

The Natural History of Information

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Keynote Abstract

Currently there exists no general theory for what life is. This makes it challenging to anticipate how a more fundamental understanding of life could inform the design (or evolution) of artificial life forms and/or artificial intelligences, or what the role of these will play in the future evolution of Earth and its biosphere. For artificial systems, designed in software, the role of information is clear, whereas for biological and other physical systems it is less so. Unifying the long history of biological evolution with what is happening currently on our planet, or with what might happen in the future due to the technological advances we are mediating, will require new paradigms for understanding what information is and does in natural systems. In this talk, I discuss quantitative approaches aimed at developing a new theory for understanding life based on the idea that life is fundamentally about information (life itself is an abstraction) and how that information interacts with the physical world. I discuss how this leads to new approaches to understand the abstraction that was the last universal common ancestor of known life on Earth, through the evolution of our biosphere to its current technologically mediated form and beyond.