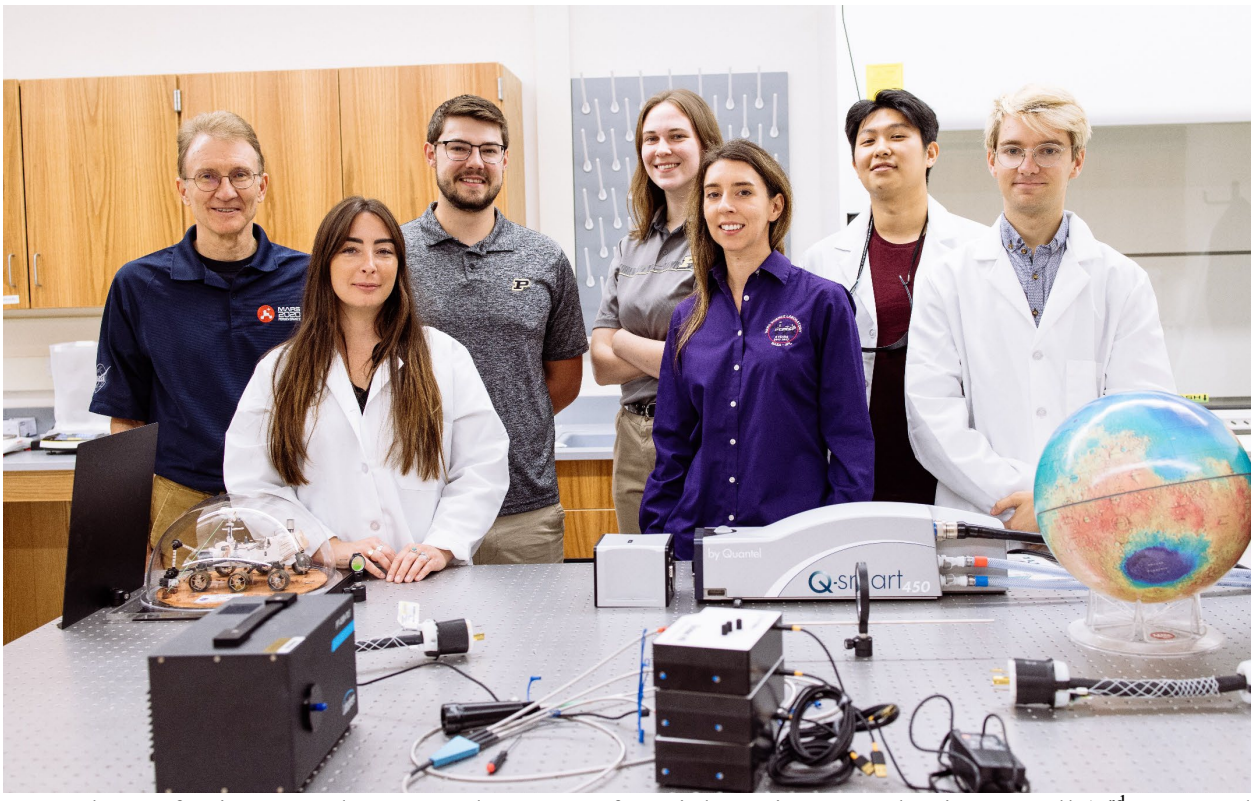
Roger C. Wiens, Ph.D.
Earth, Atmospheric, and Planetary Sciences, Purdue University

Current Positions:

- Professor, Earth, Atmospheric, and Planetary Sciences, and Aerospace and Astronautical Engineering (courtesy)
- Senior Fellow and Guest Scientist of Los Alamos National Laboratory (LANL)

Research Interests:

- Planetary science, with a focus on Mars
- Cosmochemistry: Solar system isotopic and elemental abundances
- Development of instruments, including laser-induced breakdown spectroscopy (LIBS), Raman, and fluorescence spectroscopy to support the science goals
- Operation of extraterrestrial vehicles and their instrumentation



2024 photo of Wiens' Purdue research team. Left to right: Wiens, Stephanie Connell (3rd year grad student), Noah Martin and Mia Rudin (1st year grad students), Candice Bedford (Research Scientist), DJ Lee (1st year grad student), Henry Manelski, 3rd year grad student).

Notable Achievement:

The only person to develop and lead major instruments and their teams on both generations of NASA's 1-ton rovers currently exploring Mars, leading and producing major discoveries of Mars' climate and habitability.

