

BIOGRAPHICAL SKETCH – KAREN J. MEECH

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PROFESSIONAL PREPARATION

Rice University	Space Physics	B.A. 1981
Massachusetts Institute of Tech.	Planetary Astronomy	Ph.D. 1987

APPOINTMENTS

2018 – present	Graduate Chair
2000 – present	Astronomer, Institute for Astronomy, University of Hawaii
1992-2000	Associate Astronomer, Institute for Astronomy, University of Hawaii
1987-1992	Assistant Astronomer, Institute for Astronomy, University of Hawaii
1982-1987	Graduate Research & Teaching Assistant, Massachusetts Inst. Tech.
1981-1982	Research Specialist, AAVSO and Massachusetts Institute of Technology

AWARDS

2018	ARCs Scientist of the Year
2015	University of Hawai'i Regent's Medal for Research Excellence
2013	Director's Research Excellence Award
2011	NASA Group Achievement Award for the EPOXI Project Team
2011	NASA Group Achievement Award for EPOXI & Stardust-NEXT Missions
2009	William Tylor Olcott Distinguished Service Award of the American Association of Variable Star Observers
2006-8	National Academy of Science/Kavli Foundation Fellow
2005	NASA Group Achievement Award for the Stardust Flight Team
1996	Asteroid 4367 named Meech
1994	American Astronomical Society / DPS Harold C. Urey Prize
1988	Annie Jump Cannon Award
1981	Heaps Physics Prize

RESEARCH FIELD AND ACTIVITIES

- Developed a Discovery mission concept to explore the origin of Earth's water.
- Co-Investigator on the Deep Impact, Stardust-NeXT and EPOXI missions, leading the Earth-based observing campaigns for all three.
- Leads the UH Astrobiology Research interdisciplinary program, overseeing ~30 postdocs and coordinating the research with ~20 local faculty and international partners.
- International Astronomical Union Division Vice President and President (2006-2012)
- Responsible for development of large outreach student/teacher enhancement programs

FUNDING RECEIVED

Meech has been PI for a total of ~\$24M in grants since arriving at the University of Hawaii in 1987. Most of this funding has been through NASA and NSF research programs

REFEREED PUBLICATIONS (179 total; H-index=48)

