

FRANCESCA DEMEO

CONTACT

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EMPLOYMENT

- Dec 2014 – Present Massachusetts Institute of Technology
Research Scientist (current) Visiting Scientist (2014-2015)
- Dec 2014 – Present Cambridge Select Inc.
Co-Founder, Director of Analytics
- Sep 2013 – Dec 2014 Harvard-Smithsonian Center for Astrophysics
Hubble Fellow
- Sep 2013 – Dec 2014 Massachusetts Institute of Technology
Research Affiliate
- Sep 2010 – Aug 2013 Massachusetts Institute of Technology, Cambridge, MA, USA
Postdoctoral Associate

EDUCATION

- Sep 2007 – Jun 2010 Observatoire de Paris, Meudon, France
Ph.D. in Astronomy and Astrophysics, received June 16, 2010
Dissertation: “The Compositional Variation of Small Bodies across the Solar System”
Thesis Advisors: Antonella Barucci and Richard P. Binzel
- 2006 – 2007 Massachusetts Institute of Technology, Cambridge, MA, USA
M.S. in Planetary Science
- 2002 – 2006 Massachusetts Institute of Technology, Cambridge, MA, USA
B.S. in Physics
B.S. in Earth, Atmospheric, and Planetary Sciences

FELLOWSHIPS AND AWARDS

- 2013 – 2014 Hubble Fellowship
- 2012 – 2015 NASA Planetary Science Early Career Fellow
- 2012 – 2015 NASA Planetary Astronomy Grant
- 2009 – 2010 Eiffel Grant Laureate (French equivalent of a Fulbright)
- 2008 – 2009 Fulbright Scholar
- 2007 – 2008 Fulbright Scholar
- 2006 Christopher Goetze Prize for Undergraduate Research

PUBLICATIONS FIRST AUTHOR

13. *The Compositional Structure of the Asteroid Belt.* **DeMeo, F. E.**, Alexander, C. M. O’D., Walsh, K. J., Chapman, C. R., Binzel, R. P. (2015) in *Asteroids IV* (eds. Michel P., **DeMeo, F. E.**, Bottke, W. F.).
12. *Spectral variability of Charon’s 2.21- μ m feature.* **DeMeo, F. E.**, Dumas, C., Cook J. C., Carry B., Merlin F., Verbiscer A. J., Binzel, R. P. (2015) *Icarus*, 246: 213-219.
11. *Unexpected D-type Interlopers in the Inner Main Belt.* **DeMeo, F. E.**, Binzel, R. P., Carry, B., Polishook, D., Moskovitz, N. A., (2014) *Icarus* 229:392-399.
10. *Solar System evolution from compositional mapping of the asteroid belt.* **DeMeo, F. E.**, Carry, B. (2014) *Nature* 505:629-634.
9. *Mars Encounters cause fresh surfaces on some near-Earth asteroids.* **DeMeo, F. E.**, Binzel, R. P., M. Lockhart. (2014) *Icarus*. 227:112-122.
8. *The taxonomic distribution of asteroids from multi-filter all-sky photometric surveys.* **DeMeo, F. E.**, Carry, B. (2013) *Icarus* 226:723-741.

7. *A spectral comparison of (379) Huenna and its satellite.* **DeMeo F. E.**, Carry B., Marchis F., Birlan M., Binzel R. P., Bus S. J., Decamps P., Nedelcu, A., Busch M., (2011) *Icarus* 212:677-681.
6. *A spectroscopic analysis of Jupiter-coupled object (52872) Okyhrøe, and TNOs (90482) Orcus and (73480) 2002 PN₃₄.* **DeMeo F. E.**, Barucci M. A., Merlin F., Guilbert-Lepoutre A., Alvarez-Candal A., Delsanti A., Fornasier S., de Bergh C., (2010) *A&A* 521:A35.
5. *Surface properties of icy transneptunian objects from the second ESO large program.* Icy Bodies of the Solar System, **DeMeo, F. E.**, Barucci, M. A., Alvarez-Candal A., de Bergh C., Fornasier S., Merlin F., Perna D., Belskaya I. (2010) *Proceedings of the International Astronomical Union, IAU Symposium.* 263:186-191.
4. *A search for ethane on Pluto and Triton.* **DeMeo, F. E.**, Dumas, C., de Bergh, C., Protopapa, S., Cruikshank, D., Geballe, T., Alvarez Candal, A., Merlin, F., Baruci, A. (2010) *Icarus.* 208:412-424
3. *An extension of the Bus asteroid taxonomy in the near-infrared.* **DeMeo, F. E.**, Binzel, R. P., Slivan, S. M., Bus, S. J. (2009) *Icarus.* 202:160-180.
2. *Visible and near-infrared colors of TNOs and Centaurs from the second ESO large program.* **DeMeo, F. E.**, Fornasier, S., Barucci, M. A., Protopapa, S., Perna, D., Alvarez-Candal, A., Delsanti, A., Doressoundiram, A., Merlin, F., de Bergh, C. (2009) *A&A.* 493:283-290.
1. *Comets in the near-Earth Object Population.* **DeMeo, F. E.**, Binzel, R. P. (2008) *Icarus.* 194:436-449.

