012-13
- Volunteer, Organizing Team, Undergraduate Orientation Program, IIT Kanpur 2012

Other Major Achievements

'*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.