Curriculum Vitae

Kaveh Pahlevan

CONTACT INFORMATION

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EDUCATION

2010	Ph.D., Planetary Science, California Institute of Technology
2006	M.S., Planetary Science, California Institute of Technology
2004	B.S., Astronomy with Honors, University of Maryland

ACADEMIC APPOINTMENTS

2010	Dringing I Investigator	Carl Sagan Contor	The CETI Institute
2019 -	Fincipal investigator,	Call Sagall Celler,	The SETT Institute

- 2018 19 Visiting Faculty, Earth & Space Exploration, Arizona State University
- 2016 18 Asst Research Scientist, Earth & Space Exploration, Arizona State University
- 2013 15 Poincaré Fellow, Lagrange Laboratory, Observatoire de la Côte d'Azur, Nice
- 2010 13 Bateman Fellow, Geology and Geophysics, Yale University

HONORS, GRANTS, AND AWARDS

- 2021 NASA Solar System Workings Proposal (PI, \$178,027, active)
- 2018 NASA Emerging Worlds Proposal (PI, \$144,601, active)
- 2015 Nature Editor's Choice (for Nature paper published in the same year)
- 2013 Henri Poincaré Fellowship (Observatoire de la Côte d'Azur)
- 2010 Bateman Postdoctoral Fellowship (Yale University)
- 2010 Institute Postdoctoral Fellowship (ETH Zurich respectfully declined)
- 2007 Nature Research Highlights (for EPSL paper published in same year)
- 2004 Institute Research Fellowship (Caltech)

PEER-REVIEWED PUBLICATIONS

2022 Pahlevan, K., Schaefer, L., Elkins-Tanton, L., Desch, S., Buseck, P. A primordial origin of hydrospheric deuterium enrichment on Mars, *Earth & Planetary Science Letters*, 595, 117772.
Pahlevan, K., Gammie, C. Isotopic fractionation in the proto-lunar disk: constraints on equilibration (in revision, *The Astrophysical Journal*) Schaefer, L., Pahlevan, K., Elkins-Tanton, L. Ferric iron evolution during magma ocean crystallization produces oxidized upper mantle (submitted to *Earth & Planetary Science Letters*) Canup, R., Righter, K., Dauphas, N., Pahlevan, K., Cuk, M., Lock, S., Stewart, S., Salmon, J., Rufu, R., Nakajima, M., Magna, T. Origin of the Moon (accepted for inclusion in *New Views of the Moon II*)

2019	Pahlevan, K. , Schaefer, L., Hirschmann, M.M. Hydrogen isotopic evidence for early oxidation of silicate Earth, <i>Earth & Planetary Science Letters</i> , 526,
2018	115770. Wu, J., Desch, S., Schaefer, L., Elkins-Tanton, L., Pahlevan, K., Buseck, P. Origin of Earth's water: chondritic inheritance plus nebular ingassing and
	storage of hydrogen in the core, <i>Journal of Geophysical Research – Planets</i> , 123, 2691–2712.
	Greenwood, J. P., Karato, S. I., Vander Kaaden, K. E., Pahlevan, K., Usui, T. Water and Volatile Inventories of Mercury, Venus, the Moon, and Mars. <i>Space Science Reviews</i> , 214(5), 92.
2016	Pahlevan, K. , Karato, S., Fegley, B. Speciation and dissolution of hydrogen in the proto-lunar disk, <i>Earth & Planetary Science Letters</i> , 445, 104-113.
2015	Pahlevan, K. , Morbidelli, A. Collisionless encounters and the origin of the lunar inclination, <i>Nature</i> , 527, 492-494. News and Views: The Moon's tilt for Gold, 455-456.
2014	Pahlevan, K. Isotopes as tracers of the sources of the lunar material and processes of lunar origin. <i>Philosophical Transactions of the Royal Society A.</i> 372, 20130257.
Pre-2013	 Pahlevan, K., Stevenson, D.J., Eiler, J. Chemical fractionation in the silicate vapor atmosphere of the Earth, <i>Earth & Planetary Science Letters</i>. 301, 433-443. Li, K-F., Pahlevan, K., Kirschvink, J.L., Yung, Y.L. Atmospheric pressure as a natural climate regulator for a terrestrial planet with a biosphere, <i>Proceedings of the National Academy of Sciences</i>, 106 (24) 9576-9579. Pahlevan, K., Stevenson, D.J. Equilibration in the aftermath of the lunar forming giant impact, <i>Earth & Planetary Science Letters</i>. 262, 438-449. News and Views: Isotopic Lunacy. <i>Nature</i>, 450, 356, 357.
	rews and views. isotopic Lunacy, ivuale, 450, 550-557.

