

42nd SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The  
Next Steps (A4)  
SETI 1: SETI Science and Technology (1)

Author: Dr. Claudio Maccone  
International Academy of Astronautics (IAA), Italy

## SETI AS A PART OF BIG HISTORY

### Abstract

Big History is an emerging academic discipline which examines history scientifically from the Big Bang to the present. It uses a multidisciplinary approach based on combining numerous disciplines from science and the humanities, and explores human existence in the context of this bigger picture. It is taught at universities.

We claim that SETI is a part of Big History. In fact, in 2012, this author published a book entitled “Mathematical SETI” (ref. [1]) intended for University-level courses on SETI and related fields for post-graduates and researchers. In particular:

1) The Statistical Drake Equation is the extension of the classical Drake equation into Statistics. Probability distributions of the number of ET civilizations in the Galaxy (lognormals) are given, and so is the probable distribution of the distance of ETs from us.

2) Darwinian Evolution is re-defined as a Geometric Brownian Motion (GBM) in the number of living species on Earth over the last 3.5 billion years. Its mean value grows exponentially in time and Mass Extinctions of the past are accounted for as unpredictable low GBM values.

3) The exponential growth of the number of species during Evolution is the geometric locus of the peaks of a one-parameter family of lognormal distributions constrained between the time axis and the exponential mean value (b-lognormals). This accounts for cladistics (i.e. the science of Evolution lineages), as lineages now become a set of exponential time functions.

4) The lifespan of a living being, let it be a cell, an animal, a human, a historic human society, or even an ET society, is mathematically described as a finite b-lognormal. This author then analyzed mathematically the historical development of eight human historic civilizations by b-lognormals, from Ancient Greece to the USA.

5) Finally, the b-lognormal’s entropy is the measure of a civilization’s advancement level. By measuring the entropy difference between Aztecs and Spaniards in 1519, this author was able to account for the 20-million-Aztecs defeat by a few thousand Spaniards, due to the latter’s technological (i.e. entropy) superiority. The same might happen to Humans when they will face an ET superior civilization for the first time.

The conclusion of all this is that SETI and Galactic Evolution, as mathematically cast in ref. [1], are indeed a part of Big History.

### REFERENCE

[1] C. Maccone, “Mathematical SETI”, a 724-pages book published by Springer-Praxis, ISBN 978-3-642-27437-7, e-ISBN ISBN 978-3-642-27437-4, DOI 10.1007/ 978-3-642-27437-4, © Springer-Verlag Berlin Heidelberg 2012.