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Does Astrobiology require an astrobioethical approach?

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To our knowledge, the first use of the term 'Astrobiology' dates back to 1941 [1]. However, the term's first appearance in a Science Citation Index (SCI) journal didn't take place until 1997, in a paper discussing the etymological and conceptual relations between astrobiology and exobiology [2, 3]. Astrobiology is considered a new word for a new paradigm, which addresses three main questions: a) How does life begin and evolve? b) Does life exist elsewhere in the universe? And c) What is the future of life on Earth and beyond? [4] To deal with these questions a cross-cutting approach is obviously required. In fact, astrobiology is probably the best and most outstanding example of the development of cross-cutting scientific studies over the last quarter-century [5]. With the recent increase in the exploration and research of the planets and celestial bodies, planetary geoscience is one of the fastest-growing branches of the geosciences, and there is a great variety of geoscientific aspects which connect with astrobiology [6]. Many of them are related to: a) the concept of planetary habitability (including the Earth) and potential habitable environments, at different scales of space and time, and b) the multiple open issues and questions linking the abiotic and biotic worlds. Obviously, this also involves taking into account ethical (bioethical and geoethical) approaches, which, giving the complexity and transdisciplinary nature of Astrobiology, could require a step forward towards the developing of astrobioethics, at least for considering and facing some special cases. A search in the Web of Science (WoS) database (1900-2016) of the term "astrobioethics" yielded no results. However, it was utilized for the first time, to our knowledge, in 2008 [7] as "a *branch of ethics involving the implications of life sciences in space*" and in the framework of an article about perchlorate in Martian soil and the possible existence of life [8]. McMahom [9] considers that astrobioethics comprises different perspectives, from purely philosophical to other much more scientific in nature. In this sense, a working group on astrobioethics has been recently established [10]. One of its main tasks will be "to analyse the potential societal and ethical implications related to astrobiology, taking into account the complexity of the connections between its main scientific issues and goals (see, for instance, the NASA Astrobiology Institute Astrobiology Roadmap), and considering the synergies between both bioethical and geoethical approaches (from microbes to humans and from the Earth to space environments)".

References:

[1] Lafleur LJ Astronomical Society of the Pacific Leaflets, 1941, (143), 333.
[2] Soffen GA Acta Astronautica, 1997, 41, 609–611.
[3] Martínez-Frías J and Hochberg D (2007) Inter. Sci. Rev. 32-4: 315-319
[4] Des Marais DJ et al. (2008) Astrobiology 8, 4:715-730
[5] Cockell, CS (2001) Space Policy, 2002, 18, 263–266
[6] Martínez-Frías J (2014) In: Astrobiology: An Evolutionary Approach. CRC Press Textbook. 504 p
[7] Kleim B (2008) http://www.wired.com/2008/08/wired-science-c/
[8] Bignell R (2008) http://alienlifeblog.blogspot.com.es/2008/08/perchlorate-in-martian-soil-and.html
[9] McMahon M (2016) http://www.wisegeek.com/what-is-astrobioethics.htm
[10] IAGETH (2016) http://www.icog.es/iageth/index.php/p3loki-gn/