OTHER PUBLICATIONS

- 2021 Rufu, R., Salmon, J., **Pahlevan, K.,** Visscher, C., Nakajima, M., Righter, K. The Origin of the Earth-Moon System as Revealed by the Moon, Planetary Science and Astrobiology Decadal Survey 2023-2032 White Paper, Bulletin of the American Astronomical Society, 53 (4) 238.
- 2018 **Pahlevan, K.** Telltale tungsten and the Moon, *Nature Geoscience*, 11, 16-18.
- 2010 **Pahlevan, K.** Chemical and Isotopic Consequences of Lunar Formation via Giant Impact, Ph.D. Thesis, California Institute of Technology.

INVITED TALKS

- 2022 "New models of primordial atmospheres on Earth and Mars", University of California, Berkeley, CIDER summer workshop on Earth's evolution as an inhabited world, July 7.
- 2021 "Magma oceans and primordial atmospheres on Earth and Mars", University of California, Berkeley, Joint Seminar, Department of Earth & Planetary Sciences and Department of Astronomy, October 14. "New perspectives on the origin of the lunar inclination", University of California, Berkeley, Thursday Astronomy Short Talks, October 14.

	"Magma ocean outgassing on Earth and Mars recorded in D/H", Winter Seminar, Bayerisches Geoinstitut (BGI), University of Bayreuth, Germany,
2020	"Hydrogen isotopic constraints on primordial atmospheric evolution on Earth and Mars" Planetary Lunch University of California Santa Cruz, June 29
2019	"The Search for Life on Mars", Department of Aerospace, Physics, and Space Sciences, Florida Institute of Technology, March 15
2018	"D/H constraints on early planetary evolution on Earth and Mars", Dept. of Geosciences, University of Wisconsin-Madison, Madison, Wisconsin, December 6.
	"Oxygen fugacity of the primordial atmosphere and the early oxidation of the mantle", Natural Environment Research Council Head Office, Swindon, UK, March 14.
2017	"A massive hydrogen-rich Martian greenhouse recorded in D/H", Dept. of Terrestrial Magnetism, Carnegie Institution of Washington, November 16. "Chemical and dynamical signatures of Earth-Moon origin", University of Illinois, Urbana-Champaign, April 12.
2016	"Interpreting the isotopic record: signatures of planetary origin", Institute of Geological Sciences, Freie Universität, Berlin, October 13. "Cosmochemical and dynamical signatures of lunar origin", Institute de
2015	"Cosmochemical and dynamical signatures of lunar origin", Seminar at the Observatoire de la Côte d'Azur (OCA), Nice, France, November 12. "Cosmochemical and dynamical signatures of lunar origin", Laboratoire de Geology, Ecole Normale Superjeure (ENS), Lyon, November 11.
2014	"Cosmochemical signatures of lunar origin via giant impact", Institute of Geochemistry and Petrology, Swiss Federal Institute of Technology (ETH), Zurich, October 2. "Cosmochemical signatures of lunar origin via giant impact", Le Centre de Recherche Pétrographique et Géochimique (CRPG), Nancy, January 30
2013	 "Evolution of the proto-lunar disk: constraints from the isotopic record", Seminar, Observatoire de la Cote d'Azur (OCA), Nice, France, Sept. 19. "Evolution of the proto-lunar disk: constraints from the isotopic record", Southwest Research Institute (SwRI), Boulder, Colorado, July 10. "Evolution of the proto-lunar disk: constraints from the isotopic record", School of Physics, University of Bristol, Bristol, UK, March 18.
2012	 "When the Moon was a Cloud: A Creation Myth", Department of Earth Sciences, Oxford University, Oxford, UK, May 21. "When the Moon was a Cloud: A Creation Myth", Seminar at the Observatoire de la Côte d'Azur (OCA), Nice, France, May 10. "When the Moon was a Cloud: A Creation Myth", Lunar & Planetary Institute (LPI) Spring Seminar Series, Houston, Texas, March 30. "When the Moon was a Cloud: A Creation Myth", GEOTOP Seminar Series, Department of Earth and Planetary Sciences, McGill University, Mantacal Eshruary 24
	Montreal, February 24.