PUBLICATIONS CO-AUTHOR

31. *Spectral properties of near-Earth and Mars-crossing asteroids using Sloan photometry.* Carry, B., Solano, E. Eggl, S. **DeMeo, F. E.** (2016) *Icarus* 268:340-354.
30. *A 2 km-size asteroid challenging the rubble-pile spin barrier - A case for cohesion.* Polishook, D. Moskovitz, N. Binzel, R. P., Burt, B. **DeMeo, F. E.**, Hinkle, M., Thirouin, A., Thomas, C. A., Trilling, D., Willman, M., Aharonson, O. (2016) *Icarus* 267:243-254.
29. *Visible spectroscopy of the Polana-Eulalia family complex: Spectral homogeneity.* De Leon, J., Pinilla-Alonso, N., Delbo, M., Campins, H., Cabrera-Lavers, A., Tanga, P., Cellino, A., Bendjoya, P., Gayon-Markt, J., Licandro, J., Lorenzi, V., Morate, D., Walsh, K. J., **DeMeo, F. E.**, Landsman, Z., Ali-Lagoa, V. (2016) *Icarus* 266:57-75.
28. *Compositional characterisation of the Themis family.* Marsset, M., Vernazza, P., Birlan, M., **DeMeo, F. E.**, Binzel, R. P., Dumas C., Milli, J., Popescu, M. (2016) *A&A* 586:idA15.
27. *Spectral slope variations for OSIRIS-REx target Asteroid (101955) Bennu: Possible evidence for a fine-grained regolith equatorial ridge.* Binzel, R. P., **DeMeo, F. E.**, Burt, B., Cloutis, E. A., Rozitis, B., Burbine, T. H., Campins, H., Clark, B. E., Emery, J. P., Hergenrother, C. W., Howell, E. S., Loretta, D. S., Nolan, M. C., Mansvield, M., Pietrasz, V., Polishook, D., Scheeres, D. J. (2015) *Icarus* 256:22-29.
26. *Interplanetary Dust Particles as Samples of Icy Asteroids.* Vernazza, P., Marsset, M., Beck, P., Binzel, R. P., Birlan, M., Brunetto, R., **DeMeo, F. E.**, Djouadi, Z., Dumas C., Merouane, S., Mousis, O., Zanda, B. (2015) *ApJ* 806:id204.
25. *The small binary asteroid (939) Isberga.* Carry, B., Matter, A., Scheirich, P., Pravec, P., Molnar, L., Mottola, S., Carbognani, A., Jehin, E., Marciniak, A., Binzel, R. P., **DeMeo, F. E.**, Birlan, M., Delbo, M., Barbotin, E., Behrend, R., Bonnardeau, M., Colas, F., Farissier, P., Fauvaud, M., Fauvaud, S., Gillier, C., Gillon, M., Hellmich, S., Hirsch, R., Leroy, A., Manfroid, J., Montier, J., Morelle, E., Richard, F., Sobkowiak, K., Strajnic, J., Vachier, F. (2015) *Icarus* 248:516-525.
24. *Rotationally resolved spectroscopy of asteroid pairs: No spectral variation suggests fission is followed by settling of dust* Polishook, D., Moskovitz, N., **DeMeo, F. E.**, Binzel, R. P., (2014) *Icarus* 243:222-235.
23. *Multiple and Fast: The Accretion of Ordinary Chondrite Parent Bodies.* Vernazza, P., Zanda, B., Binzel, R. P., Hiroi, T. **DeMeo, F. E.**, Birlan, M., Hewins, R., Ricci, L., Barge, P., Lockhart, M. (2014) *ApJ* 791:id120.
22. *Evolution from protoplanetary to debris discs: the transition disc around HD 166191.* Kennedy, G. M., Murphy, S. J., R., **DeMeo, F. E.**, Crawford, K. B., Kim, D. L., Rudy, R. J., Russell, R. W., Sibthorpe, B., Skinner, M. A., Zhou, G. (2014) *MNRAS* 438:3299-3309.
21. *Observations of "fresh" and weathered surfaces on asteroid pairs and their implications on the rotational-fission mechanism.* Polishook, D., Moskovitz, N. A., Binzel, R. P., **DeMeo, F. E.**, Vokrouhlicky, D., Jindrich, Z., Oszkiewicz, D. (2014) 233: 9-26.

