Editorial

Astrobiology harbors a number of rather diverse disciplines combining expertise in astronomy and astrophysics, biophysics and biology, chemistry and biochemistry, geophysics and geology, as well as mathematics. The need to foster advances in astrobiology are two-fold. On the one hand, there are many scientific reasons: the discoveries of extra-solar planets which contributes to our understanding of the Solar System and the formation of Earth-like planets, the realization that life can thrive under rather extreme conditions making it more probable for life to exist elsewhere in the Solar System and beyond, and the fact that major resources are being spent in developing the technology to produce artificial life, which helps us to appreciate the range of possibilities that nature may have utilized on Earth or elsewhere. On the other hand, astrobiology touches upon some fundamental questions regarding our very existence, and it is perhaps this that attracts the broad interest of scientists and the public alike. As a result, astrobiology networks and astrobiology centers have been emerging all over the world.

With the focus on research in the Nordic countries, the Nordic Institute for Theoretical Physics (NORDITA) has decided to support a Nordic project on astrobiology (`http://www.nordita.dk/~brandenb/astrobiology`) which has hosted and/or organized three meetings over the past two years. Some of the speakers of these meetings have agreed to contribute to this special issue. After some papers on basic considerations of what the early Earth may have been like, there are a number of contributions highlighting various aspects of the molecular origin of life. Given that the anticipated reactions in a certain scenario must be energetically and thermodynamically possible, one must ask how, in the absence of a guiding hand, the protocol for making life has been realized. Whether tides or convection currents can do the job is to be seen, but whatever it is, it is surely broadening our scope in the search for solutions. Another question that is traditionally discussed in connection with the origin of life is whether the handedness of amino acids and sugars (homochirality) in living things was a prerequisite that was necessary for the stability of biomolecules, or a consequence of life that developed when the first replicating biomolecules polymerized. This problem is frequently addressed from various perspectives including physics, mathematics, chemistry and biochemistry, as is in fact also reflected in the present paper collection. The last two papers address more practical questions about the survivability in space or on Mars.

Obviously, the present collection of papers cannot provide a reasonable overview about astrobiological research in the Nordic countries. However, the selection of papers still gives insight into some of the problems that are currently being addressed in the Nordic region. Clearly, astrobiology is a growing field that is extremely interdisciplinary. Indeed, one of the goals of the Nordic project is to identify problems that physicists and biologists, including astronomers, geologists, and others, can work on, given their individual possibilities and expertise.

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