HILKE ELISABETH SCHLICHTING

Department of Earth, Planetary, and Space Sciences
University of California, Los Angeles

Professor of Exoplanets & Planetary Sciences, Associate Dean for Research, Physical Sciences

Education:

Ph.D., Astrophysics, California Institute of Technology, 2009
Master of Science, Astrophysics, California Institute of Technology, 2007
Master of Arts, University of Cambridge, 2007
Master of Natural Sciences, Theoretical Physics, University of Cambridge, 2004
Bachelor of Arts, Physics, University of Cambridge, 2004

Professional Appointments:

Associate Dean for Research, Division of Physical Sciences, UCLA, 2022-
Professor, Earth, Planetary and Space Sciences, UCLA, 2021-
Visiting Professor, EAPS, Massachusetts Institute of Technology, 2017-2021
Associate Professor, Earth, Planetary and Space Sciences, UCLA, 2015-2021
Assistant Professor, Physics, Massachusetts Institute of Technology, 2015-2017
Assistant Professor, EAPS, Massachusetts Institute of Technology, 2013-2017
NASA Hubble Postdoctoral Fellow, University of California, Los Angeles, 2010-2013
Postdoctoral Fellow, Canadian Institute for Theoretical Astrophysics, 2009-2010

Honors & Awards:

- Visiting Fellow, Trinity College, University of Cambridge, UK, 2022
- Scialog: Signatures of Life in the Universe Fellow, Research Cooperation for the Advancement of Science, 2020
- Kavli visitor in Astrophysics (medium term), University of Cambridge, UK, 2019-2022
- Kavli visitor in Astrophysics (short term), University of Cambridge, UK, 2018
- Kavli Frontiers of Science Fellow, U.S. National Academy of Sciences, 2015
- Asteroid (9522) Schlichting, named 2014
- Elected Member of Elisabeth-Schiemann-Kolleg, Max Planck Society, 2014
- Chancellor's Award for Exceptional Accomplishments in Postdoctoral Research, University of California, Los Angeles, 2012
- Hubble Fellowship, NASA, 2010
- Best Poster Prize, WE-Heraeus Physics School on "The Early Phase of Planet Formation", 2008
- Reed-Fellowship, California Institute of Technology, 2004
- New Hall Scholarship, University of Cambridge, 2004
- Fellow of the Cambridge European Society, Cambridge European Trust, 2004

Scientific Leadership:

- Associate Dean for Research, Division of Physical Sciences, UCLA, 2022-Current
- Member NASA NExSS Steering Committee, 2018-current
- Scientific Organizing Committee:
  - Transformative Astrophysics with WFIRST meeting, Pasadena (2016)

- 4th Session of the Sant Cugat Forum on Astrophysics, Spain (2016)
- Formation and Dynamical Evolution of Exoplanets meeting, Aspen (2017)
- Stars, Planets & Galaxies meeting, Berlin, Germany (2018)
- Exoplanets II meeting, Cambridge, UK (2018)
- Planet Formation: From dust coagulation to final orbit assembly, Germany (2020)

- UCLA Division of Physical sciences: shaped with private donor the new Queen's Road Foundation Undergraduate Research Fellowship to increase gender diversity
- UCLA Division of Physical sciences: Queen's Road Foundation Undergraduate Research Fellowship selection committee
- Chair UCLA Pegasus 51 b fellowship selection committee, 2019-2020, 2021-2022
- UCLA Division of Physical sciences: co-organizer women leadership workshop, 2018, 2020
- Hubble Fellow Selection Committee, 2014, 2020
- Hubble Space Telescope Time Allocation Committee, 2011, 2015
- NASA Review Panel
- NSF Review Panel
- *Undergraduate Women in Physics Conferences,* including 2018 plenary speaker, 2017-2018
- UCLA EPSS representative to the legislative assembly, 2017-2020
- UCLA EPSS Faculty Search Committee, 2016/2017, 2021/2022
- UCLA EPSS Diversity Committee, 2016/2017
- External Thesis committee: John Biersteker (MIT, 2019), Matthew Heising (2021, Harvard), Diana Powell (2021, UCSC)
- Referee for Nature, Nature Astronomy, Astrophysical Journal, Astrophysical Journal Letters, Astronomical Journal, Icarus, MNRAS, Space Science Reviews, JGR Planets, Astronomy & Astrophysics

