

Dr. Renyu Hu

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Jet Propulsion Laboratory
4800 Oak Grove Dr., MS 169-237
Pasadena, CA 91109, USA

1 (818) 281 9459
renyu.hu@jpl.nasa.gov
<https://renyuplanet.github.io/>

EMPLOYMENT

2023- Scientist V, NASA Jet Propulsion Laboratory
2019-23 Scientist IV, NASA Jet Propulsion Laboratory
2015-19 Scientist III, NASA Jet Propulsion Laboratory
2013-15 Hubble Fellow, NASA Jet Propulsion Laboratory

EDUCATION

2013 Ph.D., Planetary Sciences, Massachusetts Institute of Technology
 "Atmospheric Photochemistry, Surface Features, and Potential Biosignature Gases of Terrestrial Exoplanets," Advisor: Sara Seager
2009 M.S., Astrophysics, Tsinghua University
2009 Diplôme d'Ingénieur (French Engineer's Degree), École Centrale Paris
2007 B.S., Mathematics and Physics, Tsinghua University

FIELDS OF INTEREST

Atmospheres of planets and exoplanets from Earth-sized to Jupiter-sized. Remote sensing of exoplanets using transit spectroscopy, phase curve mapping, and direct imaging. Evolution of planetary atmospheres and stable isotope geochemistry. Search for habitable planets and biosignatures. Gas and aqueous phase chemical kinetics.

SELECTED AWARDS AND HONORS

2023 Scialog Fellow, Research Corporation for Science Advancement
2021 JPL Edward Stone Award for Outstanding Research Publication
2020 NASA Early Career Public Achievement Medal
2019 NASA Group Achievement Award for the Astrophysics Large Mission Studies
2017 JPL Voyager Award for Individual Achievement
2013-15 NASA Hubble Fellowship
2011-13 NASA Earth and Space Science Fellowship
2012 Barrett Prize, Massachusetts Institute of Technology
2009 Presidential Fellowship, Massachusetts Institute of Technology
2009 Best Master Dissertation, Tsinghua University
2009 Wu You-Xun Prize, Tsinghua University

SPACE MISSION & LEADERSHIP EXPERIENCE

- 2023- **Member**, NASA Science, Technology, Architecture Review Team (START) for the Habitable Worlds Observatory
- Chartered to quantify the science objectives and guide the technology maturation program. Serve to liaise with the atmosphere modeling community
- 2022- **Principal Investigator**, JPL Strategic Initiative for scientific optimization of missions
- Led a team of 7 JPL employees and additional postdocs and students to study the spectral characterization requirements for the Habitable Worlds Observatory
- 2018- **Starshade Scientist**, NASA Exoplanet Exploration Program
- Provided science leadership to the Starshade Technology Development to TRL-5 (S5) project and managed a national-level and community-facing starshade Science and Industry Partnership program
 - Led a team of 6 JPL scientists and engineers to formulate, develop, and conduct the Starshade Exoplanet Data Challenge, and managed the acquisition of two external participating teams through a proposal process
- 2022- **Collaborator**, Ultraviolet Explorer (UVEX), one of two missions selected by NASA to conduct mission concept studies as a Medium Explorer (MIDEX)
- 2022- **Co-chair**, exoplanet working group of the Uranus flagship mission concept team
- 2017-21 **Atmospheric Science Lead**, Starshade Rendezvous Probe concept study and Roman Space Telescope starshade accommodation study
- 2021-23 **Member**, Venus in-situ aerobot mission concept team
- 2018-22 **Member**, TESS Atmospheric Characterization Working Group
- 2016-21 **Member**, WFIRST (Roman) Coronagraph Science Investigation Teams
- 2016-17 **Member**, NASA Study Analysis Group on science questions for direct imaging exoplanet missions
- 2016-17 **Member**, NASA Study Analysis Group on exoplanet biosignatures
- 2014 **Principal Investigator** for science return of direct-imaging exoplanet missions, NASA Exoplanet Exploration Program

