Robin M. Canup
Southwest Research Institute; 1050 Walnut Street, Suite 300; Boulder, Colorado 80302

Employment

Vice President	Southwest Research Institute	10/22—present
Assistant Vice President	Southwest Research Institute	3/19—9/22
Associate Vice President	Southwest Research Institute	3/10 – 3/19
Institute and Chief Scientist	Southwest Research Institute	3/09 – 3/10
Executive Director	Southwest Research Institute	3/07—3/09
Director	Southwest Research Institute	4/05 – 3/07
Visiting Professor	Division of Geological and Planetary Sciences, California Institute of Technology	1/05 – 4/05
Assistant Director	Southwest Research Institute	9/99 – 4/05
Senior Research Scientist	Southwest Research Institute	3/98 – 9/99
Research Associate	LASP, University of Colorado	5/95 – 2/98

Education

Ph.D., M.S., Astrophysical, Planetary and Atmospheric Sciences	University of Colorado
B.S., Physics	Duke University

Selected Professional and Service Activities

Space Studies Board (2023 – present)
Co-Chair, 2023-2032 Planetary Science and Astrobiology Decadal Survey (2020 – 2022)
NASA Planetary Advisory Council (2018-2020)
Editorial board, Annual Reviews in Earth and Planetary Science (2015- 2018)
J. Lawrence Smith Medal Committee, NAS (2015, 2018)
Class Membership Committee, Class I, NAS (2014, 2017-2019, 2024)
AGU Planetary Prize Committee (2010-2014)
AGU Hess Medal Prize Committee (2009 – 2010)
Planetary Science Subcommittee of the NASA Advisory Council (2006 – 2009)
DPS Prize Committee (2007 – 2009)
NSF Astronomy Division's Committee of Visitors (2008)
Editorial board member, *Icarus* (2003 - 2006)
Brouwer Award Committee, Division of Dynamical Astronomy, AAS (2003-2006)
Jupiter Icy Moons Orbiter Science Definition Team (2003-2004)
Committee Member (2001-2003), Division of Dynamical Astronomy
Lead Editor, 'Origin of the Earth and Moon', University of Arizona Space Science Series, 2000

Honors and Awards

Thomas A. Mutch Memorial Lecture, Brown University (2024)
Alfred O. Nier Lecture, University of Minnesota (2024)
Stanton J. Peale Lecture, University of California Santa Barbara (2018)
American Academy of Arts and Sciences (2017)
Hertha Sponer Presidential Lecture, Duke University (2014)
National Academy of Sciences (2012)
Masursky Lecture, Lunar and Planetary Sciences Conference (2011)
Asteroid 17836 Canup
Brilliant 10, Popular Science magazine (2004)
Fellow of the American Geophysical Union (2004)
James B. Macelwane Medal of the American Geophysical Union (2004)
Harold C. Urey Prize of the Division of Planetary Sciences of the AAS (2003)

Selected Publications

Rufu, R., and Canup, R. M. 2024. Origin of compact exoplanetary systems during disk infall. **Nature Communications**, in revision.

Hull, S.C., Nakajima, M., Hosono, N., Canup, R. M., Gassmoller, R. 2024. Effect of equation of state and cutoff density in smoothed particle hydrodynamics simulations of the Moon-forming giant impact. 2024. **Planet. Sci. J**. 5, id. 9, 40 pp.

Canup, R.M., Righter, K., Dauphas, N., Pahlevan, K., Cuk, M., Lock, S. J., Stewart, S. T., Salmon, J., Rufu, R., Nakajima, M. and T. Magna, 2023. *Origin of the Moon.* In **New Views of the Moon 2**, Reviews in Mineralogy and Geochemistry 89(1), 53-102.

Porter, S. B. and Canup, R. M. 2023. *Orbits and masses of the small satellites of Pluto*. **Planet. Sci. J**. 4, id. 120, 14 pp.

Halliday, A., and Canup, R. M. 2023. *The accretion of planet Earth*. **Nature Reviews Earth & Environment** 4, 19-35.

Genova, A., Smith, D. E., Canup, R. M., Hurford, T., Goossens, S., Mazarico, E., Neumann, G. A., Zuber, M. T., Nimmo, F., Wieczorek, M. and E. Bierhaus., 2022. *Geodetic investigations of the mission concept MAGIC to reveal Callisto's internal structure*. **Acta Astronautica,** 195, 68-76.

Dauphas, N., Nie, N. X., Blanchard, M., Zhang, Z. J., Zeng, H., Hu, J. Y., Meheut, M., Visscher, C., Canup, R. M. and T. Hopp, 2022. *The Extent, Nature, and Origin of K and Rb Depletions and Isotopic Fractionations in Earth, the Moon, and Other Planetary Bodies*. **Planet. Sci. J.** 2, id. 29, 39 pp.