2011	"When the Moon was a Cloud: A Creation Myth", Department of Earth and Planetary Sciences Colloquium, Harvard University, Cambridge, Nov. 7. "When the Moon was a Cloud: A Creation Myth", Department of Geosciences, State University of New York (SUNY) at Stony Brook, New York, September 22.
	"Neutrinos and the History of the Sun's Luminosity", Institute for Theory and Computation (ITC) Luncheon, Center for Astrophysics (CfA), Harvard University, Cambridge, April 5.
	"When the Moon was a Cloud: A Creation Myth", Institute for Theory and Computation (ITC) Colloquium, Center for Astrophysics (CfA), Harvard University, Cambridge, April 5.
	"When the Moon was a Cloud: A Creation Myth", Department of
	Astronomy Seminar, University of Texas at Austin, Texas, March 14.
2010	"When the Moon was a Cloud: A Creation Myth", Department of
	Astronomy Seminar, University of Maryland, College Park, November 23.
	"Towards a Predictive Theory of Lunar Origin", Department of Geosciences
	Colloquium, Brown University, Providence, November 18.
	"The Giant Impact Hypothesis – Where We Stand", Department of
	Geosciences Lunch Seminar, Brown University, Providence, November 18.
	"Chemical and Isotopic Consequences of the Moon-forming Giant Impact"
	Department of Geosciences, Solid Earth Brown Bag Seminar, Princeton
2000	University, Princeton, September 24.
2009	and Mineral Resources Seminar, Swiss Federal Institute of Technology
	"When the Moon was a Cloud: A Creation Muth" Department of Terrestrial
	Magnetism (DTM) Seminar, Carnegie Institute of Washington, July 29.
	"Fractionation after the Moon-Forming Giant Impact", Geochemistry
	Seminar, Department of Earth, Planetary, and Space Sciences, University of
	California, Los Angeles (UCLA), May 6.
SELECT	ED CONFERENCE/WORKSHOP ABSTRACTS & PRESENTATIONS
2022	Pahlevan, K. "Primordial Mars as an Analog to a New Class of Terrestrial
	Exoplanet", The Exoplanets in Our Backyard 2, Albuquerque, New Mexico. Schaefer, L., Pahleyan , K., Elkins-Tanton, L. "Crystallization of Ferrous and
	Ferric Iron Oxides Drive the Redox Evolution of Crystallizing Magma
	Oceans" American Geophysical Union Fall Meeting Chicago
2021	Pahlevan K Schaefer I. Hirschmann M M "Primordial atmospheric
2021	evolution recorded in the Martian mantle" Goldschmidt Conference (virtual)
2020	Pahlevan , K , A massive hydrogen-rich primordial greenhouse recorded in
	Martian D/H NFxSS Quantitative Habitability Science Workshop (virtual)
	Pahlevan, K. , Schaefer, L., Hirschmann, M.M. Primordial magma ocean
	outgassing on Earth and Mars recorded in D/H, Goldschmidt Conference, Hawaii.