PROFESSIONAL SERVICE

- 2023 **External Reviewer**, James Webb Space Telescope Time Allocation Committee
- 2022 **Chair**, Astrophysics Return to Lab Working Group, Jet Propulsion Laboratory
- 2021- **Chair**, Astrophysics Colloquium Committee, Jet Propulsion Laboratory
- 2020 **Panel Reviewer**, Hubble Space Telescope Time Allocation Committee
- 2016- **Founder**, Exoplanet Lunch Seminar Series, Jet Propulsion Laboratory
- 2013- **Referee** for Science, Nature, Nature Geoscience, Nature Astronomy, PNAS, ApJ, ApJS, MNRAS, A&A, Astrobiology, Icarus, EPSL, JGR, and GRL
- 2012- **Panel Reviewer** for NASA's Planetary Atmospheres Program, Mars Data Analysis Program, Mars2020 Participating Scientists Program, Exoplanets Research

- Program, Exobiology Program, Astrophysics Research and Analysis Program, and Earth and Space Science Fellowship
- 2018 **Panel Reviewer**, Hubble Space Telescope Time Allocation Committee
- 2018 **Member**, Organizing Committee of the workshop “Combining high-resolution spectroscopy and high-contrast imaging for exoplanet characterization”
- 2018 **Member**, Selection Committee of NASA Hubble Postdoctoral Fellowship
- 2017 **Member**, Selection Committee of NSF Astronomy and Astrophysics Postdoctoral Fellowship
- 2015 **Panel Reviewer**, Hubble Space Telescope Time Allocation Committee

POSTDOC ADVISING EXPERIENCE

- 2023- Armen Tokadjian, JPL Postdoc Fellow
- 2022- Apurva V. Oza, JPL Postdoc Fellow (co-advise with Rosaly Lopes)
- 2022- Jeehyun Yang, JPL Postdoc Fellow (co-advise with Murthy Gudipati)
- 2022- Aaron Bello-Arufe, JPL Postdoc Fellow
- 2021-23 Markus Scheucher, JPL Postdoc Fellow (now JPL employee)
Research led to development of a novel radiative-convective climate model
- 2018-22 Mario Damiano, JPL Postdoc Fellow (now JPL employee)
Research led to 5 first-author papers and multiple JWST proposal wins

GRADUATE STUDENT ADVISING EXPERIENCE

- 2022- Kimberly Paragas (Caltech, co-advise with Heather Knutson)
Research led to a paper in prep
- 2021-23 Danica Adams (Caltech, co-advise with Yuk Yung). Now postdoc at Harvard
Research led to two papers in Astrobiology
- 2020-21 Eva L. Scheller (Caltech, co-advise with Bethany Ehlmann). Now postdoc at MIT
Research led to a paper in Science
- 2015 Peter Gao (Caltech, co-advise with Yuk Yung). Now staff scientist at the Carnegie Institution for Science
Research led to a paper in ApJ

UNDERGRADUATE STUDENT ADVISING EXPERIENCE

- 2023 Aidan Robinson (UCLA)
- 2023 Zachary Burr (Delft University of Technology)
Research led to a paper in prep
- 2022-23 Audrey DeVault (Caltech). Now graduate student at MIT
Research led to a paper in prep
- 2022 Naylynn Tañón Reyes (Smith College)
- 2020-21 Lexy LeMar (Caltech). Now graduate student at MIT
- 2018- Trent Thomas (UCLA). Now graduate student at U. Washington
Research led to two papers in Nature Geosciences and PSJ

- 2018-19 Héctor Delgado Diaz (Cal State LA). Now graduate student at U. Washington
Research led to a paper in ApJ
- 2018 Luke Peterson (Northwestern University). Now graduate student at CU Boulder
Research led to a paper in ApJ
- 2017-18 Tre'Shunda James (Occidental College). Now graduate student at UT Arlington
Research led to a paper in ApJ
- 2017 Isabel Angelo (UC Berkeley). Now graduate student at UCLA
Research led to a paper in AJ
- 2017 George Filippatos (Penn State). Now graduate student at Colorado School of Mines