Professional Highlights and Educational Background:

2022-present, Professor in Earth, Atmospheric, and Planetary Sciences, Purdue University

1997-2022, Scientist, up to Level VI, Space Physics & Remote Sensing, Los Alamos National Laboratory (LANL)

2017-2020 Team Leader in Space Planetary Exploration Team at LANL

1990-1997, Staff Scientist at Caltech, developing NASA's Genesis mission

1988-1990, Post-doctoral researcher in geochemistry at Scripps Institution of Oceanography, UCSD

1988, wrote the first PhD thesis on the Mars atmosphere that used actual samples, trapped in Mars meteorites, Physics Department, University of Minnesota

1982, BS in Physics, with high honors, Wheaton College, Wheaton, Illinois

Peer-Reviewed Publications: >300, available in a separate list; h index > 90, >30k citations. Wiens' space flight hardware has been featured on the cover of *Science*.

Mission Projects

1990-2008 NASA Genesis Discovery Solar Wind Sample Return Mission, LANL lead with overall responsibilities for 3 flight instruments, and NASA's Flight Payload Lead. Follow-on grants and work continued through 2018. This work led, among other things, to the discovery of the oxygen and nitrogen isotopic composition of the Sun.

2003 PI of Atmospheric Sample Experiment (ACE) for the Sample Collection to Investigate Mars (SCIM), a Mars atmosphere and dust sample return mission that was selected for Phase A development.

2004-2021, PI, ChemCam instrument suite on the Mars Science Laboratory rover. ChemCam has the first LIBS instrument to be used in planetary science and also has the highest resolution remote imager on the rover. $40M development cost. ChemCam led to many unique observations shaping our understanding of the climate history of Mars; it is still operating today.

2014-present, PI, SuperCam instrument suite on the Mars 2020 rover. Successor to ChemCam that includes the first remote Raman spectrometer to be used in planetary science, plus LIBS, visible and infrared reflectance spectrometry, high-resolution imaging, and acoustic spectra. $60M development cost. The science and engineering team consists of >80 people in Europe and North America.

2014-present, Co-investigator on the Scanning Habitable Environments with Raman and Luminescence of Organics & Chemicals (SHERLOC) instrument on the Mars 2020 rover. The electronics, software, and spectrometer detection system were built at LANL at a cost of $8M; the overall instrument cost is ~$80M.

2024 photo of Wiens' international SuperCam team at their annual meeting. About two thirds of the team was present. Valladolid, Spain.

Non-Mission Research Projects

1998-2001 PI, NASA Planetary Instrument Definition and Development Program (PIDDP) project to develop laser-based instrumentation to analyze ions from laser-produced plasmas with space plasma analyzers.

1998-2001 Co-I, NASA Mars Instrument Development Program (MIDP) project to develop LIBS for space applications; resulted in the ChemCam proposal.

2002-2006 PI, NASA Planetary Instrument Definition and Development Program (PIDDP) project to develop combined stand-off LIBS and Raman spectroscopy instrumentation, resulted in the SAGE Venus Lander Phase-A study and the SuperCam project.

2003-2006 LANL PI of NASA PIDDP project to use LIBS to develop a potassium-argon in-situ dating instrument, with PI Tim Swindle.

2009-2012 PI, LANL Internal R&D project to perform LIBS on lunar samples and analog samples for Venus and asteroids.

2009-2010, Co-I, SAGE Venus New Frontiers mission, which was selected for Phase A development and included a LIBS + Raman spectroscopy instrument led by LANL.

2010-2014 PI, NASA Sample Return Laboratory Instrument Data Analysis Program project on studying fractionation of the solar wind to support the Genesis sample program.

2010-2015 LANL PI, NASA University Research Centers (URC) program to develop and optical center of excellence at Delaware State University, with PI Noureddine Melikechi.

2011-2014, PI, LANL Institute of Geophysics and Planetary Physics (IGPP) project with UC Davis to study carbon-monoxide self-shielding (COSS) in the laboratory; COSS is a phenomenon confirmed by the Genesis mission to have fractionated the oxygen and nitrogen isotopes in the early solar nebula.

2013-2015, Co-I on $5.3M LANL Internal R&D project on Raman and LIBS combined instrumentation.

2015-2019, PI, NASA Laboratory Analysis of Returned Samples Project to analyze Genesis samples for the purpose of understanding solar-wind fractionation.

2016-2020, Co-I, NASA Minority Institution Grant (N. Melikechi, PI, U. Mass. Lowell), development of LIBS.

