



## Scientific Insights into the Evolution of the Universe and of Life



**Plenary Session 31 October - 4 November 2008** – Research into the origins and evolution of the universe, of matter and of life belongs to the focal topics of the natural sciences. The Pontifical Academy of Sciences has repeatedly paid attention to these questions both in plenary sessions and in specialised meetings. In recent years relevant basic scientific knowledge has been considerably enriched, in particular by the introduction of novel and powerful research strategies. Cosmic investigations can reach ever greater distances, while particle physics and the nanosciences allow scientists to explore structures of ever smaller dimensions. The results of these largely interdisciplinary studies considerably enrich our knowledge about natural reality and they also raise new questions. These concern, for example, a postulated multiverse or dark matter and, more generally, cosmic evolution. In the life sciences more precise structural knowledge on genetic information and on gene products provides insights not only into functional characteristics but also into molecular mechanisms that contribute to the occasional generation of genetic variants – the drivers of biological evolution. By definition, evolution implies a changing reality. This is what the sciences have postulated as holding both for the inanimate cosmos and for the living world. Ever more powerful research strategies continue to strengthen the validity of these postulates.

The Council of the Pontifical Academy invites the Academicians to present in the forthcoming Plenary Session any scientific contributions that may validate or falsify evolutionary theories and can provide a deeper insight into the evolutionary processes of the living and of the non-living world. This might allow our Academy to update its own knowledge basis and to transmit this knowledge to human society for an actualisation of its science-based worldview. Scientific knowledge forms – in addition to traditional wisdom, religious beliefs and educational values – an essential part of the orientating knowledge that serves us for taking individual and socio-political decisions.

In these scientific debates the Council of the Academy proposes to focus more on the evolutionary process as such than on the postulated origins of things which, however, shall also be discussed. It is our intention to strengthen our knowledge on the dynamics of evolution in its historical dimensions and also to provide prospective views on upcoming developments into the far future. Contributions on the specific impact that human activities may have on evolutionary processes will also be welcome. The Council also expects to be able to draw from the Plenary Session conclusions that are of relevance to the subject of the creation of something out of nothing and the various forms – of an evolutionary kind as well – in which this participation in being, caused by the Being in essence, is realised. Indeed, for Thomas Aquinas, expressing a philosophical perspective, everything that is by participation is (or is caused) by the Being in essence. Thus not even the evolutionary processes of the universe and life can be excluded from emanation from the universal principle of being.

Werner Arber & Nicola Cabibbo

### Participants

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