

Life As No One Knows It.

Sara Imari Walker

Sara Imari Walker is deputy director of the Beyond Center for Fundamental Concepts in Science. She is the recipient of the Stanley L. Miller Early-Career Research Award for her work on the origin of life.

It took me awhile to get use to the author's writing style, but I am glad that I stuck with it because I had not heard of this exciting new idea called 'Assembly Theory' till I opened the pages of this book.

Walker states that modern science has taught us that life is not a property of matter because there is no transition point, no "vital" force, that animates inorganic matter, nor is there any difference in the properties of organic and inorganic chemistry.

Walker says that there are several conceptual "hard" problems in science. The most prominent of these is the hard problem of consciousness first proposed by David Chalmers. But equally difficult conceptual hard problems are those of life and matter.

We might imagine, on first thought, that matter is well understood; however, we only know matter through its interactions. In fact, three researchers won the 2022 Nobel Prize in physics for disproving local realism—the notion that elementary particles have attributes independent of observation.

Assembly theory opens the door to the possibility that the hard conceptual problems of life, mind, and matter might be intrinsically connected if we treat matter as information. If matter is informational, then the mind/body dichotomy disappears when explaining the most complex structure in the universe—the human brain which displays operational aspects of both hardware and software. Likewise, the universe may well mimic the workings of the brain utilizing matter in a superposition of state as information and producing the hardware of structural information in the form of observed matter.

The author states that: "fundamental objects have always been defined by technological and epistemological limitations—the smallest building blocks of

matter that we can observe. In assembly theory, objects are defined as all things that can be built from elementary building blocks using operations that are consistent with the physics of our universe. Objects are therefore the opposite of what they are in physics: they are the things you can build and break apart.”

The complexity we observe in the world are not products of design but objects that are assembled using the building blocks of matter as both the hardware and software of a long lineage of recursive algorithms culminating in the emergence of life, mind, and consciousness. Thinking of it in these terms, the living cell is not the fundamental unit of life, rather, it is the product of the assembly of prior and less complex building blocks going all the way back to the beginning of the universe.

Walker states: “Many of us who think about the problem [of life] deeply already share a common sense of what life is—much work is converging on the idea that information must be at the core.”

Assembly theory is certainly one of the boldest ideas that has emerged for an explanation of the hard problems of life, mind, and matter.