Invited Talks and Lectures:

Summary: 130+ invited presentations, including seminars, colloquia, and international conferences. Selection of recent (last 5 years) conference talks and colloquia summarized below:

- **Astronomy Colloquium, CfA, Harvard University***, Atmospheres as Probes of the Interiors and Formation pathways of Earth, super-Earths and sub-Neptunes,* 2025
- **Planetary Science Seminar, University of Cambridge,** *Atmospheres as Probes of the Interiors and Formation pathways of Earth, super-Earths and sub-Neptunes,* 2025
- **ISSI Workshop 'Life beyond Earth: The Missing Link'***, The Role of Hydrogen in Determining Habitability*, 2025
- **Invited Keynote talk Dynamics & Detection of Exoplanets***, Capitalizing on synergies between planet formation theory and observations*, Portugal, 2025
- **Institute for Advanced Studies, Seminar, Princeton,** *Atmospheres as Probes of the Interiors and Formation pathways of Earth, super-Earths and sub-Neptunes,* 2025
- **Young Transiting Planet Workshop,** *New interior and thermal evolution models of young sub-Neptune exoplanets,* Japan, 2025
- **Carnegie Observatories Colloquium***, Formation pathways of Earth, super-Earths and sub-Neptunes,* 2025
- **Invited talk, AGU,** *Fleeting but Not Forgotten: The Imprint of Escaping Hydrogen Atmospheres on Super-Earths,* DC, 2024

- **Exoplanets V,** *Atmosphere-interior connections: What recent JWST observations revel about the interiors of Sub-Neptunes,* Netherlands, 2024
- **Escaping from Exoplanets I,** *Core-powered Mass loss, Photoevaporation and the not so isothermal Wind*, London, 2024
- **Extreme Solar Systems 5**, *Atmosphere-interior connections: What recent JWST observations revel about the interiors of Sub-Neptunes,* New Zealand, 2024
- **Astronomy Colloquium, Caltech**, *From Exoplanets to the Solar System: Rocky Planet Formation in a new Light, 2023*
- **Invited Plenary speaker**, **AAS Division for Dynamics Meeting,** *Giant Impacts: Sculpting Planet Uniformity or Diversity*, East Lansing, 2023
- **Invited speaker, Sagan summer school**, Caltech, 2023
- **Colloquium, Stanford University**, *Rocky Planet Formation with primordial H_2-rich Atmospheres: Implications for Super-Earths, Sub-Neptunes and Earth, 2023*
- **Astronomy Colloquium, Princeton University**, *The Atmosphere-Interior connection of super Earths & sub-Neptunes: From Formation and Evolution to Observations, 2022*
- **Astronomy Colloquium, UCSC,** *The Atmosphere-Interior connection of super Earths & sub-Neptunes: From Formation and Evolution to Observations, 2022*
- **ESS Colloquium, Harvard University**, *Rocky Planet Formation with primordial H_2-rich Atmospheres: Implications for Super-Earths, Sub-Neptunes and Earth, 2022*
- **Astronomy Seminar, Imperial College London**, *Rocky Planet Formation with primordial H_2-rich Atmospheres: Implications for Super-Earths, Sub-Neptunes and Earth, 2022*
- **Invited Plenary speaker**, **AAS Division for Planetary Sciences Meeting,** *The Atmosphere-Interior connection of super Earths & sub-Neptunes***,** 2021
- **Exoplanet Seminar, University of Cambridge***, Losing Oceans: Atmospheric loss by giant impacts revisited,* Cambridge, UK, 2020
- **EAPS Colloquium, MIT**, *Metamorphosis: Turning (sub-)Neptunes into (super-)Earths*, Cambridge, MA, USA, 2020
- **Invited speaker, Exoplanet III**, *Planet Formation in the era of exoplanets: Theory and Observation*, Heidelberg, Germany, 2020

Publications:

Summary: 81 peer-reviewed publications: 78 published, 3 under review, 15 first author, 25 second author, 23 papers led by student authors directly supervised. 3 Nature (1 as first-author), 1 Science. h-index=41, total citations: ~5500** (**google scholar Oct 2025)

18 most significant publications with focus on recent work:
*= student/postdoc author directly supervised:

