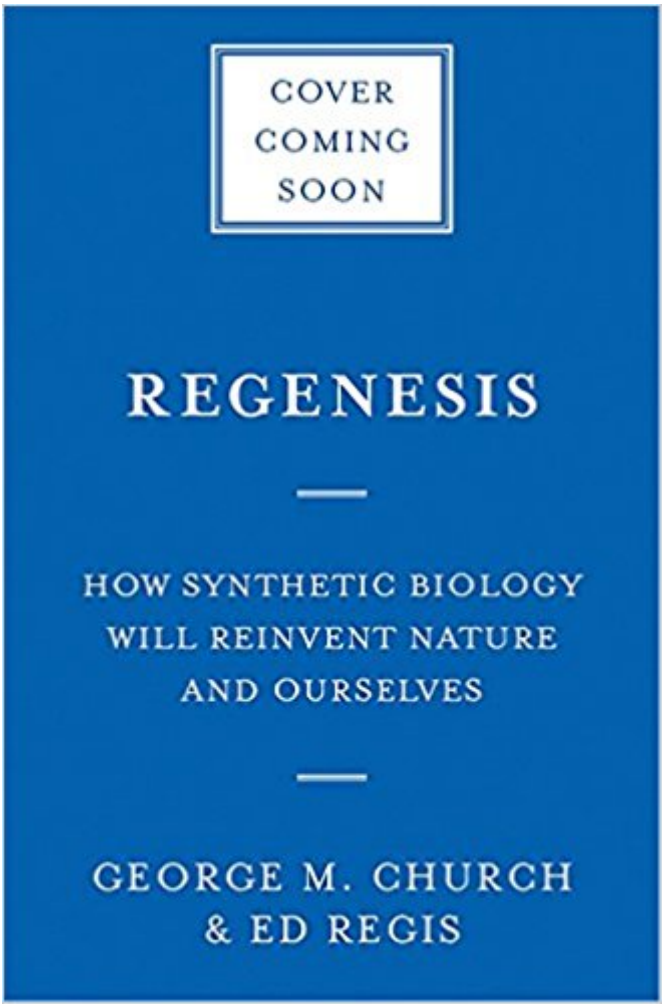
Regenesis: How Synthetic Biology Will Reinvent Nature And Ourselves



Synopsis

“Bold and provocative… Regenesis tells of recent advances that may soon yield endless supplies of renewable energy, increased longevity and the return of long-extinct species.Ã¢â ¬Â•—New ScientistIn Regenesis, Harvard biologist George Church and science writer Ed Regis explore the possibilities—and perils—of the emerging field of synthetic biology. Synthetic biology, in which living organisms are selectively altered by modifying substantial portions of their genomes, allows for the creation of entirely new species of organisms. These technologies—far from the out-of-control nightmare depicted in science fiction—have the power to improve human and animal health, increase our intelligence, enhance our memory, and even extend our life span. A breathtaking look at the potential of this world-changing technology, Regenesis is nothing less than a guide to the future of life.

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Customer Reviews

Nathan Myhrvold, Founder and CEO, Intellectual Ventures"A delightfully opinionated, visionary and controversial romp through synthetic biology, which is one of the most important technologies of our time." Eric Topol, Professor of Genomics, The Scripps Research Institute, and author of "The Creative Destruction of Medicine""Literally reinventing nature could provide solutions to intractable problems with the energy supply, global warming, and human health. In "Regenesis," George Church, a pioneer and pre-eminent force in promoting our ability to "read" DNA sequence, now guides us to the future: "writing" DNA sequence. Teaming up with Ed Regis, Church provides a mind-bending, tour de force account of how this seventh industrial revolution will take hold, and how

ultimately the survival of our planet and the human species may rely upon rewriting the code of life. An enthralling journey into the future--with truly profound implications--that should not be missed." Stewart Brand, author of "Whole Earth Discipline""Here you will find the bleeding, screaming, thrilling edges of what is becoming possible with genomic engineering, handsomely framed in the fine-grained fundamentals of molecular biology. It is a combination primer and forecast of what is coming in this 'century of biology' from the perspective of a leading pioneer in the science.""Kirkus Reviews""[An] authoritative, sometimes awe-inspiring book.... A valuable glimpse of science at the edge." "Publishers Weekly""Exhilarating and scary facts suffuse this book about bioengineering by leading Harvard genetics professor and entrepreneur Church.... [W]hen Church describes current work building microbes with minimal genes, the book takes off - and eventually soars.... [A] stimulating book." Steven Pinker, Harvard College Professor of Psychology, Harvard University, and author of "How the Mind Works "and "The Better Angels of Our Nature""A thoughtful introduction to one of the great frontiers of science, o"New Scientist""Bold and provocative... Church and Regis offer a behind-the-scenes look at synthetic biology, a rapidly emerging field that is reprogramming the genetic code to create organisms and functions not found in nature. "Regenesis" tells of recent advances that may soon yield endless supplies of renewable energy, increased longevity and the return of long-extinct species." Nathan Myhrvold, Founder and CEO, Intellectual Ventures"A delightfully opinionated, visionary and controversial romp through synthetic biology, which is one of the most important technologies of our time." Eric Topol, Professor of Genomics, The Scripps Research Institute, and author of "The Creative Destruction of Medicine""Literally reinventing nature could provide solutions to intractable problems with the energy supply, global warming, and human health. In "Regenesis," George Church, a pioneer and pre-eminent force in promoting our ability to "read" DNA sequence, now guides us to the future: "writing" DNA sequence. Teaming up with Ed Regis, Church provides a mind-bending, tour de force account of how this seventh industrial revolution will take hold, and how ultimately the survival of our planet and the human species may rely upon rewriting the code of life. An enthralling journey into the future--with truly profound implications--that should not be missed." Stewart Brand, author of "Whole Earth Discipline""Here you will find the bleeding, screaming, thrilling edges of what is becoming possible with genomic engineering, handsomely framed in the fine-grained fundamentals of molecular biology. It is a combination primer and forecast of what is coming in this 'century of biology' from the perspective of a leading pioneer in the science." "Kirkus Reviews""[An] authoritative, sometimes awe-inspiring book.... A valuable glimpse of science at the edge." "Publishers Weekly""Exhilarating and scary facts suffuse this book about bioengine"Wall Street Journal""A definitive account of the advances

