I was interested to learn that Lawrence Berkeley National Lab, up the hill from where I work, has the world's first department of synthetic biology. Berkeley's bioengineering department also has a program focusing on systems and synthetic biology. Synthetic biology is genetic engineering but on a more ambitious scale, explains a very useful NY Times piece:

> For almost 40 years, genetic engineers have been decoding DNA and transplanting individual genes from one organism into another… But synthetic biologists want to break out of this cut-and-paste paradigm altogether. They want to write brand-new genetic code, pulling together specific genes or portions of genes plucked from a wide range of organisms — or even constructed from scratch in a lab — and methodically lacing them into a single set of genetic instructions. Implant that new code into an organism, and you should be able to make its cells do and produce things that nothing in nature has ever done or produced before.

Thus, "synthetic biologists imagine nature as a manufacturing platform: all living things are just crates of genetic cogs; we should be able to spill all those cogs out on the floor and rig them into whatever new machinery we want." This isn't just a vision. In a recent breakthrough, scientists announced "the stepwise creation of a bacterial chromosome and the successful transfer of it into a bacterium, where it replaced the native DNA and began producing proteins."

This is pretty cool stuff, but also a little worrisome. The Times observes:

> Given synthetic biology's open-source ethic, critics cite the possibility of bioterror: the malicious use of DNA sequences posted on the Internet to engineer a new virus or more devastating biological weapons. ETC Group, an international watchdog that has raised complicated questions about synthetic biology since its earliest days, also warns of the potential for "bio-error": what unintended and unimaginable consequences might result from deploying all these freely reproducing, totally novel organisms into the world? What if those living machines don't work exactly as planned?

Congress recently held hearings about synthetic biology, while NIH is contemplating proposed guidelines. Cells are really amazingly complicated system. We've had all too many lessons in how such systems can confound our expectations, sometimes to disastrous results. So a certain degree of caution does seem to be in order before we release this stuff into the wild.