



## Brother Guy Joseph Consolmagno SJ



**Place** Detroit, Michigan (USA)

**Nomination** September 2015

**Field** Earth and Planetary Sciences

**Title** Director, Specola Vaticana and President, Vatican Observatory Foundation

### Most important awards, prizes and academies

Fellow of the Meteoritical Society, 2008; PhD Honoris Causa of Humane Letters, Georgetown University, 2014; Carl Sagan Medal, for outstanding communication by an active planetary scientist to the general public, American Astronomical Society Division for Planetary Sciences, 2014; Member, International Astronomical Union, 1999-present; Planetary System Nomenclature, 2008-present; Chair, Mars Task Group, 2015-present; Member, American Astronomical Society, Division for Planetary Sciences, 1994-present.

### Summary of scientific research

Br Consolmagno entered the Society of Jesus in August 1989. He holds an SB in Earth and Planetary Sciences, Massachusetts Institute of Technology, 1974, an SM in Earth and Planetary Sciences, Massachusetts Institute of Technology, 1975, and a PhD in Planetary Sciences, University of Arizona, 1978.

Dr. Consolmagno studies the nature and evolution of small bodies in the solar system. His work in the 1970s on the moons of the outer solar system predicted many of the features later discovered by the Voyager and Galileo spacecraft, including the first published suggestion of European sub-crustal oceans with the possibility of life. Models for the geochemical evolution of lunar basalts and basaltic meteorites eventually led to the identification, on geochemical grounds, of asteroid Vesta as the parent body of the eucrite, diogenite, and howardite meteorites.

His doctoral thesis on the role of electromagnetic forces in chemical fractionations of the early solar system pioneered the field of gravito-electrodynamics, the behavior of dust subjected to both gravitational and electromagnetic forces, and he was the first person to apply this concept to describe the dynamics of Jupiter's dust ring.

Geophysical research in the late 1980s to mid-1990s included mapping tectonic features on the surfaces of outer planet icy satellites to correlate the orientation of these features with possible internal stresses, and applying electromagnetic theory to the problem of detecting an ocean brine under the ice crust of Europa. He was also part of the world-wide campaigns to observe the impact of Comet Shoemaker-Levy 9 into Jupiter and mutual events during the Saturn ring plane crossing.

Present research is centered on understanding the origin of moons, meteorites, asteroids, and Trans-Neptunian Objects (TNOs). One continuing project is measuring the physical properties of meteorites, with applications to understanding the lithification of meteorites, the structure of their asteroidal parent bodies, and the nature of their terrestrial weathering. He is also involved in telescope observations of asteroid spectra and the broad band colors of the irregular moons of the outer solar system, dormant comets, and TNOs.

### Main publications

Consolmagno G.J., Golabek G.J., Turrini D., Jutzi M., Sirono S., Svetsov V., Tsiganis K. (2015). Is Vesta an intact and pristine protoplanet? *Icarus* 254, 190-201; Russell S.S., Joy K.H., Jeffries T.E., Consolmagno G.J., Anton Kearsley A. (2014). Heterogeneity in lunar anorthosite meteorites: implications for the lunar magma ocean model. *Philosophical Transactions A*, 372A, id. 20120241; Britt D.T., Consolmagno G., and Lebofsky

L. (2014). Main-belt asteroids. In *Encyclopedia of the Solar System*, Third Edition (ed: T. Spohn, T. Johnson, and D. Breuer), San Diego: Academic Press.

*Popular books*: Consolmagno G.J. and Davis D.M. (1989; second edition, 1995; third edition 2000; fourth edition, 2011). *Turn Left at Orion: hundreds of night sky objects to see in a small telescope – and how to find them*. Cambridge: Cambridge University Press, 256 pp. (first and second editions, 205 pp.; third edition, 224 pp.); Italian edition: Consolmagno G.J. and Davis D.M. (1999). *A Orione Svolta a Sinistra*. (tr.: Sabino Maffeo). Milan: Hoepli Editrice. 205pp. also, Korean edition; Consolmagno G.J. and Schaefer M.W. (1994) *Worlds Apart: A Textbook in Planetary Science*. Englewood Cliffs, NJ: Prentice-Hall, 336pp. (also Solutions Manual); Consolmagno G.J. (1998) “*The Way to the Dwelling of Light...*” *How Physics Illuminates Creation*. Rome: Vatican Observatory and Notre Dame, Indiana: U. of Notre Dame Press, 180 pp.; Consolmagno G.J. (1999) *A rain of comet dust*. In *Cosmic Pinball*. (ed: C. Sumners, C. Allen and J. Allen), New York: McGraw Hill. 191 pp.; Consolmagno G.J. (2000) *Brother Astronomer: Adventures of a Vatican Scientist*. New York: McGraw Hill. 256 pp; Spanish edition: Consolmagno G.J. (2001) *El Otro Cielo: Revelaciones científicas de un astro#nomo del Vaticano* (tr.: Rosa Maria Roses-Sa#nchez). Mexico City: McGraw Hill, 225 pp.; Consolmagno G.J. (2005) *Intelligent Life in the Universe? Catholic belief and the search for extraterrestrial intelligent life*. London: Catholic Truth Society. 48 pp.; French edition: Consolmagno Guy (2013) *Les extraterrestres existent-ils? Un astronome du Vatican re#pond*. (tr: Phillippe Quentin) Paris: Quasar Editions; Britt D.T., Consolmagno G., and Lebofsky L. (2007). Main-belt asteroids. In *Encyclopedia of the Solar System*, Second Edition (ed: L. McFadden, P. Weissman, and T. Johnson), San Diego: Academic Press. 966 pp.; Consolmagno G.J. (2008). *God’s Mechanics*. San Francisco, CA: Jossey–Bass, 245pp.; Consolmagno G.J. (2009), ed: *The Heavens Proclaim*. Huntington, IN: OSV Press. 231pp.; Italian edition: Consolmagno G.J. (2009), ed: *L’Infinitamente Grande*. (tr.: Alessandro Omizzolo; Vatican City: Libreria Editrice Vaticana, and Rome: DeAugustini). 231pp.; Consolmagno; Spanish edition: Consolmagno G.J. (2010), ed: *Los Cielos Proclaman Tu Gloria*. (tr.: Beatriz Mun#oz Estrada; Vatican City: Libreria Editrice Vaticana, and Burgos: Editorial Monte Carmelo). 231pp.; Slovak edition: Consolmagno G.J. (2013), ed: *Nebes#ia Rozpra#vaju#* (tr.: Ma#ria Hajdukova# and Juraj To#th; Vatican City: Libreria Editrice Vaticana, and Trnava: Spolok sva#te#ho Vojtecha). 231pp.

also, Arabic edition; Britt D.T., Consolmagno G., and Lebofsky L. (2014). Main-belt asteroids. In *Encyclopedia of the Solar System*, Third Edition (ed: T. Spohn, T. Johnson, and D. Breuer), San Diego: Academic Press; Consolmagno G.J. and Mueller P.R. (2014). *Would You Baptize an Extraterrestrial?* New York: Image Books. 293 pp.