CAN WE BUILD ARTIFICIAL LIFE?

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Abstract

The capacity to construct and operate organisms from defined molecules without constraint to natural lineage or artificial environment would mark the start of a new era for biology and everything life impacts. Two complementary approaches have and are being pursued: Natural lineage minimization and bottom-up synthesis. Minimization approaches have, for over 20 years, encountered the puzzle of "essential genes of unknown function." Synthetic approaches are beginning to acknowledge the complementary puzzle of "essential functions that are unknown" and have already encountered the challenge of "insufficient autocatalysis." Stated differently, we now know enough about what we do not know to systematically approach the challenge of constructing organisms that, from a limited perspective, we understand. I will explore what methods and ways of working are most likely to result in progress. I will also question whether we should proceed at all and, if so, what other aspects of reality and connectedness we might wish to be mindful of as responsible Earthlings.

Bio

Drew Endy is Associate Chair, Education for Stanford Bioengineering. His research teams pioneered amplifying genetic logic, rewritable DNA data storage, reliably reusable standard biological parts, and genome refactoring. Drew helped launch undergraduate bioengineering majors at both MIT and Stanford and co-founded the iGEM competition, a global genetic engineering "olympics" now engaging thousands of students annually (www.igem.org).

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