Rufu, R., and Canup, R. M. 2022. *Coaccretion + Giant Impact Origin of the Uranus System: Tilting Impact*. **Astrophys J**. 928, id. 123, 11 pp.

Salmon, J., and Canup, R. M. 2022. *Coaccretion + Giant Impact Origin of the Uranus System: Post-impact Evolution*. **Astrophys J**. 924, id. 6, 13 pp.

NASEM (National Academies of Sciences, Engineering, and Medicine), 2022. *Origins, Worlds, and Life: A Decadal Strategy for Planetary Scinence and Astrobiology 2023 – 2032*. National Academies Press, Washington, D.C. (R. M. Canup and P. R. Christensen, Co-Chairs), 713 pages.

Canup, R. M., Kratter, K. M., and Neveu, M. 2021. *On the Origin of the Pluto System.* In **The Pluto System after New Horizons**, Univ. of Az. Press, Tucson, 663 pages, p. 475-506.

Rufu, R. and Canup, R. M. 2020. *Tidal evolution of the Evection Resonance/Quasi-resonance and the Angular Momentum of the Earth-Moon System.* **Journal Geophys. Res**., 125, e06312.

Ward, W. R., Canup, R. M. and Rufu, R. 2020. *Analytical model for the tidal evolution of the evection resonance and the timing of resonance escape.* **Journal Geophys. Res**., 125, e06266.

Marchi, S., Walker, R. J., and Canup, R. M. 2020. *A compositionally heterogeneous martian mantle due to late accretion*. **Science Advances**, 6.

Salmon, J. and Canup, R. M. 2019. *HydroSyMBA: A 1D Hydrocode Coupled with an N-body Symplectic Integrator*. **Astrophys. J**., 881, 13pp.

Marchi, S., Canup, R. M., and Walker, R. J. 2018. *Heterogeneous delivery of silicate and metal to the Earth by large planetesimals*. **Nature Geoscience**, 11, 77-81.

Canup, R. M. and Salmon, J. 2018. *Origin of Phobos and Deimos by the impact of a Vesta-to-Ceres sized body with Mars*. **Science Advances** 4, p.eaar6887.

Charnoz, S., Canup, R. M., Crida, A., and Dones, L. 2018. *The origin of planetary ring systems.* In **Planetary Ring Systems. Properties, Structure, and Evolution**, Edited by M.S. Tiscareno and C.D. Murray. ISBN: 9781316286791. Cambridge University Press, pp. 517-538.

Rufu, R. and R. M. Canup, 2017. *Triton's evolution with a primordial Neptunian satellite system*. **Astron. J**. 154, No. 208, 8 pp.

Salmon, J., and R. M. Canup, 2017. *Accretion of Saturn's mid-sized moons from a massive primordial ice ring*. **Astrophys. J**., 836, 19 pp.

Canup, R. M., Visscher, C., Salmon, J., and B. Fegley, Jr., 2015. *Lunar volatile depletion due to incomplete accretion within an impact-generated disk.* **Nature Geoscience** 8, 918-921.

Peale, S. and R. M. Canup, 2015. *The Origin of the Natural Satellites.* In **Treatise on Geophysics**, 2nd edition, Vol 10., Gerald Schubert (editor-in-chief) Oxford: Elsevier; pp. 559-604.

Canup, R. M., 2015. *The Moon's tilt for gold.* **Nature** 527, 455-456.

Canup, R. M., 2015. *An incredible likeness of being*. **Nature** 520, 169-170.

Canup, R. M., 2014. *Lunar-forming impacts: Processes and alternatives*. **Phil. Trans. Roy. Society A.**, 372: 20130175, 1-14.

Salmon, J. and R. M. Canup, 2014. *Lunar accretion from non-canonical disks*. **Phil. Trans. Roy. Society A**., 372: 20130256, 1-14.

Canup, R. M., 2013. *Lunar conspiracies*. **Nature** 504, 27-30.

Canup, R. M., 2013. *Modification of the rock content of the inner Saturnian satellites by an outer Solar System LHB*. **44th LPSC**, 2298.

Ward, W. R. and R. M. Canup, 2013. *The evection resonance and the angular momentum of the Earth-Moon system*. **44th LPSC**, 3029.

Canup, R. M., A. C. Barr, and D. Crawford, 2013. *High-resolution simulations of Moon-forming impacts with SPH and CTH*. **Icarus** 222, 200-219.

Canup, R. M., 2012. *Forming a Moon with an Earth-like composition via a giant impact*. **Science**, 338, 1052-1055.

Salmon, J. and R. M. Canup, 2012. *Lunar accretion from a Roche interior disk*. **Astron. J.**, 760, 1-18.