20. *Rotational characterization of Hayabusa II target Asteroid (162173) 1999 JU3.* Moskowitz, N. A., Abe, S., Pan, K., Osip, D. J., Pefkou, D., Melita, M. D., Elias, M., Kitazato, K., Bus, S. J., **DeMeo, F. E.**, Binzel, R. P., Abell, P. A. (2013) 224: 224-231.
 19. *2011 HM102: Discovery of a high-inclination L5 Neptune Trojan in the search for a post-Pluto New Horizon target.* Parker, A. H., Buie, M., Osip, D., Gwyn, S., Holman, M., Borncamp, D., Spencer, J., Benecchi, S., Binzel, R., **DeMeo, F. E.**, Fabbro, S., Fuentes, C., Gay, P., Kavelaars, J.J., McLeod, B., Sheppard, S., Stern, A., Tholen, D., Trilling, D., Ragozzine, D., Wasserman, L., Yang, B., and the Ice Hunters. (2013) AJ 145: 4 id. 96.
 18. *Spectral and spin measurement of two, super-fast and super-small, Earth grazing asteroids.* Polishook, D., Binzel, R. P., Lockhart, M., **DeMeo, F. E.**, Golisch, B., Bus, S. J., Denault, T., Rayner, J., Tokunaga, A. Gulbis, A. S. (2012) 221:1187-1189.
 17. *Physical Characterization and Origin of Binary Near-Earth Asteroid (175706) 1996 FG₃.* Walsh, K. J., Delbo', M., Mueller, M., Binzel, R. P., **DeMeo, F. E.** (2012) ApJ, 748, 2, article id. 104 .
 16. *Asteroid (101955) 1999 RQ36: Spectroscopy from 0.4 to 2.4 μ m and meteorite analogs.* Clark, B. E., Binzel, R. P., Howell, E. S., Cloutis, E. A., Ockert-Bell, M., Christensen, P., Barucci, M. A., **DeMeo, F. E.**, Lauretta, D. S., Connolly, H., Soderberg, A., Hergenrother, C., Lim, L., Emery, J., Mueller, M., (2011) Icarus, 216, 2, 462-475.
 15. *Spectral properties of eight near-Earth asteroids* Popescu, M., Birlan, M., Binzel, R., Vernazza, P., Barucci, A., Nedelcu, D. A., **DeMeo, F.**, Fulchignoni, M. (2011) A&A, 535, id.A15.
 14. *Integral-field spectroscopy of (90482) Orcus-Vanth* Carry, B., Hestroffer, D., **DeMeo, F. E.**, Thirouin, A., Berthier, J., Lacerda, P., Sicardy, B., Doressoundiram, A., Dumas, C., Farrelly, D., Müller, T. G. (2011) A&A, 534, id.A115.
 13. *New insights on ices in Centaur and Transneptunian populations.* Barucci, M. A., Alvarez-Candal, A., Merlin, F., Belskaya, I. N., de Bergh, C., Perna, D., **DeMeo, F.**, Fornasier, S., (2011) Icarus, Volume 214, Issue 1, p. 297-307
 12. *Chemical and physical properties of the variegated Pluto and Charon surfaces.* Merlin, F., Barucci, M. A., de Bergh, C., **DeMeo, F. E.**, Alvarez-Candal, A., Dumas, C., Cruikshank, D. P. (2010) Icarus. 210:930-943.