1) **Redefining interiors and envelopes: hydrogen-silicate miscibility and its consequences for the structure and evolution of sub-Neptunes,* J. Rogers, E. D. Young, & **Hilke E. Schlichting**, 2025, MNRAS, in review

2) **Atmospheric C/O Ratios of Sub-Neptunes with Magma Oceans: Homemade rather than Inherited,* A. Werlen, C. Dorn, **Hilke E. Schlichting**, S. L. Grimm, & E. D. Young, 2025, ApJL, 988, 55

3) *Mapping out the parameter space for photoevaporation and core-powered mass-loss*, J.E. Owen & **Hilke E. Schlichting**, 2024, MNRAS, 528, 1615

4) **Fleeting but Not Forgotten: The Imprint of Escaping Hydrogen Atmospheres on Super-Earth Interiors*, J. G. Rogers, **Hilke E. Schlichting** & E.D. Young, 2024, ApJ, 970, 47

5) *Earth Shaped by Primordial H_2 Atmospheres,* E. D. Young, A. Shahar & **Hilke E. Schlichting**, 2023, Nature, 616, 306

6) **Conclusive evidence for a population of water-worlds around M-dwarfs remains elusive,* J. G. Rogers, **Hilke E. Schlichting** & J. E. Owen, 2023, ApJL, 947, 19

7) *Chemical equilibrium between Cores, Mantles, and Atmospheres of Super-Earths and Sub-Neptunes, and Implications for their Compositions, Interiors and Evolution*, **Hilke E. Schlichting** & E. D. Young, 2022, Planetary Science Journal, 3, 127

8) **Losing Oceans: The Effects of Composition on the Thermal Component of Impact-driven Atmospheric Loss*, John B. Biersteker & **Hilke E. Schlichting**, 2021, MNRAS, 501, 587

9) **Signatures of the Core-Powered Mass-Loss Mechanism in the Exoplanet Population: Dependence on Stellar Properties and Observational Predictions,* A. Gupta & **Hilke E. Schlichting**, 2020, MNRAS, 493, 792

10) **Sculpting the Valley in the Radius Distribution of Small Exoplanets as a by-product of Planet Formation: The Core-Powered Mass-Loss Mechanism,* A. Gupta & **Hilke E. Schlichting**, 2019, MNRAS, 487, 24

11) *Oxygen fugacities of extrasolar rocks: evidence for an Earth-like geochemistry of exoplanets* A. E. Doyle, E. D. Young, B. Klein, B. Zuckerman, **Hilke E. Schlichting**, 2019, Science, 6463, 356

12) **Atmospheric Mass Loss Due to Giant Impacts: The Importance of the Thermal Component for H/He Envelope,* J. B. Biersteker & **Hilke E. Schlichting**, 2019, MNRAS, 485, 4454

13) **Core-powered mass-loss and the radius distribution of small exoplanets,* S. Ginzburg, **Hilke E. Schlichting** & R. Sari, 2018, MNRAS, 476, 759

14) **Super-Earth Atmospheres: Self-consistent Gas Accretion and Retention*, S. Ginzburg, **Hilke E. Schlichting** & R. Sari, 2016, ApJ, 825, 29

15) *Atmospheric Mass Loss During Planet Formation: The importance of Planetesimal Impacts,* **Hilke E. Schlichting**, R. Sari & A. Yalinewich, 2015, Icarus, 247, 81

16) *Formation of Close in Super-Earths & Mini-Neptunes: Required Disk Masses & Their Implications*, **Hilke E. Schlichting**, 2014, ApJL, 795, 15

17) *Overstable Librations can Account for the Paucity of Mean Motion Resonances among Exoplanet Pairs***,** P. Goldreich & **Hilke E. Schlichting**, 2014, AJ, 147, 32

18) *A Single sub-km Kuiper Belt object from a stellar Occultation in archival data,* **Hilke E. Schlichting**, E. O. Ofek, M. Wenz, R. Sari, A. Gal-Yam, M. Livio, E. Nelan, S. Zucker 2009, Nature, 462, 895

Grants:

Summary: total extramural funding received > 3.7M, current active funding > 1.3M, past funding 2.4M.