TEACHING EXPERIENCE

- 2015 **Co-Instructor**, California Institute of Technology, Class Ge 194: Isotopic Tracers of Mars Atmosphere-Surface Interactions
- 2015 **Guest Lecturer**, California Institute of Technology, Class Ge 159: Planetary Evolution and Habitability
- 2014 **Professional Development Program**, Institute for Scientist and Engineer Educators, UC Santa Cruz
- 2012 **Teaching Certificate Program**, Massachusetts Institute of Technology
- 2010 **Teaching Assistant**, Tsinghua University, Class: Quantum Mechanics

EXTERNALLY SPONSORED RESEARCH PROJECTS

Awarded \$3.6M since 2015

- **\$2.6M as PI or Co-PI**
- **\$1.7M for JWST projects, in which \$1.2M as PI or Co-PI**

Probing the volcanic outgassing activity of a warm sub-Earth planet

Principal Investigator: Mario Damiano (**Renyu Hu** is Co-PI)

Program: James Webb Space Telescope Cycle 2 Guest Observers

Funding Period: 2023 – 2025

Total Funding: \$226,553

Deep Characterization of the Atmosphere of a Temperate Sub-Neptune

Principal Investigator: **Renyu Hu**

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2025

Total Funding: \$394,001

Determining the Atmospheric Composition of the Super-Earth 55 Cancri e

Principal Investigator: **Renyu Hu**

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2024

Total Funding: \$236,320

Exploring the nature of a temperate exoplanet in the Fulton gap

Principal Investigator: Mario Damiano (**Renyu Hu** is Co-PI)

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2024

Total Funding: \$226,553

A Search for Signatures of Volcanism and Geodynamics on the Hot Rocky Exoplanet LHS 3844b

Principal Investigator: Laura Kreidberg (**Renyu Hu** is Co-PI)

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2024

Total Funding: \$176,322

Thermal Structure, Chemistry, and Observational Signatures of Cold Exoplanet Atmospheres

Principal Investigator: **Renyu Hu**

Program: NASA Exoplanets Research Program

Funding Period: 2018 – 2022

Total Funding: \$ 458,552

Constraining Early Mars's Atmosphere and Habitability with Isotopic Measurements

Principal Investigator: **Renyu Hu**

Program: NASA Habitable Worlds

Funding Period: 2017 – 2022

Total Funding: \$ 808,295

First Transmission Spectrum of a Cold, Water-Cloud Gas Giant Planet

Principal Investigator: **Renyu Hu**

Program: Hubble Space Telescope Cycle 24 Guest Observers

Funding Period: 2017 – 2020

Total Funding: \$74,629

Mapping the atmosphere or surface of a hot ultra-short-period super Earth

Principal Investigator: Michael Zhang

Program: James Webb Space Telescope Cycle 2 Guest Observers

Funding Period: 2023 – 2024

Co-I Funding: \$91,339

The search for regolith on the airless exoplanet LHS 3844 b

Principal Investigator: Sebastian Zieba

Program: James Webb Space Telescope Cycle 2 Guest Observers

Funding Period: 2023 – 2024

Co-I Funding: \$63,616

The SPACE Program: a Sub-neptune Planetary Atmosphere Characterization Experiment

Principal Investigator: Laura Kreidberg

Program: Hubble Space Telescope Cycle 30 Guest Observers

Funding Period: 2022 – 2025

Co-I Funding: \$64,338

Is it raining lava in the evening on 55 Cancri e?