 11. *Almahata Sitta (=asteroid 2008 TC3) and the search for the ureilite parent body.* Jenniskens, P., Vaubaillon, J., Binzel, R. P., **DeMeo, F. E.**, Nesvorný, D., Bottke, W. F., Fitzsimmons, A., Hiroi, T., Marchis, F., Bishop, J. L., Vernazza, P., Zolensky, M. E., Herrin, J. S., Welten, K. C., Meier, M. M., Shaddad, M. H. (2010) Meteoritics & Planetary Science. 45: 1590-1617.
 10. *Resolved spectroscopy of Mercury in the Near-IR with SpeX/IRTF.* Vernazza, P., **DeMeo, F. E.**, Nedelcu, A., Birlan, M., Doressoundiram, A., Erard, S., Volquardsen, E. (2010) Icarus. 209:125-137.
 9. *Spectroscopy of B-type asteroids: Subgroups and meteorite analogs.* Clark, B. E., Ziffer, J., Nesvorny, D., Campins, H., Rivkin, A. S., Hiroi, T., Barucci, M. A., Fulchignoni, M., Binzel, R. P., Fornasier, S., **DeMeo, F.**, Ockert-Bell, M. E., Licandro, J., Mothé-Diniz, T. (2010) Journal of Geophysical Research. 115, E6, E06005.
 8. *Colors and taxonomy of Centaurs and trans-Neptunian objects.* Perna, D., Barucci, M. A., Fornasier, S., **DeMeo, F. E.**, Alvarez-Candal, A., Merlin, F., Dotto, E., Doressoundiram, A., de Bergh, C. (2010) Astronomy and Astrophysics, 510, id.A53.
 7. *Earth encounters as the origin of fresh asteroid surfaces.* Binzel R. P., Morbidelli A., Merouane S., **DeMeo F. E.**, Birlan M., Vernazza P., Thomas C. A., DeMeo F. E., Rivkin A. S., Bus S. J., Tokunaga A., Nature. 463, 7279, 331-334.
 6. *Visible spectroscopy of the new ESO Large Program on Trans-Neptunian Objects and Centaurs: final results.* Fornasier S., Barucci M. A., de Bergh C., Alvarez-Candal A. **DeMeo F. E.**, Merlin F., Perna D., Guilbert A., Deslanti A., Dotto E., & Doressoundiram A. (2009) A&A 508:457-465
 5. *Spectral Properties and Composition of Potentially Hazardous Asteroid (99942) Apophis.* Binzel, R. P., Rivkin, A. S., Thomas, C. A., **DeMeo, F. E.**, (2009) Icarus. 200:480-485
 4. *Stratification of methane ice on Eris' surface.* Merlin, F., Alvarez-Candal, A., Delsanti, A., Fornasier, S., Barucci, M. A., **DeMeo, F. E.**, de Bergh, C., Doressoundiram, A. (2009) A&A 137:315-328.
 3. *Compositional differences between meteorites and near-Earth asteroids.* Vernazza, P., Binzel R. P., Thomas, C.A., **DeMeo, F. E.**, Bus, S. J., Rivkin A. S, Tokunaga A. (2008) Nature. 7206:858-860
 2. *Observations of X/M asteroids across multiple wavelengths.* Ockert-Bell, M. E., Clark, B. E., Shepard, M. K., Rivkin, A. S., Binzel, R. P., Thomas, C. A., **DeMeo, F. E.**, Bus, S. J., Shah, S. (2008) Icarus. 195:206-219
 1. *Composition of the L5 Mars Trojans: Neighbors, Not Siblings.* Rivkin, A. S., Trilling, D. E., Thomas, C. A., **DeMeo, F. E.**, Spahr, T. B., Binzel, R. P. (2007) Icarus 192:431-441.
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SPACE MISSIONS