1) NASA, XRP, *Metamorphosis: Atmospheric compositions as a result of hydrodynamic escape from Sub-Neptunes and Super Earths*, 2024-2027, PI, **$742,368**

2) NASA, XRP, *Using Helium Absorption Signatures to Probe Planetary Magnetic Fields*, 2024-2027, Co-I, **$79,000**

3) Space Telescope Science Institute (GO-04098), *Exploring the Existence and Diversity of Volatile-Rich Water Worlds,* 2024-2026, Co-I, **$249,000**

4) NASA, XRP, *A physical model of Lyman-alpha transits in the photoevaporation and core-powered mass-loss model,* 2023-2025, Co-I**, $254,884**

5) NASA XRP, *To Have but Not to Hold: Atmospheric Mass Loss of Super-Earths and Sub-Neptunes,* 2021-2023, PI , **$350,778**

6) Sloan Foundation, *AEThER: Atmospheric Empirical, Theoretical, and Experimental Research* (UCLA PI together with Ed Young), 2021-2024, **$272,862**

7) NASA, FINESST, *Investigating Planet Evolution under the Core-Powered Mass-Loss Mechanisms at Longer Orbital Period and Determining its Observable Signatures*, 2020-2023, PI, **$135,000**

8) NASA, NAI: *Origin and Cycles of Life-essential Ingredients in Young Rocky Planets*, 2018-2023, Co-I, **$520,021**

9) Space Telescope Science Institute (GO-02149), *The Nature, Origin, and Fate of Two Planets of A Newborn System through the Lens of Their Relative Atmospheric Properties*, Co-I, **$22,499**

10) NASA, XRP, *Giant impacts: The formation and diversity of super-Earths*, 2018-2021, PI, **$327,463**

11) Hubble Space Telescope Grant # 15213*, A Pure Parallel survey of the colors of small trans-Neptunian objects to constrain the collisional history of the Outer Solar System*, 2018-2021, Co-I, **$65,849**

12) NASA, XRP, *Probing the debris disk-planet connection with collisional cascades,* 2017-2018, Co-I, **$48,456**

13) Hubble Space Telescope Grant # 13883, *Probing sub-km-sized Kuiper Belt Objects with Stellar Occultations*, 2016-2018, PI, **$107,000**

14) NASA, SSO, *The IMACS Occultation Survey*, 2016-2019, Co-I, **$38,146**

15) Hubble Space Telescope Grant # 13716, *Constraining the history of the outer Solar System: Definitive proof with HST*, 2016-2018, Co-I, **$12,209**

16) Kavli Research Investment Fund, *Architecture of Kepler Planets & Migration,* 2015-2016: PI, **$30,500**

17) MIT Wade Award, *Extra Solar Planets & Solar System Satellites*, 2013-2016, PI, **$75,000**

18) Hubble Space Telescope Grant # 13031, *Testing Collisional Grinding in the Kuiper Belt*, 2013-2014, MIT PI, **$17,0677**

19) Hubble Space Telescope Grant # 12154, *Measuring the Kuiper Belt Size Distribution using Stellar Occultations*, 2010-2013, PI , **$62,000**

20) NASA Hubble Fellowship, *Towards an Understanding of the Origin of the Solar System: Studying the Kuiper Belt*, 2010-2013, PI, **$278,066**

Postdocs & Research Scientists:

Adams, Danica, NASA Hubble Fellow, UCLA, 2024 -
Sur, Ankan, EPSS Postdoctoral Fellow, UCLA, 2024 -
Rogers, James, NASA Astrobiology Postdoctoral fellow, UCLA, 2022-2023, now senior Kavli Fellow at the University of Cambridge
James Owen, UCLA, 2022, 2023, 2024
Diana Powell, UC Presidential Postdoctoral fellow, UCLA, 2021
Pan, Margaret, MIT, 2015-2018

Ph.D. & Masters Students:

Adamski, Hanna, UCLA, Fall 2024-
Zlimen, Eva, NSF graduate student fellow, UCLA, Fall 2024-
Misener, William, UCLA, Fall 2018 – 2024, now Carnegie Postdoctoral Fellow
Trierweiler, Isabella, UCLA, Fall 2018 – 2024 (master-advisor), now Postdoc at Yale
Gupta, Akash, UCLA, Fall 2017- Spring 2023, PhD, June 2023, now 51 Pegasi b Postdoctoral Fellow, Harry H. Hess Postdoctoral Fellow, and Future Faculty in Physical Sciences Fellow at Princeton University
Biersteker, John, MIT, Fall 2014 – Summer 2019, PhD, August 2019
Inamdar, Niraj, MIT, Spring 2014- Summer 2016, PhD August 2016
Gonzales, Alexandria, MIT, Fall 2014-2016 (Masters project)