1. A'Hearn, M.F., M.J.S. Belton, W.A. Delamere, J. Kissel, K.P. Klaasen, L.A. McFadden, **K. J. Meech**, J. H. Melosh, P. H. Schultz, J. M. Sunshine *et al.* (2005). "Deep Impact: Excavating Comet Tempel 1", *Science* **310**, 258-264.
2. A'Hearn, M.F., Belton, M.J.S., Collins, S.M., Farnham, T.L., Feaga, L.M., Groussin, O., Lisse, C.M., **Meech, K.J.**, Schultz, P.H., Sunshine, J.M. "Deep Impact and Sample Return", *Earth, Planets, and Space* **60**, 61-66, 2008.
3. A'Hearn, M.F., M.J.S. Belton, W.A. Delamere, Feaga, L.M., Hampton, D., Kissel, J., Klaasen, K.P., McFadden, L.A., **Meech, K.J.**, Schulz, P.H. (and 13 colleagues) (2011). "EPOXI at Comet Hartley 2", *Science* **332**, 1396.
4. A'Hearn, M.F., Feaga, L.M., Keller, H.U., Kawakita, H., Hampton, D.L., Kissel, J., Klaasen, K.P., McFadden, L.A., **Meech, K.J.**, Schulz, P.H. (and 13 colleagues) (2012). "Cometary Volatiles and the Origin of Comets", *Astrophys. J.* **758**, 29 (8pp).
5. Ansdell, M., **Meech, K.J.**, Hainaut, O., Buie, M.W., Kaluna, H., Bauer, J., Dundon, L. (2014). "Refined Rotational Period, Pole Solution, and Shape Model for (3200) Phaethon", *Astrophys. J.* **793**, 50.
6. Archinal, B.A., Acton, C.H., A'Hearn, M.F., (and 15 colleagues) (2018). "Report of the IAU Working Group on Cartographic Coordinates and Rotational Elements: 2015", *Celestial Mech. & Dynamical Ast.* **130**, Issue 3, ID 22, 46 pp.
7. Bailer-Jones, C.A.L., Farnocchia, D., Meech, K.J., Brassier, R., Micheli, M., Chakrabarti, S., Buie, M.W., Hainaut, O.R. 2018. "Plausible Home Stars of the Interstellar Object 'Oumuamua Found in Gaia DR2", *Astronomical Journal* **156**, id. 205, 11 pp.
8. Barucci, M. A., and 19 colleagues 2002. Visible and near-infrared spectroscopy of the Centaur 32532 (2001). ESO PT Large Program on TNOs and Centaurs: First spectroscopy results. *Astronomy and Astrophysics* **392**, 335-339.
9. Bauer, J. M., and 24 colleagues 2013. Centaurs and Scattered Disk Objects in the Thermal Infrared: Analysis of WISE/NEOWISE Observations", *The Astrophysical Journal* **773**, 22.
10. Bauer, J.M., Fernandez, Y.R., **Meech, K.J.** 2003. An optical survey of the active centaur C/NEAT (2001 T4). *Publications of the Astronomical Society of the Pacific* **115**, 981-989.
11. Bauer, J.M., Grav, T., Fernandez, Y.R., Mainzer, A.K., Kramer, E.A., Masiero, J.R., Spahr, T., Nugent, C.R., Stevenson, R.A., Meech, K.J., Cutri, R.M., Lisse, C.M., Walker, R., Dailey, J.W., Rosser, J., Krings, P., Ruecker, K., Wright, E.L., the NEOWISE Team (2017). "Debiasing the NEOWISE Cryogenic Mission Comet Populations". *Astron. J.* **154**, 53, 9 pp.
12. Bauer, J. M., Kramer, E., Mainzer, A.K., Stevenson, R., Grav, T., Masiero, J. R., Walker, R.G., Fernandez, Y. R., **Meech, K. J.** and 9 colleagues 2012. WISE/NEOWISE Preliminary Analysis and Highlights of the 67P/Churyumov-Gerasimenko near Nucleus Environs. *The Astrophysical Journal* **758**, 18.
13. Bauer, J.M., Mainzer, A.K., Grav, T., Walker, R.G., Masiero, J.R., Blauvelt, E.K., McMillan, R.S., Fernandez, Y.R., **Meech, K.J.**, Lisse C.M. (+61 colleagues) (2012). "WISE/NEOWISE Observations of Active Bodies in the Main Belt", *Astrophysical Journal* **747**, 49 (9pp).
14. Bauer, J. M., **Meech, K. J.**, Fernandez, Y. R., Pittichova, J., Hainaut, O. R., Boehnhardt, H., Delsanti, A. C. 2003. Physical survey of 24 Centaurs with visible photometry. *Icarus* **166**, 195-211.
15. Bauer, J. M., **Meech, K. J.**, Fernandez, Y. R., Farnham, T. L., Roush, T. L. 2002. Observations of the Centaur 1999 UG5: Evidence of a Unique Outer Solar System Surface. *Publications of the Astronomical Society of the Pacific* **114**, 1309-1321.