2017-2020, PI, LANL Internal R&D project to develop OrganiCam, a panoramic fluorescence imager for detection of bio-organic molecules, potentially for the Europa Lander.

2018-2020, Deputy lead for maturation of Raman-LIBS Spectrometer instrument designed for future Venus lander missions.

2023-present, Co-Investigator on OrganiCam MATISSE instrument maturation program. https://www.youtube.com/watch?v=DYUHAzaOKvM.

2024-present, Co-Investigator of Purdue Resources Empowering Coordinated Investigations for Sample Exploration (PRECISE) NASA Planetary Science Enabling Facilities (PSEF) grant, contributing LIBS capabilities.

2024-present, PI of NASA Planetary Instrument Concept for the Advancement of Solar System Observations (PICASSO) project: Fine-Scale Pixel Element Mapping for Mars, the Moon, and Other Bodies with Miniaturized LIBS.

Support

(Only Purdue support is listed here; see above for previous & external projects. Total external funding since 2/2022 is $4.28M). Some of the projects are tens of millions of dollars total, considering all institutions.

CURRENT SUPPORT (NONE PENDING)

Wiens Role	Sponsor Name	Title	Dates	Wiens Awarded
PI	NASA	Fine-Scale Pixel Element Mapping for Mars, the Moon, and Other Bodies with Miniaturized LIBS	8/24-7/27	$988k
PI	NASA *(LANL sub-contract)*	The SuperCam Remote-Sensing Instrument on the Mars 2020 Rover	10/24-9/26	$1140k
Co-I	NASA	Purdue Resources Empowering Coordinated Investigations for Sample Exploration (PRECISE)	4/25-3/29	$44k
Co-I	NASA *(JPL sub-contract)*	M2020 SHERLOC	10/24-9/26	$71k

Co-I	NASA *(LANL sub-contract)*	OrganiCam Instrument Development	1/24-9/26	$345k
Co-I	NASA *(LANL sub-contract)*	The SuperCam Remote-Sensing Instrument on the Mars 2020 Rover	1/23-9/24	$1400k
Co-I	NASA *(JPL sub-contract)*	M2020 SHERLOC	12/22-9/24	$80k
PI	NASA *(JPL sub-contract)*	Mars Rover Laser Instrument Projects	6/22-9/22	$190k

Personnel Management Skills

- Led two major NASA flight projects and co-led a third
- 2010, passed a course in project management taught by former LANL division leader David Schneider using the book, *Critical Chain* (Eliyahu Goldratt, 2002) among other resources
- 2018-2021, Team Leader for Space Planetary Exploration in LANL's ISR Division

Review Panels and Proposal Evaluations

- NASA: Participation on numerous proposal review panels and write-in evaluations including PIDDP/PICASSO, HCIPE, PG&G, LARS, MFRP, SALMON, ASTID, PLANET, PDART, and Outer Planets evaluations.
- Other: Participated in evaluations for NSF, DTRA, LANL, and foreign proposals including for ESA.

Other NASA Service

2014-2025, NASA Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM) sub-committee responsible for Genesis mission sample allocation

1999-present, NASA Mars Exploration Planning and Assessment Group (MEPAG) participant; also participate from time to time in Venus exploration planning (VEXAG) meetings.

Courses Taught

- EAPS 50300, Mars Exploration (2022, 2024)
- EAPS 59100, Planetary Spacecraft Instrumentation (2023, 2025)
- EAPS 50600, Geochemistry and Cosmochemistry (2023, 2026)
- EAPS 59100, Space Policy and the Future of Space (2024, 2025)

Guest or Visiting Scientist

- 1984-87, Johnson Space Center, Houston, TX

- 1992-96, Argonne National Laboratory, Argonne, IL
- 1995, Physikalisches Institut, Bern, Switzerland
- 2009, Institut de Recherche en Astrophysique et Planetologie, Toulouse, France