Principal Investigator: Alexis Brandeker

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2024

Co-I Funding: \$97,764

Searching Our Closest Stellar Neighbor for Planets and Zodiacal Emission

Principal Investigator: Charles Beichman

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2025

Co-I Funding: \$15,362

Unveiling the Atmospheric Composition and Haze Formation Rates in the Young, Cool, Super-Puff Kepler-51d

Principal Investigator: Jessica Libby-Roberts

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2024

Co-I Funding Requested: \$40,003

Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Principal Investigator: Laura Kreidberg

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2023

Co-I Funding: \$18,670

The First and Only Multi-wavelength Map of an Ultra-short-period sub-Earth

Principal Investigator: Michael Zhang

Program: James Webb Space Telescope Cycle 1 Guest Observers

Funding Period: 2022 – 2023

Co-I Funding: \$18,804

The first near-infrared spectroscopic phase-curve of a super-Earth

Principal Investigator: Nestor Espinoza
Program: James Webb Space Telescope Cycle 1 Guest Observers
Funding Period: 2022 – 2023
Co-I Funding: \$15,813

The Imitation Game: Construction of a Habitable Exoplanet Detection Machine

Principal Investigator: Jonathan Jiang
Program: NASA Exoplanets Research Program
Funding Period: 2020 – 2023
Co-I Funding: \$22,100

Confirming a Tentative Detection of an Atmosphere around a Potentially Rocky Planet

Principal Investigator: Thomas Barclay
Program: Hubble Space Telescope Cycle 28 Guest Observers
Funding Period: 2021 – 2023
Co-I Funding: \$29,703

Searching for Secondary Atmospheres in a System of Benchmark Worlds

Principal Investigator: Thomas Barclay
Program: Hubble Space Telescope Cycle 27 Guest Observers
Funding Period: 2021 – 2022
Co-I Funding: \$64,375

Optimizing WFIRST Coronagraph Science

Principal Investigator: Bruce Alan Macintosh
Program: NASA WFIRST Science Investigation Teams and Adjutant Scientists
Funding Period: 2016 – 2021
Co-I Funding: \$113,530

Model Atmospheres and Spectral Irradiance Library of the Exoplanet Host Stars Observed in the MUSCLES Survey

Principal Investigator: Jeffrey Linsky
Program: Hubble Space Telescope Cycle 25 Archival or Theory Research
Funding Period: 2018 – 2020
Co-I Funding: \$85,792

Restoring and Archiving Voyager 1 Cruise Images of Uranus and Neptune

Principal Investigator: Daniel Wenkert
Program: NASA Planetary Data Archiving, Restoration, and Tools
Funding Period: 2018 – 2020
Co-I Funding: \$ 16,510

Detecting and Characterizing Exoplanets with the WFIRST Coronagraph: Colors of Planets in Standard and Designer Bandpasses

Principal Investigator: Margaret Turnbull

Program: NASA WFIRST Preparatory Science

Funding Period: 2015 – 2018

Co-I Funding: \$73,910

Chemical Fingerprints of Alien Worlds – Towards an Evolutionary View of Mars and Terrestrial Exoplanet Atmospheres

Principal Investigator: Wesley A. Traub

Science-PI: **Renyu Hu**

Program: NASA Hubble Postdoctoral Fellowship

Funding Period: 2013 – 2015

Total Funding: \$316,500

Photochemistry of Super Earth Exoplanet Atmospheres

Principal Investigator: Sara Seager

Science PI: **Renyu Hu**

Program: NASA Earth and Space Science Fellowship

Funding Period: 2011 – 2013

Total Funding: \$60,000

COMPETITIVE OBSERVATION PROGRAMS

JWST: 5 programs (123 hours) as PI and Co-PI, 7 programs (230 hours) as Co-I

HST: 1 program (6 orbits) as PI, 3 programs (241 orbits) as Co-I

Spitzer: 2 programs (175.9 hours) as Co-I

TESS: 1 program as Co-I

Probing the volcanic outgassing activity of a warm sub-Earth planet

Principal Investigator: Mario Damiano (**Renyu Hu** is Co-PI)

Facility: James Webb Space Telescope

Date of Selection: 05/2023

Allocated Time: 13.1 hours

Deep Characterization of the Atmosphere of a Temperate Sub-Neptune

Principal Investigator: **Renyu Hu**

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 67.9 hours

Determining the Atmospheric Composition of the Super-Earth 55 Cancri e

Principal Investigator: **Renyu Hu**

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 15.4 hours

Exploring the nature of a temperate exoplanet in the Fulton gap

Principal Investigator: Mario Damiano (**Renyu Hu** is Co-PI)