2019	Pahlevan, K., Schaefer, L., Desch, S., Hirschmann, M.M. Evolution of the
	steam atmosphere and early oxidation of the silicate Earth, American
	Geophysical Union, Fall Meeting, San Francisco.
	Schaefer, L., Pahlevan, K., Elkins-Tanton, L. T. Coevolution of the Earth's
	interior and atmospheric oxidation state during planet formation,
	Astrobiology Science Conference, Bellevue, Washington.
	Pahlevan, K. Earth's primordial atmosphere evolution recorded in D/H,
	Exoclimes V: The Diversity of Planetary Atmospheres, Oxford, UK.
2018	Schaefer, L., Elkins-Tanton, L. T., Pahlevan, K. Ferric Iron Production in
	Magma Oceans and Evolution of Mantle Oxidation State, Differentiation:
	Building the Internal Architecture of Planets workshop, Pasadena, California.
2017	Pahlevan, K., Schaefer, L., Elkins-Tanton, L., Desch, S. A massive
	hydrogen-rich primordial greenhouse recorded in Martian D/H, American
	Geophysical Union, Fall Meeting, New Orleans.
	Schaefer, L., Elkins-Tanton, L. T., Pahlevan, K. Redox Evolution in Magma
	Oceans Due to Ferric/Ferrous Iron Partitioning, American Geophysical
	Union, Fall Meeting, New Orleans.
	Famevan, K., Elkins-Tanton, L. Tidai Dissipation on the Post-Glant-Impact
	differentiation of the terrestrial planets. Nice, France
	Pablevan K Schaefer I Elkins-Tanton I Desch S Karato S-i
	Hydrogen isotonic fractionation during crystallization of the terrestrial
	magma ocean Lunar & Planetary Science Conference. The Woodlands
	Texas.
2016	Pahlevan, K. , Karato, S. Hydrogen isotopic fractionation during
	crystallization of the terrestrial magma ocean, American Geophysical Union,
	Fall Meeting, San Francisco.
	Pahlevan, K. Isotopic constraints on proto-lunar disk evolution, 47 th Lunar &
	Planetary Science Conference, The Woodlands, Texas.
2015	Pahlevan, K. Major element isotopic fractionation in the proto-lunar disk,
	Goldschmidt Conference, Prague.
	Pahlevan, K., Morbidelli, A. Collisionless encounters and the origin of the
	lunar inclination, Solar System Bombardment III, Houston.
2014	Pahlevan, K., Morbidelli, A. Excitation of the lunar inclination via three-
	body interactions, International interdisciplinary workshop on accretion and
	early differentiation of the terrestrial planets, Nice, France.
	Panievan, K. , Morbidelli, A. The lunar inclination as a dosinieter for
2013	The Woodlands, Texas
	Pahlevan K Isotonic Constraints on Physical Models Royal Society
2015	Meeting on the Origin of the Moon Chicheley Hall Buckinghamshire UK
	(invited)
	Pahlevan, K. , Karato, S., Fegley, B. Loss of Volatile Elements After the
	Moon-Forming Giant Impact, Goldschmidt Conference. Florence.

	Pahlevan, K. Developing the Rare Earth Element Constraint for Scenarios of Lunar Origin, 44 th Lunar & Planetary Science Conference, The Woodlands, Texas.
2012	Pahlevan, K. What do Moons of Terrestrial Planets Tell us about their
	Origins? Planetary Origins and Frontiers of Exploration, Weizmann Institute of Science, Rehovot, Israel (keynote).
	Pahlevan, K. Origin of the Moon – Evolution of an Impact-Generated Disk,
	Micro-symposium 53 (co-sponsored by Brown University, Vernadsky
	Institute, MIT, and the NASA Lunar Science Institute), The Woodlands,
	Texas (keynote).
2011	Pahlevan, K. Isotopic Abundances as Tracers of the Processes of Lunar
	Formation, American Geophysical Union, Fall Meeting (invited).
	Pahlevan, K., Karato, S. Volatile Loss via Outgassing of the Lunar Magma
	Ocean, Goldschmidt Conference, Prague.
2010	Fitoussi, C., Bourdon, B., Pahlevan, K., Wieler, R. Si Isotope Constraints on
	the Moon-forming Impact, 41st Lunar & Planetary Science Conference, The
	Woodlands, Texas.
2009	Pahlevan, K., Stevenson, D.J. Chemical Fractionation after the Moon-
	forming Giant Impact, 40 th Lunar & Planetary Science Conference, The
••••	Woodlands, Texas.
2008	Pahlevan, K., Stevenson, D.J. Volatile loss Following the Moon-forming
0007	Giant Impact, Goldschmidt Conference, Vancouver.
2007	Pahlevan, K., Stevenson, D.J. Equilibration of the Earth-Moon System
	Following the Giant Impact, Goldschmidt Conference, Cologne.
	Pahlevan, K., Stevenson, D.J. "Mixing During Planet Formation and After
	the Moon-Forming Impact" Theoretical Institute for Advanced Research in
2007	Astrophysics Workshop, Academia Sinica, Taipei (invited).
2006	Panlevan, K., Stevenson, D.J. Mixing in the Aftermath of the Giant Impact –
	Implications for Planet Formation, Meeting of the Division for Planetary
2005	Sciences of the American Astronomical Society, Pasadena, CA.
2003	ranevan, K., Stevenson, D.J. The Oxygen Isotope Similarity of the Earth
	Science Conference, Houston, Texas
	טרורות כטוובובותב, ווטעזוטוו, ובגמז.