Professional Memberships

American Geophysical Union (AGU), Life Member

Awards and Special Mention

- 2003, R&D100 Magazine Invention Award for development of a combined LIBS-Raman instrument
- 2009, NASA Group Achievement Award, for the Genesis mission
- 2011, Los Alamos National Laboratory Top 10 Science Stories for the oxygen isotope composition of the Sun
- 2012, 2013, Los Alamos National Laboratory Top 10 Science Stories for ChemCam discoveries
- 2013, Los Alamos National Laboratory Distinguished Performance Award, for Mars-time ChemCam operations
- 2014, NASA Leadership Individual Award, as Principal Investigator of ChemCam
- 2014, NASA Group Achievement Award, for the ChemCam team
- 2015, LANL ISR division scientist of the year
- 2016, Chevalier de l'Ordre National des Palmes Academiques (knighted by the office of the Education Ministry of France for forging ties between the French and American academic communities)
- 2016, Chevalier de l'Ordre National Merite (knighted by the office of the Science Minister of France for forging ties between the French and American scientific communities)
- 2017, Fellow, Los Alamos National Laboratory
- 2017, Doctorus Honoris Causa, University of Toulouse
- 2017, Air and Space Academy Vermeil Medal
- 2017, Asteroid 41795 WIENS
- 2019, LANL Distinguished Performance Award for delivery of SuperCam
- 2020, R&D 100 award, OrganiCam invention; https://www.youtube.com/watch?v=DYUHAzaOKvM
- 2022, Patent #11,467,090 B1, Single Detector Laser-Induced Fluorescence Imager and Raman Spectral Instrument (OrganiCam)
- 2022, NASA Group Achievement Award, SuperCam Development Team
- 2022, NASA Group Achievement Award, SHERLOC Development and Science Team
- 2023, NASA Group Achievement Award, SuperCam Science, Engineering, and Operations Team

- 2023, NASA Group Achievement Award, SHERLOC Science and Operations Team
- 2023, NASA Group Achievement Award, Mars 2020 Atmospheres Team
- 2023, NASA Group Achievement Award, Mars 2020 Science Team
- 2023, NASA Group Achievement Award, Mars 2020 Instrument Operations Development Team
- 2023, NASA Group Achievement Award, Mars Pre-landing Strategic Science Group
- 2025, Herbert Newby McCoy Award, highest science award at Purdue University

Sponsored Lectures

- 2005, LANL Frontiers in Science, Genesis lecture, Albuquerque, Los Alamos, Taos
- 2008, Larry Haskin Memorial Lecture, Washington University, Saint Louis
- 2009, Lunar and Planetary Institute, Houston, Genesis lecture
- 2010, Planetary Science, Chiba, Japan
- 2010, Planetary Science, Daejeon, South Korea
- 2010, Planetary Science, Seoul National University, South Korea
- 2011, Public and technical lectures, DSU, Dover, Delaware
- 2012, DOE Workshop on Sensors, with the Secretary of Energy, Chicago
- 2013, LANL Frontiers in Science, Curiosity lecture, Albuquerque, Santa Fe, Taos, Los Alamos
- 2013, Princeton Plasma Physics Laboratory
- 2013, Open University, Milton Keynes, UK
- 2013, University of Leicester, UK
- 2013, NSSC Summer School, Berkeley
- 2013, SCCM/AIRAPT Banquet Lecture, Seattle
- 2013, SPIE Optics and Photonics Plenary Talk, San Diego
- 2013, Westmont College, Santa Barbara
- 2013, 2014, Calvin College, Grand Rapids
- 2014, 2015, Pittsburg Analytical Chemistry Plenary Talks, Chicago and New Orleans
- 2015, University of California, Davis
- 2015, National Radio Astronomy Observatory, Socorro
- 2015, University of Florida Chemistry Department, Gainesville (3 lectures)
- 2016, Keynote speaker, American Scientific Affiliation Annual Meeting
- 2017, Stanford University, Department of Geophysics
- 2017, LeTourneau University, plus TV interviews & newspaper front page
- 2017, Calvin College, Grand Rapids
- 2017, Dordt University, First Monday Lecture Series
- 2017, Los Alamos Phi Beta Kappa speaker of the year
- 2017, Spectroscopy Symposium, Purdue University
- 2018, University of Michigan CLASP Department Chair candidate speaker
- 2018, Banquet speaker, Winter Conference on Plasma Spectroscopy
- 2018, Clemson U. Chemistry Symposium keynote speaker
- 2018, Southern Illinois University, Boris Muslin Symposium keynote speaker
- 2018, Los Alamos ProjectY Night with a Nerd