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 14.4 hours

A Search for Signatures of Volcanism and Geodynamics on the Hot Rocky Exoplanet LHS 3844b

Principal Investigator: Laura Kreidberg (**Renyu Hu** is Co-PI)

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 11.7 hours

First Transmission Spectrum of a Cold, Water-Cloud Gas Giant Planet

Principal Investigator: **Renyu Hu**

Facility: Hubble Space Telescope

Date of Selection: 10/2016

Allocated Time: 6 orbits

Mapping the atmosphere or surface of a hot ultra-short-period super Earth

Principal Investigator: Michael Zhang

Facility: James Webb Space Telescope

Date of Selection: 05/2023

Allocated Time: 16.6 hours

The search for regolith on the airless exoplanet LHS 3844 b

Principal Investigator: Sebastian Zieba

Facility: James Webb Space Telescope

Date of Selection: 05/2023

Allocated Time: 18.6 hours

The SPACE Program: a Sub-neptune Planetary Atmosphere Characterization Experiment

Principal Investigator: Laura Kreidberg

Facility: Hubble Space Telescope

Date of Selection: 06/2022

Allocated Time: 205 orbits

Is it raining lava in the evening on 55 Cancri e?

Principal Investigator: Alexis Brandeker

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 25 hours

Searching Our Closest Stellar Neighbor for Planets and Zodiacal Emission

Principal Investigator: Charles Beichman

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 25 hours

Unveiling the Atmospheric Composition and Haze Formation Rates in the Young, Cool, Super-Puff Kepler-51d

Principal Investigator: Jessica Libby-Roberts

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 20.5 hours

Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Principal Investigator: Laura Kreidberg

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 17.9 hours

The First and Only Multi-wavelength Map of an Ultra-short-period sub-Earth

Principal Investigator: Michael Zhang

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 13.2 hours

The first near-infrared spectroscopic phase-curve of a super-Earth

Principal Investigator: Nestor Espinoza

Facility: James Webb Space Telescope

Date of Selection: 03/2021

Allocated Time: 14.9 hours

Confirming a tentative detection of an atmosphere around a potentially rocky planet

Principal Investigator: Thomas Barclay

Facility: Hubble Space Telescope

Data of Selection: 10/2020

Allocated Time: 8 orbits

Searching for Secondary Atmospheres in a System of Benchmark Worlds

Principal Investigator: Thomas Barclay

Facility: Hubble Space Telescope

Date of Selection: 07/2019

Allocated Time: 28 orbits

Characterizing the Super-Earth 55 Cnc e: The Tess Opportunity

Principal Investigator: Diana Dragomir

Facility: Transiting Exoplanet Survey Satellite

Date of Selection: 06/2019

Allocated Time: N/A

A Test for the Existence of An Atmosphere on a Terrestrial Exoplanet Orbiting a Small Star