SERVICE TO THE PROFESSION

2009-2022 Peer-Review Referee Service

Science, Nature, Nature Geoscience, Nature Communications, Science Advances, Icarus, Earth & Planetary Science Letters, Journal of Geophysical Research, Astronomy & Astrophysics, Astrophysical Journal, Planetary Science Journal, Geochimica et Cosmochimica Acta, Philosophical Transactions of the Royal Society A

2013-2022 Grant Proposal/Fellowship Review Service External Reviewer, Austrian Science Fund (FWF) External Reviewer, Swiss National Science Foundation (SNSF)

External Reviewer, UK Natural Environment Research Council (NERC) External Reviewer, NASA Earth & Space Science Fellowship (NESSF) External Reviewer, US National Science Foundation (NSF) Service on various NASA panels

2014-2022 Conference Service

Contributed talk co-convener on proposed session "Origins and planetary budgets of volatile elements in the interior of terrestrial bodies: accretion, outgassing, & ingassing", Goldschmidt Conference, Honolulu, 2022 Contributed talk session co-chair on "Formation, composition and evolution of atmospheres", Exoclimes V Conference, Oxford, August, 2019 Contributed talk session co-chair on "Signatures of Accretion and Core Formation", Goldschmidt Conference, Paris, August, 2017 Scientific Organizing Committee, Workshop on Solar System Bombardment III held at the Lunar and Planetary Institute, Houston, Texas, February, 2015 Contributed talk session co-chair on: "Protolunar Disk and Magma Ocean: Models and Sample Constraints", Lunar & Planetary Science Conference, The Woodlands, Texas, March, 2014.

PROFESSIONAL SOCIETY MEMBERSHIPS

- 2004- American Geophysical Union
- 2006- American Astronomical Society
- 2007- Geochemical Society

SELECTED PRESS COVERAGE

- 2022 The Guardian, "Ancient Mars could have been teeming with microbial life, researchers find"; Link: <u>https://tinyurl.com/2p8v8vwj</u>
- 2018 American Geophysical Union Newsroom, "Scientists theorize new origin story for Earth's water" by Lauren Lipuma; Link: <u>https://bit.ly/2KpYkgb</u>
- 2015 The NY Times, "Scientists Link Moon's Tilt and Earth's Gold" By Kenneth Chang; Link: <u>https://nyti.ms/2Ty4H5j</u>

The LA Times, "Gold and platinum offer clues about the moon's mysterious tilt" By Karen Kaplan, Link: <u>http://shorturl.at/lBSZ9</u>

Science Magazine, "How the moon got its tilt—and Earth got its gold" By Sid Perkins, Link: <u>http://shorturl.at/dyEX2</u>

New Scientist, "Flying gold knocked the moon off course and ruined eclipses" By Jacob Aron, <u>https://bit.ly/2scadRy</u>

The Christian Science Monitor, "A strong tug might have pulled the moon to its inclined orbit" By Eva Botkin-Kowacki, <u>https://bit.ly/2DXi08u</u>

ABC Science, "Moon's orbit was tilted by close encounters with passing planetesimals" By Stuart Gary, <u>https://ab.co/2PurUUH</u>

- 2012 The Chicago Tribune, March 29, 2012, "Moon struck?" by Cynthia Dizikes; Link: <u>https://trib.in/2AcJcOz</u>
- 2011 New Scientist, January 5, 2011, "Did magma rain on the early Earth?"; Link: https://bit.ly/2Tvnv57