16. Bauer, J.M., Roush, T.L., Geballe, T.R., **Meech, K.J.**, Owen, T.C., Vacca, W.D., Rayner, J.T., Jim, K.T.C., “The Near Infrared Spectrum of Miranda: Evidence of Crystalline Water Ice”, *Icarus* **158**, 178-190, 2002.
17. Bauer, J.M., Stevenson, R., Kramer, E., Mainzer, A.K., Grav, T., Masiero, J.R., Fernandez, Y.R., Cutri, R.M., Dailey, J.W., Masci, F.J., **Meech, K.J.**, Walker, R., Lisse, C.M., Weissman, P.R., Nugent, C. R., Sonnett, S., Blair, N., Lucas, A., McMillan, R.S., Wright, E.L., and the NEOWISE team 2015. The NEOWISE-Discovered Comet population and the CO+CO₂ production rates, *Astrophysical Journal* **814**, id 85 (24 pages)
18. Bauer, J. M., Walker, R.G., Mainzer, A.K., Masiero, J. R., Grav, T., Dailey, J.W., McMillan, R.S., Lisse, C.M., Fernandez, Y. R., **Meech, K.J.** and 12 colleagues 2011. WISE/NEOWISE Observations of Comet 103P/Hartley 2. *The Astrophysical Journal* **738**, 171.
19. Belton, M.J.S., Hainaut, O.R., **Meech, K.J.**, Mueller, B.E.A., Kleyna, J.T., Weaver, H.A., Buie, M.W., Drahus, M., Buzik, ., Wainscoat, R., Waniak, W., Handzlik, B., Kurowski, S., Xu, S., Sheppard, S.S., Micheli, M., Ebeling, H., Keane, J.V. (2017). “The Excited Spin State of 1I/2017 U1 ‘Oumuamua”, *Astrophys. J. Lett.* **856**, Issue 2, id L21, 6pp.
20. Belton, M.J.S., **Meech, K.J.**, Chesley, S., and 68 colleagues) (2011). “Stardust-NExT, Deep Impact, and the accelerating spin of 9P/Tempel 1”, *Icarus* **213**, 345-368.
21. Belton, M.J.S., **Meech, K.J.**, A’Hearn, M.F., Groussin, O., McFadden, L., Lisse, C., Fernandez, Y.R., Pittichova, J., Hsieh, H., Kissel, J., Klaasen, K., Lamy, P., Prialnik, D., Sunshine, J., Thomas, P., Toth, I. 2005. Deep Impact: working properties for the target nucleus comet 9P/Tempel 1. *Space Science Reviews* **117**, 137-160.
22. Belton, M. J. S., Samarasinha, N. H., Fernandez, Y. R., **Meech, K. J.** 2005. The excited spin state of Comet 2P/Encke. *Icarus* **175**, 181-193.
23. Belton, M.J.S., P. Thomas, J. Veverka, P. Schultz, M.F. A’Hearn, O. Groussin, J.-Y. Li, C. Lisse, L. McFadden, J. Sunshine, **K.J. Meech**, W. Delamere, “Implications of the Results of the Deep Impact Mission for the Internal Structure of Jupiter Family Cometary Nuclei: The Talps or Layered Pile Model,” *Icarus* **187**, 332-4, 2006.
24. Belton, M.J.S., P. Thomas, J. Veverka, P. Schultz, M.F. A’Hearn, O. Groussin, J.-Y. Li, C. Lisse, L. McFadden, J. Sunshine, **K.J. Meech**, W. Delamere, “Implications of the Results of the Deep Impact Mission for the Internal Structure of Jupiter Family Cometary Nuclei: The Talps or Layered Pile Model,” *Icarus* **191**, 573, 2007.
25. Belton, M.J.S., Thomas, P., Li, J.-Y., Williams, J., Carcich, B., A’Hearn, M.F., McLaughlin, S., Farnham, T., McFadden, L., Lisse, C.M., Collins, S., Besse, S., Klaasen, K., Sunshine, J., **Meech, K.J.**, Lindler, D. (2013). “The complex spin state of 103P/Hartley 2: Kinematics and orientation in space”, *Icarus* **222**, 595-609.
26. Belton, M.J. S., Hainaut, O.R., **Meech, K. J.** & 15 colleagues (2018). The Excited Spin State of 1I/2017 U1 ‘Oumuamua. *Astrophysical Journal*, **856**, 21L.
27. Boe, B.; Jedicke, R.; **Meech, K. J.**; Wiegert, P.; Weryk, R. J.; Chambers, K. C.; Denneau, L.; Kaiser, N.; Kudritzki, R.-P.; Magnier, E. A. et al. (2019). “The orbit and size-frequency distribution of long period comets observed by Pan-STARRS1”, *Icarus* **333**, 252-272.
28. Boehnhardt, H., and 21 colleagues 2003. Results from the ESO Large Program on Transneptunian Objects and Centaurs. *Earth Moon and Planets* **92**, 145-156.
29. Boehnhardt, H., and 17 colleagues 2002. ESO large program on physical studies of Transneptunian Objects and Centaurs: Visible photometry - First results. *Astronomy and Astrophysics* **395**, 297-303.
30. Bonev, B. P., Villanueva, G. L., Paganini, L., DiSanti, M. A., Gibb, E. L., Keane, J. V., **Meech, K. J.**, Mumma, M. J. 2013. Evidence for two modes of water release in Comet