Principal Investigator: Laura Kreidberg

Facility: Spitzer Space Telescope

Date of Selection: 09/2018

Allocated Time: 100.9 hours

The Transiting Exoplanet Community Early Release Science Program

Principal Investigator: Natalie Batalha

Facility: James Webb Space Telescope

Date of Selection: 11/2017

Allocated Time: 78.1 hours

The First Orbital Phase Curve of a Rocky Exoplanet

Principal Investigator: Brice-Olivier Demory

Facility: Spitzer Space Telescope

Date of Selection: 12/2012

Allocated Time: 75 hours

INVITED TALKS

Seminars and Colloquia

2024 University of California, Riverside, CA, Astrobiology Seminar

2023 Tokyo Institute of Technology, Earth-Life Science Institute Seminar

2023 University of California, Los Angeles, CA, Planetary Science Seminar

2023 California Institute of Technology, Pasadena, CA, DIX Planetary Science Seminar

2021 The University of Arizona, Tucson, AZ, Lunar and Planetary Laboratory Colloquium

2021 NASA Nexus for Exoplanet System Science, CLEVER Planets Seminar
 2021 Institute of Planetary Research, German Aerospace Center, Berlin, Germany, Seminar
 2021 Northwestern University, Evanston, IL, Astrophysics Seminar
 2021 National Astronomical Observatory of Japan, Tokyo, Japan, Seminar
 2019 California State University, Los Angeles, CA, Physics and Astronomy Seminar
 2019 Max Planck Institute for Astronomy, Heidelberg, Germany, Origins of Life Seminar
 2019 Purdue University, West Lafayette, IN, Department Seminar
 2018 University of Geneva, Geneva, Switzerland, Seminar
 2018 University of California, Los Angeles, CA, Planetary Science Seminar
 2018 University of Florida, Gainesville, FL, Astronomy Seminar
 2017 CNRS Orléans, Orléans, France, Space Science Seminar
 2017 Caltech, Pasadena, CA, Geological and Planetary Sciences Seminar
 2017 Academia Sinica, Taipei, Taiwan, Astronomy Colloquium
 2016 California State University, Northridge, CA, Physics and Astronomy Seminar
 2016 ETH Zurich, Zurich, Switzerland, Astrophysics Seminar
 2016 University of Bern, Bern, Switzerland, Space Research Seminar
 2016 Geneva Observatory, Geneva, Switzerland, Seminar
 2016 Arizona State University, Tempe, AZ, Astrobiology Seminar
 2014 Caltech, Pasadena, CA, Kiegel Lectures in Planetary Sciences
 2014 University of California, Los Angeles, CA, Planetary Seminar
 2013 University of California, Los Angeles, CA, iPLEX Lunch Seminar
 2013 California Institute of Technology, Pasadena, CA, Yuk Lunch Seminar
 2012 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, SSP Seminar
 2012 Institute for Advanced Study, Princeton, NJ, Seminar

Invited Conference Talks

2024 Lorentz Center Workshop on Neutral and Ion Photochemistry in Planetary Atmospheres, Leiden, Netherlands
 2024 ISSI Workshop on the Geoscience of (Exo)planets: Going beyond habitability, Bern, Switzerland
 2024 “Density Matters” Ringberg Castle Workshop, Bavaria, Germany
 2023 Scialog Conference on Signatures of Life in the Universe, Tucson, AZ
 2022 Exoplanets in Our Backyard 2, Albuquerque, NM
 2022 Chianti International Workshop on Atmospheres, Florence, Italy
 2021 The Mars panel of the planetary science and astrobiology decadal survey
 2019 The 234th Meeting of the American Astronomical Society, St Louis, MO
 2019 The EGU General Assembly, Vienna, Austria
 2018 Defining the Landscape for Precision Radial Velocity (PRV) Science in the 2018-2028 Time Frame, Pasadena, CA
 2018 Technology for Direct Detection and Characterization of Exoplanets, Pasadena, CA
 2017 Asia Oceania Geosciences Society 14th Annual Meeting, Singapore

- 2016 NASA Starshade Technology Workshop, Pasadena, CA
- 2016 Community Astrophysics with WFIRST, Guest Observer and Archival Science, Pasadena, CA
- 2016 The 227th Meeting of the American Astronomical Society, Kissimmee, FL
- 2015 Exoplanetary Atmospheres and Habitability, Nice, France
- 2015 IAU XXIX General Assembly, Honolulu, HI
- 2015 Planetary Systems: a Synergistic View, Quy Nhon, Vietnam
- 2015 Physics of Exoplanets: From Earth-sized to Mini Neptunes, Santa Barbara, CA