PhD Thesis Committee: Julian de Witt (MIT, 2014), Roger Fu (MIT, 2015), Niraj Inamdar (MIT, 2016), John Biersteker (MIT, 2019), Lior Rubanenko (UCLA, 2020), Alexander Stephan (UCLA, 2020), Matthew Heising (2021, Harvard), Diana Powell (2021, UCSC), Jonathan Zink (UCLA, 2021), Alexandra Doyle (UCLA, 2021), Kevin Hayakawa (UCLA, 2022), Akash Gupta (UCLA, 2023), Ashley Schoenfeld (UCLA, 2023), William Misener (UCLA, 2024), Isabella Trierweiler (UCLA, 2024), Dakotah Tyler (UCLA, 2025), Aidan Gibbs (UCLA, 2025), Hanzhang Chen (UCLA, 2025)

Undergraduate Students:

Dave, Neha, Rutgers, 2023-2024
Carrillo, Israel, UCLA, 2022-2023 (now Ph.D. student, University of Colorado)
Narasimhan, Manasa, UCLA, 2021-2022
Esquival, Emma, UCLA, 2020 - 2021
Nicholson, Lorraine, UCLA, 2020-2022 (now Ph.D. student, University of Florida)
Eshbaugh, Emilie, UCLA, 2019 - 2020
Heising, Matthew, MIT, 2013 - 2014 (Ph.D., Harvard University 2021)
Kulchoakrungsun, Ekapob, MIT, 2013-2015 (now Ph.D. student, NYU)
Romero, Robert, MIT, 2014

Teaching:

UCLA: EPSS 9, Solar Systems and Planets, 2017, 2018, 2019, 2021, level: large undergraduate general education class

EPSS M140/AOS M120, Introduction to Fluid Dynamics, level: upper division undergraduate, 2023, 2024, 2025

EPSS 155, Planetary Physics, 2020, 2022, level: upper division undergraduate

EPSS 219, Planetary and Orbital Dynamics, 2017, 2019, 2021, level: graduate

EPSS 200E, Planetary Origins and Evolution, 2018, 2020, 2021, 2023, 2024, level: graduate

EPSS 19, Fiat lux, level: UCLA Centennial Initiative: Life and Work of Five Female UCLA Scientists, Spring 2018, level: undergraduate

MIT: 12.425/12.625/8.926J, Extrasolar Planets, Physics & Detection Techniques, Spring 2014, Spring 2015, Spring 2016, level: undergraduate & graduate

12.098/12.S680, The Formation & Evolution of Planetary Systems, Fall 2014, level: undergraduate & graduate

Summer/Winter Schools:

CIDER, 2022, UC Berkeley, Berkeley, CA
Lecturer Planet Formation Summer School, 2015, Niels Bohr Institute, Copenhagen, Denmark
Lecturer Winter Workshop on Planetary Astrophysics, 2009, Kavli Institute for Astronomy & Astrophysics, Peking University, China

Public Lectures:

Public Lecture, The National Museum of Natural Science, Taichung, Taiwan
NASA's Universe of Learning, science briefing, *Understanding the origin and diversity of planets*, 2018
Melon conference talk, Hong Kong, 2018
Aspen: physics café speaker, 2017
UCLA Meteorite Gallery, University of California, Los Angeles, 2016
Observing Night, Wellesley College, 2015,
Astronomy Society, Santa Barbara City College, 2015
Astronomy & Space Exploration Society, University of Toronto, 2010

Press Release:

1) *Home-Made is Always Better than Delivery,* UCLA Release, April, 13th, 2023
2) *Ancient stars shed light on Earth's similarities to other planets,* UCLA Release, October 17, 2019
3) *Using Dust Lines to Learn About Planetary Birthplaces,* AAS Nova News Release, 19th May 2017
4) *Versatile Instrument to Scout for Kuiper Belt Objects*, NASA News Release, March 3, 2016
5) *Losing Air, new study finds that a barrage of small impacts likely erased much of the Earth's primordial atmosphere,* MIT News Release, December 2, 2014
6) *Hubble Finds Smallest Kuiper Belt Object Ever Seen,* STScI News Release, December 16, 2009