- 2018, Great Lakes Institute, University of Minnesota, Duluth; front page of Duluth newspaper
- 2018, Physics Department, University of Massachusetts, Lowell
- 2019, Geology Department, Baylor University
- 2019, University of Basque Country, Leoia, Spain
- 2019, Keynote speaker, Symposium on Life in the Universe, Wheaton College
- 2019, Banquet speaker, Mountain Lake Area Foundation
- 2019, Distinguished Lecture Series, Wyoming Stargazing, Jackson WY, plus radio and newspaper interviews
- 2019, Levandowski Lecturer; Earth, Atmospheric, and Planetary Sciences, Purdue University
- 2020, Lunar and Planetary Institute, Houston, public seminar speaker (virtual event)
- 2020, American Scientific Affiliation, West Michigan chapter, public seminar (virtual event)
- 2020, Royal Astronomical Society, London, keynote speaker (virtual event)
- 2020, Pajarito Environmental Education Center Astronomy talk on Mars (virtual event)
- 2020, University of New Mexico Geology seminar speaker (virtual event)
- 2021, Planetary Society Mars landing event (virtual event)
- 2021, Modesto Area Planetarium and Science Outreach (virtual event)
- 2021, Eastern Analytical Symposium Plenary Lecture
- 2022, Frank G. and Jean M. Chesley lecturer, Carleton College, Minnesota
- 2022, Planetary Society, Chicago Chapter (virtual event)
- 2022, Wheaton College, local American Scientific Affiliation Chapter
- 2023, Denver, local American Scientific Affiliation Chapter (virtual)
- 2024, Purdue Astronomy Club
- 2024, University of Valladolid, Spain
- 2024, Leidos Remote Sensing Professional Course
- 2024, Embry-Riddle Aeronautical University
- 2024, Bethune Cookman University
- 2025, Mt. Lake Christian School
- 2025, Robotics Club, Orange City, Iowa
- 2025, University of Iowa, Earth and Environmental Sciences Department
- 2025, Westwood Lecture, Purdue President's Mansion

Meeting and Session Convener or Chair

- 2012-2013, Co-convener of an International Team on Solar Wind Fractionation, two week-long meetings at the International Space Science Institute, Bern, along with side meetings elsewhere.
- 2014 Fall AGU Meeting, Co-convener of session, "The Martian Crust: Synergism of Meteorites and Missions"
- 2018 Fall AGU Meeting, Convener of session, "Diagenesis on Mars and Clues from Terrestrial Systems"
- 2019 Co-convener of an International Team on "Cross-calibration of Laser-Induced Breakdown Spectroscopy (LIBS) instruments for planetary exploration, one week-long meeting at the International Space Science Institute in Bern.
- 2019 Session chair at Planetary Caves Workshop, Carlsbad, NM

- 2020 Fall AGU Virtual Meeting, Co-convener of session, "Raman Spectroscopy for Mineralogy and Organics on Planets and Analog Samples"
- 2022 Lunar and Planetary Science Conference, session chair for "A Year of Perseverance at Jezero II"
- 2025 Purdue Space Symposium, session for external speakers

Outreach

I have given personal presentations on Mars exploration to the following individuals and groups:

- Bill Gates and son Rory, 2013
- University of California Board of Regents, 2012
- Janet Napolitano, 2014
- Chris Godsick, 2014
- Los Alamos National Security Board of Governors, 2014
- Larry Gerschwin, 2015
- Moro Toyoshima, 2015
- John and Linda Mars, Mars Inc. (family owners of $33B business), 2019
- Thomas Zurbuchen, former NASA Associate Administrator for Science Mission Directorate, 2024
- Laurie Leshin, JPL Director; Tiffany Morgan, NASA Mars Exploration Program Director; Chris D'Souza, NASA Human Spaceflight Program Lead, 2025

Hosting of Special Visitors at Purdue

2024 Thomas Zurbuchen, former NASA Asssociate Administrator for SMD

2025 Laurie Leshin, JPL Director (Wiens was instrumental in inviting her)

2025 Abigail Fraeman, Deputy Project Scientist for the Curiosity Rover Mission

2025 Barbara Cohen, Goddard Space Flight Center, Project Scientist for Artemis III Mission

Interviews and appearances: Wiens has given live and taped interviews on many TV and radio news programs and news outlets in the US and in Europe, including National Public Radio, Associated Press, Secrets of the Universe (2021). In 2022 he was interviewed for The Register and the Dutch News Service. In 2023 he was on live TV for the landing of Chandrayaan-3 lunar mission.

Blogs: Wiens has written NASA Mars rover blogs as follows:

- Curiosity: 2016-2020, many blogs
- Perseverance: August 2021, March 2022, May 2022, July 2022, December 2022, December 2024.