MEDIA REPORTS AND PUBLIC OUTREACH

- 2022 *JWST Science Feature Volcanic Worlds*, by STScI
- 2021 *How to Find Hidden Oceans on Distant Worlds? Use Chemistry*, by NASA
- 2021 *Where are the water worlds? New tool to find out*, by EarthSky
- 2021 *The Water on Mars Vanished – This Might Be Where It Went*, by NY Times, National Geographic, and multiple news outlets
- 2019 *A Rare Look at the Surface of a Rocky Exoplanet*, by NASA
- 2018 Science advisor for “Signs of Life”, an award-winning planetarium show at the Griffith Observatory, Los Angeles (premiered in May 2022)
- 2017 *Lava or Not, Exoplanet 55 Cancri e Likely to Have Atmosphere*, by National Geographic
- 2017 *Our Living Planet Shapes the Search for Life Beyond Earth*, by NASA
- 2017 Panel Discussion on “Arrival” at the Los Angeles Public Library
- 2017 *Signs of Alien Air Herald a New Era of Exoplanet Discoveries*, by Scientific American
- 2016 *Testing for Methane on Mars*, by Airspacemag.com
- 2015 *Mystery on Mars: Does Methane Really Indicate Life?* by Space.com
- 2015 *Mars’ Ancient Atmosphere Wasn’t Very Thick After All*, by Discovery Channel
- 2015 *Helium-Filled Exoplanets Likely Float Throughout the Galaxy*, by Discovery Channel and Space.com
- 2013 *Investigating Exoplanet Surfaces*, by Astrobiology Magazine
- 2012 *Mars Snowflakes Are as Tiny as Red Blood Cells*, by CBS, Nature, Discovery Channel, National Geographic, and Space.com
- 2011 *How Astronomers May Hunt for Life on Alien Planets*, by Astrobiology Magazine

LANGUAGE SKILLS

- Chinese High Proficiency
- French Diplôme Supérieur Langue et Culture Françaises, corresponding to CEFR Level C1
- German Basic, 200 hours of study

PUBLICATIONS

Refereed Publications

25 first-author papers, h-index = 36 (using NASA ADS)

*student advised, #postdoc advised, ^equal contribution

ADS Library: <https://ui.adsabs.harvard.edu/public-libraries/im9iiqF6Se268wGNIdielA>

Copies of the papers are available at: <https://renyuplanet.github.io/publication.html>

Most impactful publications highlighted in blue

[83] **Renyu Hu**, ... et al. (2023), *A CO₂/CO-rich Atmosphere on the Rocky Exoplanet 55 Cnc e*, submitted

[82] Xintong Lyu, Daniel Koll, Nicholas B. Cowan, **Renyu Hu**, Laura Kreidberg, and Brian Rose (2023), *Super-Earth LHS3844b is tidally locked*, submitted to **AAS Journals** (arXiv:2310.01725)

[81] Sukrit Ranjan, Edward W. Schwieterman, Michaela Leung, Chester E. Harman, and **Renyu Hu** (2023), *A re-appraisal of CO/O₂ runaway on habitable planets orbiting low-mass stars*, submitted to **AAS Journals** (arXiv: 2307.08752)

[80] Thomas Barclay, ... **Renyu Hu**, et al. (2023), *The transmission spectrum of the potentially rocky planet L 98-59 c*, submitted to **AAS Journals** (arXiv: 2301.10866)

[79] Christopher D. Parkinson, Stephen W. Bougher, Franklin P. Mills, **Renyu Hu**, Guillaume Gronoff, Jiazheng Li, Amanda Brecht, and Yuk L. Yung (2023), *Venus as an Exoplanet: I. An Initial Exploration of the 3-D Energy Balance for a CO₂ Exoplanetary Atmosphere Around an M-Dwarf Star*, submitted to **J. Geophys. Res. Planets** (arXiv: 2205.10958)

[78] #Mario Damiano, **Renyu Hu**, and Bertrand Mennesson (2023), *Reflected Spectroscopy of Small Exoplanets. III. Probing the UV Band to Measure Biosignature Gases*, **AJ**, 166, 157

[77] Emma Esparza-Borges, ... **Renyu Hu**, et al. (2023), *Detection of Carbon Monoxide in the Atmosphere of WASP-39b Applying Standard Cross-correlation Techniques to JWST NIRSpec G395H Data*, **ApJ Letters**, 955, L19