Canup, R. M., 2011. *Conditions in an infall-supplied protoplanetary disk*. **42nd LPSC**, 1245.

Canup, R. M., 2011. *On a giant impact origin of Charon, Nix and Hydra*. **Astron. J.,** 141, 35-44.

Canup, R. M., 2010. *Origin of Saturn's rings and inner moons via mass removal from a lost Titan-sized satellite*. **Nature**, **468**, 943-946.

Ward, W. R. and R. M. Canup, 2010. *Circumplanetary disk formation*. **Astron. J., 140**, 1168-1193.

Barr, A. C., R. I. Citron, and R. M. Canup, 2010. *Origin of a partially differentiated Titan*. **Icarus**, 209, 858-862.

Barr, A. C. and R. M. Canup, 2010. *Origin of the Ganymede/Callisto dichotomy by impacts during the late heavy bombardment*. **Nature Geoscience**, 3 164-167.

Canup, R. M. and W. R. Ward, 2009. *Origin of Europa and the Galilean satellites*. In **Europa**, Univ. Az. Press, Eds., R. Pappalardo, W. McKinnon and K. Khurana, pp. 59-84.

Canup, R. M., 2008. *Accretion of the Earth*. **Phil. Trans. R. Soc. A**., 366, 4061-4075.

Barr, A. C. and R. M. Canup, 2008. *Constraints on gas giant satellite formation from the interior states of partially differentiated satellites*. **Icarus**, 198, 163-177.

Canup, R. M., 2008. *Lunar forming collisions with pre-impact rotation.* **Icarus**, 196, 518-538.

Canup, R. M. and W. R. Ward, 2006. *A common mass scaling for satellite systems of gaseous planets.* **Nature**, 441 834-839.

Ward, W. R. and R. M. Canup, 2006. *The Obliquity of Jupiter*. **Astrophy. J. Let**, 640, L91-94.

Canup, R. M. and E. Pierazzo 2006. *Retention of water during planet-scale collisions*. **37th LPSC**, 2146.

Ward, W. R. and R. M. Canup, 2006. *Tidal interactions between a planet and a circumplanetary disk*. **37th LPSC**, 2169.

Canup, R. M., 2005. *A Giant Impact Origin of Pluto-Charon*. **Science**, 307, 546-550.

Canup, R. M., 2004. *Formation of the Moon*. **Ann. Revs. Astron. Astrophy**., 42, 441-475.

Canup, R. M., 2004. *Simulations of a late lunar forming impact*. **Icarus** 168, 433-456.

Canup, R. M. and W. R. Ward, 2002. *Formation of the Galilean satellites: Conditions of accretion.* **Astron. J**., 124, 3404-3423.

Canup, R. M. and E. Asphaug, 2001. *Origin of the Moon in a giant impact near the end of the Earth's formation*. **Nature,** 412, 708-712.

Canup, R. M., W. R. Ward, and A. G. W. Cameron, 2001. *A scaling relationship for satellite-forming impacts.* **Icarus**, 150, 288-296.

Ward, W. R. and R. M. Canup, 2000. *Origin of the Moon's orbital inclination through resonant disk interactions*. **Nature**, 403, 741-743.

Canup, R. M. and W. R. Ward, 2000. *A Hybrid Fluid/N-Body Model for Lunar Accretion*. **31st LPSC.**

Canup, R. M. and C. B. Agnor, 2000. *Accretion of the terrestrial planets and the Earth-Moon system.* In **Origin of the Earth and Moon** (R. M. Canup and K. Righter, Eds.), Univ. of Arizona Press, Tucson.

Kokubo, E., R. M. Canup and S. Ida, 2000. *Lunar accretion from an impact-generated disk*. In **Origin of the Earth and Moon** (R. M. Canup and K. Righter, Eds.), Univ. of Arizona Press, Tucson.

Agnor, C. B., R. M. Canup and H. F. Levison, 1999. *On the character and consequence of large impacts in the late stage of terrestrial accretion.* **Icarus** 142 219-237.

Canup, R. M., H. F. Levison and G. R. Stewart, 1999. *Stability of a terrestrial multiple moon system*. **Astron. J. 117** 603-620.

Ida, S., R. M. Canup and G. R. Stewart, 1997. *Lunar accretion from an impact-generated disk.* **Nature** 389, 353-357.

Canup, R. M. and L. W. Esposito, 1996. *Formation of the Moon from an impact-generated disk.* **Icarus** 119, 427-446.

Canup, R. M. and L. W. Esposito, 1995. *Accretion in the Roche zone: Co-existence of rings and ringmoons*. **Icarus** 113, 331-352.

Canup, R. M., J. E. Colwell and M. Horanyi, 1993. *Size distributions of satellite dust ejecta: Effects of radiation pressure and planetary oblateness*. **Icarus** 105, 363-369.