Co-Investigator for NEOCam, NASA Discovery Proposal
Collaborator for NASA OSIRIS-REx asteroid sample return mission
Co-investigator for NASA New Horizons Kuiper Belt Object search for targets following New Horizons Pluto flyby

BOOKS

Co-editor of Asteroids IV in the Space Science Series, University of Arizona Press. Book, published in Dec 2015.

INVITED TALKS AND RESEARCH

May 2016 Tokyo Institute of Technology and Japan Geoscience Union (JpGU), Japan (upcoming)
Apr 2016 University of Rochester, Rochester, NY (upcoming)
Mar 2016 Perdue University, West Lafayette, Indiana (upcoming)
Feb 2016 Department of Terrestrial Magnetism, Carnegie Institute, Washington, DC
Jan 2016 Observatoire de la Cote D'Azur, Nice, France
Oct 2015 *Asteroids as Records of Solar System History*, Boston University Lunch Talk
Jun 2015 *Asteroids as Records of Early Solar System Dynamics*, Gordon Research Conference
Jun 2014 *Compositional Mapping of the Asteroids Belt*. Asteroids, Comets, Meteors Meeting.
Apr 2014 *Compositional Diversity Among the Asteroids: Implications for the Pluto System and Kuiper Belt*. New Horizons Science Team meeting
Feb 2014 *Solar System history from the asteroid belt's perspective*. Harvard Origins of Life Initiative Chalk Talk
Jan 2014 *Geologic Mapping of the Asteroid Belt*. Caltech.
Jan 2014 *Compositional Exploration of the Asteroid Belt*. JPL
Jan 2013 *Review of the physical properties of asteroid sample return mission targets*. MarcoPolo-R Symposium Jan 16-17 2013
Jan 2013 *Asteroid classification and characterization with Gaia*. Awarded short visit grant through GREAT: Gaia Research for European Astronomy Training. 9 day research invitation with Marco Delbo.
May 2012 *The compositional mass distribution in the main asteroid belt*. European Space Astronomy Centre, Spain
Talk + 1 week research invitation
Jan 2012 *Near Earth Asteroids with young, fresh surfaces*. LESIA, Paris Observatory, France. Talk + 1 month invitation
May 2011 *Whizzing past Earth: The physical properties of Near Earth Asteroids*. European Space Astronomy Centre, Spain
Talk + 1 week research invitation
Jan 2010 *A search for ethane on Pluto and Triton*. New Horizons Science Team Meeting Jan 19-20, 2010, Laurel, MD

PROFESSIONAL SERVICE

2010 – present Referee: APJL, Icarus, A&A, AJ, PSS, Science, Nature
2011 – present External proposal reviewer: NASA, NSF, various telescope proposals
2013 Member of Scientific Organizing Committee for meeting: The Pluto System on the Eve of Exploration by New Horizons: Perspectives and Predictions, July 2013 – Laurel, MD
2013 Panelist, NSF
2012 Member of SOC, LOC for meeting: Physical characterization of MarcoPolo-R targets – Meudon, France
2012 – 2014 Panelist, NASA

PUBLIC OUTREACH

Mar 2014 Interviewed on Jim Pillsbury Live, local MA TV about our solar system and exoplanets.
Jan 2014 Interviewed for Nature research and featured on NPR, CNN, Space.com, Discovery.com, Boston Globe, MIT spotlight
Nov 2013 Interviewed for Asteroid Encounters with Mars research featured on MIT homepage spotlight
Mar 2013 Interviewed on Jim Pillsbury Live, local MA TV about asteroids and the hazard to Earth.
Jun 2012 Volunteer astronomer during MIT transit of Venus event
May 2012 Interviewed for [Under the Microscope](#) blog
May 2012 Interviewed by MIT EAPS about research: <http://eapsweb.mit.edu/news/2012/struck-asteroids>
Apr 2012 Remote telescope observing meteorite demonstration for group of highschool students
Feb 2011 Interviewed about near-Earth Objects by journalist Carolyn Johnson
Just another asteroid hurtling toward Earth ... The Boston Globe, Feb 27, 2011
March 2010 Interviewed for the 80th anniversary of the discovery of Pluto by journalist Catherine de Coppet of La Marche des Sciences (France Culture) *L'histoire de Pluton* France Culture (radio) March 11, 2010 2-3pm
October 2009 International Year of Astronomy Public Astronomy Talks in Spanish *Descubriendo el Sistema Solar* (Discovering the Solar System) Elementary School in Aroyo, and Highschool in Patillas, Puerto Rico
March 2009 Interviewed with Mirel Birlan about the Potential Hazardous Asteroid 2009 DD45 by journalist Fabien Gruhier
Un astéroïde frôle la Terre...Danger, météorite! Le Nouvel Observateur March 26, 2009 N2316 p.84