[76] Andrew P. Lincofski, ... **Renyu Hu**, et al. (2023), *Potential Atmospheric Compositions of TRAPPIST-1 c Constrained by JWST/MIRI Observations at 15 μ m*, **ApJ Letters**, 955, L7

[75] Sebastian Zieba, ... **Renyu Hu**, et al. (2023), *No thick carbon dioxide atmosphere on the rocky exoplanet TRAPPIST-1 c*, **Nature**, 620, 746

[74] Shang-min Tsai, ... **Renyu Hu**, et al. (2023), *Photochemically-produced SO₂ in the atmosphere of WASP-39 b*, **Nature**, 617, 483

[73] David Grant, ... **Renyu Hu**, et al. (2023), *Detection of carbon monoxide's 4.6 micron fundamental band structure in WASP-39b's atmosphere with JWST NIRSpec G395H*, **ApJ Letters**, 949, L15

- [72] **Renyu Hu**, Fabrice Gaillard, and Edwin Kite (2023), *Narrow loophole for H₂-dominated atmospheres on habitable rocky planets around M dwarfs*, **ApJ Letters**, 948, L20
- [71] *Trent Thomas, **Renyu Hu**, and Daniel Y. Lo (2023), *Constraints on the size and composition of the ancient Martian atmosphere from coupled CO₂-N₂-Ar isotopic evolution models*, **PSJ**, 4, 41
- [70] Lili Alderson, ... **Renyu Hu**, et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec NIRSpec G395H*, **Nature**, 614, 664
- [69] Zafar Rustamkulov, ... **Renyu Hu**, et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec PRISM*, **Nature**, 614, 659
- [68] Ahrer Eva-Maria, ... **Renyu Hu**, et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRCам*, **Nature**, 614, 653
- [67] JWST Transiting Exoplanet Community Early Release Science Team (2023), *Identification of carbon dioxide in an exoplanet atmosphere*, **Nature**, 614, 649
- [66] Steffen Buessecker, Hiroshi Imanaka, Tucker Ely, **Renyu Hu**, Stephen J. Romaniello, and Hinsby Cadillo-Quiroz (2022), *Marine mineral-catalyzed NO and N₂O formation on the anoxic early Earth*, **Nature Geoscience**, 15, 1056
- [65] Robert A. West, Philip Dumont, **Renyu Hu**, Vijay Natraj, James Breckinridge, and Pin Chen (2022), *Spectropolarimetry as a Means to Address Cloud Composition and Habitability for a Cloudy Exoplanetary Atmosphere in the Habitable Zone*, **ApJ**, 940, 183
- [64] Emily A. Whittaker, ... and **Renyu Hu** (2022), *The Detectability of Rocky Planet Surface and Atmosphere Composition with the JWST: The Case of LHS 3844b*, **AJ**, 164, 258
- [63] #Mario Damiano, **Renyu Hu**, et al. (2022), *A transmission spectrum of the sub-Earth planet L98-59 b in 1.1 – 1.7 μm*, **AJ**, 164, 225
- [62] Stefan Martin, ... **Renyu Hu**, et al. (2022), *Next-generation active telescope for space astronomy*, **Journal of Astronomical Telescopes, Instruments, and Systems**, 8, 044005
- [61] #Mario Damiano and **Renyu Hu** (2022), *Reflected spectroscopy of small planets II: characterization of terrestrial exoplanets*, **AJ**, 163, 299
- [60] **Renyu Hu** and *Trent Thomas (2022), *A nitrogen-rich atmosphere on ancient Mars consistent with isotopic evolution models*, **Nature Geoscience**, 15, 106
- [59] Jiazheng Li, Jonathan H. Jiang, Huanzhou Yang, Dorian S. Abbot, **Renyu Hu**, Thaddeus D. Komacek, Stuart J. Bartlett, and Yuk L. Yung (2022), *Rotation Period Detection for Earth-like Exoplanets*, **AJ**, 163, 27
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