- 103P/Hartley 2: Distributions of column density, rotational temperature, and ortho-para ratio. *Icarus* **222**, 740-751.
31. Brockwell, T.G., Waite, J.H., Lunine, J.I., **Meech, K.J.**, Miller, G., Wilson, P., Pickens, K., Roberts, J. 2016. The MAss Spectrometer for Planetary Exploration (MASPEX). *IEEE Aerospace Conference*, DOI: 10.1109/AERO.2016.7500777
 32. Buie, M. W., Millis, R.L., Wasserman, L.H., Elliot, J.S., Kern, S.D., Trilling, D.E., **Meech, K.J.**, Wagner, R.M. 2003. Procedures, Resources and Selected Results of the Deep Ecliptic Survey. *Earth Moon and Planets* **92**, 113-124.
 33. Chiang, E. I., Jordan, A. B., Millis, R. L., Buie, M. W., Wasserman, L. H., Elliot, J. L., Kern, S. D., Trilling, D. E., **Meech, K. J.**, Wagner, R. M. 2003. Resonance Occupation in the Kuiper Belt: Case Examples of the 5:2 and Trojan Resonances. *The Astronomical Journal* **126**, 430-443.
 34. Chiang, E. I., Lovering, J. R., Millis, R. L., Buie, M. W., Wasserman, L. H., **Meech, K. J.** 2003. Resonant and Secular Families of the Kuiper Belt. *Earth Moon and Planets* **92**, 49-62.
 35. Cochran, A.L., Jackson, W.M., **Meech, K.J.**, Glaz, M. "Observations of Comet 9P/Tempel 1 with the Keck 1 HIRES instrument during Deep Impact", *Icarus* 191, 360-370, 2007.
 36. Delahodde, C.E., **Meech, K.J.**, Hainaut, O.R., Dotto, E. "Detailed Phase Function of Comet 28P/Neujmin 1", *Astronomy & Astrophysics* 376, 672-685, 2001.
 37. Delsanti, A., Hainaut, O., Jourdeuil, E., **Meech, K. J.**, Boehnhardt, H., Barrera, L. 2004. Simultaneous visible-near IR photometric study of Kuiper Belt Object surfaces with the ESO/Very Large Telescopes. *Astronomy and Astrophysics* **417**, 1145-1158.
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 39. Delsanti, A. C., Boehnhardt, H., Barrera, L., **Meech, K. J.**, Sekiguchi, T., Hainaut, O. R. 2001. BVRI Photometry of 27 Kuiper Belt Objects with ESO/Very Large Telescope. *Astronomy and Astrophysics* **380**, 347-358.
 40. DiSanti, M.A., Bonev, B.P., Gibb, E.L., Paganini, L., Villanueva, G.L., Mumma, M.J., Keane, J.V., Blake, G.A., Dello Russo, N., **Meech, K.J.**, Vervack, R.J., McKay, A.J. 2016. En Route to Destruction: The Evolution in Composition of Ices in Comet D/2012 S1 (ISON) between 1.2 and 0.34 AU from the Sun as Revealed at Infrared Wavelengths. *Astrophysical Journal* **820**, id 34 (20 pages).
 41. DiSanti, M. A., Villanueva, G. L., Paganini, L., Bonev, B. P., Keane, J. V., **Meech, K. J.**, Mumma, M. J. 2014. Pre- and post-perihelion observations of C/2009 P1 (Garradd): Evidence for an oxygen-rich heritage?. *Icarus* **228**, 167-180.
 42. Elliot, J. L., Kern, S.D., Clancy, K.B., Gulbis, A.A.S., Millis, R.L., Buie, M.W., Wasserman, L.H., Chiang, E.I., Jordan, A.B., Trilling, D.E., **Meech, K.J.** 2005. The Deep Ecliptic Survey: A Search for Kuiper Belt Objects and Centaurs. II. Dynamical Classification, the Kuiper Belt Plane, and the Core Population. *The Astronomical Journal* **129**, 1117-1162.
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 44. Elliot, J. L., French, R. G., **Meech, K. J.**, Elias, J. H. 1984. Structure of the Uranian rings. I - Square-well model and particle-size constraints. *The Astronomical Journal* **89**, 1587-1603.
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- Monoxide in Comet 9P/Tempel 1 before and After the Deep Impact Encounter”, *ApJ. Lett.* 647, L61-L64, 2006.
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- comet 1P/Halley at $r_h=28.1$ AU”, *Astronomy & Astrophys.* **417**, 1159-64, 2004.
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