# Consortium of Researchers from Top Universities Disprove Assembly Theory

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AT

*Researchers led by Dr Hector Zenil have presented findings that expose false claims of Assembly Theory.*

LONDON, UNITED KINGDOM, September 24, 2024 /EINPresswire.com/ -- Three new papers refute claims for the Assembly Theory (AT) of molecular complexity being claimed as a new "theory of everything."

First publicly posited in 2017, Assembly Theory is a hypothesis concerning the measurability of molecular complexity that claims to

> **A breakthrough lies in building upon knowledge, integrating diverse theories to unravel the complex dynamics of life rather than rehashing what we already knew with tools we had already developed."**
> *— Dr Narsis Kiani, and Prof Jesper Tegner; Karolinska Institute and KAUST*

characterise life, explain natural selection and evolution, and even to redefine our understanding of time, matter, life and the universe.

However, researchers led by Dr Hector Zenil from the School of Biomedical Engineering & Imaging Sciences (BMEIS), in collaboration with colleagues from King Abdullah University for Science and Technology (KAUST) and the Karolinska Institute in Sweden (the institution that awards the Nobel Prize in Medicine or Physiology), have successfully demonstrated in a paper recently published by Nature's journal npj Systems Biology, that the same results can be achieved by using traditional statistical algorithms and compression algorithms.

In a second paper just published by PLoS Complex Systems, they have also mathematically proven that Assembly Theory is an equivalent to Shannon Entropy and therefore not a novel approach to any of those applications and is an implementation of a well-known and popular compression algorithm used behind ZIP compression and image encoding formats such as PNG.

While characterising life is hard and still an open problem, it has been studied from many angles, from modular units by Gregor Mendel to thermodynamics by Erwin Schrödinger to Statistical Entropy by Claude Shannon to Algorithmic Information by Gregory Chaitin. Equipped with all this knowledge and much more from complexity sciences and systems' biology, we know today that one key aspect of life is that of open-endedness, the fact that life's agency seems not bounded to regular behaviour or repetition in its adaptation and relationship to its environment.

Areas such as Algorithmic Information Dynamics (AID) led by Dr. Hector Zenil and his collaborators, are shedding light in how to find causal models for natural phenomena and mechanistic explanations for processes of living systems. AID is fully based on the current combined knowledge of information theory and causal inference to this date and builds upon and bridges these fundamental areas used today to understand the world. The methods behind AID already count for exact copies of modules but that is the most obvious first step and something Dr. Zenil reported before Assembly Theory as capable of separating organic compounds from non-organic as a function of molecular compressed length.

Before joining KCL as an Associate Professor, Dr Hector Zenil was at the Universities of Oxford (Structural Biology Group, Department of Computer Science) and Cambridge (Machine Learning Group, Department of Chemical Engineering and Biotechnology), as a faculty member and senior researcher; and with The Alan Turing Institute with which he remains affiliated as an appointed Innovate AI Independent Advisor. Before that, Prof Zenil was an Assistant Professor and Lab leader at the Algorithmic Dynamics Lab, Unit of Computational Medicine, Center for Molecular Medicine and SciLifeLab at the Karolinska Institute in Stockholm, Sweden.

Nature.com: On the salient limitations of the methods of assembly theory and their classification of molecular biosignatures

PLOS Complex Systems: Assembly Theory is an approximation to algorithmic complexity based on LZ compression that does not explain selection or evolution

Assembly Theory Reduced to Shannon Entropy and Rendered Redundant by Naive Statistical Algorithms

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