Undergraduate and Post-Baccalaureate Students

- Liese-Marie Nortier Sutherland, New Mexico State University, 2010
- Ryan Jackson, Eastern New Mexico University, 2014

- Hannah Pagel, Calvin College, 2014
- Eric Carlson, New Mexico Tech, 2015
- Alex Parra, West Point, 2015
- Keian Hardy, Naval Academy, 2015
- Veronica Sanford, Ursinus College, 2016
- Ethan Haldeman, Ursinus College, 2016
- Madeleine Bodine, New Mexico Tech, 2016
- Sarah Lamm, KSU, 2016-2018
- Sean Czarnecki, ASU, 2018
- Joseph Sarrao, LAHS, 2018-2021
- Miles Egan, U. Hawaii, 2019
- Alyre Blazon-Brown, U. Mass. Lowell, 2020-2022
- Noah Martin, AAE, Purdue, 2023-2024
- John Groves, EAPS, 2024

Graduate Student Mentor

- Stephanie Connell, 2022-
- Henry Manelski, 2022-
- Dong Jae Lee, 2024-
- Noah Martin, 2024-
- Mia Rudin, 2024-

Graduate Students, Committee Member

- 2001, Mark Shappirio, University of Virginia. Currently a scientist at Goddard Space Flight Center
- 2011, Nina Lanza, University of New Mexico, institution advisor: Horton Newsom. Currently a scientist at Los Alamos National Laboratory, and PI of the ChemCam instrument
- 2011, Agnes Cousin, Université Paul Sabatier, Toulouse, institution advisor: Sylvestre Maurice. Currently Professor at Université Paul Sabatier, Toulouse.
- 2012, Xiaoyu Xi, University of California, Davis, institution advisor: Qing-zhu Yin
- 2013, Ann Ollila, University of New Mexico, institution advisor: Horton Newsom. Currently a scientist at Los Alamos National Laboratory Planetary Exploration Team
- 2015, Alissa Mezzacappa, Delaware State University, institution advisor: Noureddine Melikechi
- 2020, Ryan Jackson, University of New Mexico, institution advisor: Horton Newsom. Currently working for the state of New Mexico.
- 2020, Baptiste Chide, U. Toulouse, advisors: Sylvestre Maurice, David Mimoun. Currently Professor at Université Paul Sabatier, Toulouse
- 2020, Zach Gallegos, University of New Mexico, institution advisor: Horton Newsom; currently a lab instructor at UNM.
- 2024, Thorsteinn Kristinsson, Purdue Aeronautics and Astronautics Engineering, for MS; currently a PhD student at U. Colorado.

- Lisette Melendez, Purdue Planetary Sciences, currently a PhD student
- Margaret Deahn, Purdue Planetary Sciences, currently a PhD student
- Sam Harris, Purdue Planetary Sciences, currently a PhD student

Graduate Students, Other

- 2011, Johan Mazoyer, U. Toulouse, foreign study stage
- 2019, Imanol Torre Fernandez, U. Basque Country, foreign study stage
- 2022, Lenaig Hurtrez, U. Lyon, foreign study stage (virtual)

Post-doctoral Researchers

- 2003-2004, Kurt Dekoning
- 2010-2012, Jeremie Lasue, currently Professor at Université Paul Sabatier, Toulouse
- 2012-2014, Nina Lanza, received LANL Distinguished Post-doc Award and LANL Early Career Award; currently scientist at LANL and PI of the ChemCam instrument
- 2013-2014, Agnes Cousin, currently Professor at Université Paul Sabatier, Toulouse
- 2013-2014, Paolo Pilleri, currently researcher at Institute pour Rescherche en Astrophysique et Planetologie, Toulouse
- 2015-2017, Jens Frydenvang, currently Professor at U. Copenhagen
- 2015-2018, Patrick Gasda, currently scientist in LANL's Planetary Exploration Team
- 2016-2019, Karen Rieck, currently researcher at New Mexico Water Quality
- 2016-2019, Ann Ollila, LANL Director's Postdoc, currently scientist at LANL
- 2019-2022, Carey Legett IV, currently scientist at LANL
- 2021-2023, Baptiste Chide, LANL Director's Postdoc, currently Assistant Professor, University of Toulouse
- 2022-2024, Clement Royer, currently postdoc at LATMOS, Paris, France

Visiting Scholar

- Dr. Lucia Mandon, 2022

Languages

- English: Native tongue
- German: Was nearly fluent at one time
- French: Comprehension and writing, moderate
- Spanish: Starting
- Chinese: Studied for one year
- Greek, written: Hobby