and business ventures that define this new science [of synthetic biology].... When history is written centuries from now, it is more likely that writing DNA will be the most enduring innovation [of our age]." "New Scientist""Bold and provocative... Church and Regis offer a behind-the-scenes look at synthetic biology, a rapidly emerging field that is reprogramming the genetic code to create organisms and functions not found in nature. "Regenesis" tells of recent advances that may soon yield endless supplies of renewable energy, increased longevity and the return of long-extinct species." "Nature""The life sciences emerge as the new high-tech in this paean to synthetic biology.... Each step in the genome's evolution serves as a springboard for expositions of how synthetic biology will revolutionize renewable energy, multivirus resistance, and more." Mike Loukides, "O'Reilly Radar""If there's one book that can turn this movement into a full-blown revolution, this is it." Derek Jacoby, "O'Reilly Radar""George Church and Ed Regis pull off an exciting and speculative romp through the field of synthetic biology and where it could take us in the not too distant future.... "Regenesis" provides an accessible and engaging introduction to the revolutionary potentials of synthetic biology and should be of interest to both experts and a general science audience." "The Scientist""[A]n important and surprisingly accessible book, magisterially structured to intertwine the accelerated history of synthetic biology with its precedents in humanity's earlier technological revolutions and in the epochal evolution of life itself. The book packs in a superb short course on life's molecular workings, enabling the reader to grasp how we can actually contemplate resurrecting mammoths and Neanderthals, brewing biofuel from seawater and sunlight, engineering total immunity to vir"Science News""Reading the first book penned by Church, a Harvard biologist and polymath, is like falling down a rabbit hole straight into his fermenting brain. Church's wide-ranging career includes developing novel methods for reading the genetic instruction manual, or genome, of creatures from bacteria to humans. Now he focuses on synthesizing those instructions from scratch.... [A] dizzying survey of how scientists have unearthed the secrets of living organisms and are now using that information to revamp life itself." Robert T. Gonzalez, io9"[A] phenomenal read." "Wall Street Journal""A definitive account of the advances and business ventures that define this new science [of synthetic biology].... When history is written centuries from now, it is more likely that writing DNA will be the most enduring innovation [of our age]." "New Scientist""Bold and provocative... Church and Regis offer a behind-the-scenes look at synthetic biology, a rapidly emerging field that is reprogramming the genetic code to create organisms and functions not found in nature. "Regenesis" tells of recent advances that may soon yield endless supplies of renewable energy, increased longevity and the return of long-extinct species." "Nature""The life sciences emerge as the new high-tech in this paean to synthetic biology.... Each

step in the genome’s evolution serves as a springboard for expositions of how synthetic biology will revolutionize renewable energy, multivirus resistance, and more." Mike Loukides, "O’Reilly Radar""If there’s one book that can turn this movement into a full-blown revolution, this is it." Derek Jacoby, "O’Reilly Radar""George Church and Ed Regis pull off an exciting and speculative romp through the field of synthetic biology and where it could take us in the not too distant future.... "Regenesis" provides an accessible and engaging introduction to the revolutionary potentials of synthetic biologys

George M. Church is Professor of Genetics at the Harvard Medical School and member of the Wyss Institute of Biologically Inspired Engineering.Ed Regis is author of seven science books, most recently What Is Life? Investigating the Nature of Life in the Age of Synthetic Biology.

A bit of a dense book (which is why I gave it only 4 stars). But if you read it through, a world will open for you. The book is about synthetic genetics -- how the advances that are happening right now, but especially in the decades to come, will change the world and blow your mind. There is a lot in this book. But I would like to just talk about my favorite part -- the iGEM competition. iGEM is an international student competition for genetic engineering. As Church says [referring to the year 2005], "Undergrads were now doing things, largely in a spirit of fun, that professional molecular biologists would have been hard-pressed to achieve a mere ten years earlier." In the 2007 competition, the team from UC Berkeley engineered E. coli to produce a blood substitute that could be freeze-dried and stored, and then could be reconstituted and grown up in large volumes when needed. In 2008, the grand prize winner was a Slovenian team from the University of Ljubljana which created a synthetic vaccine for the bacteria that causes stomach ulcers. In 2006, the same Slovenian team had presented an idea for preventing infection of human cells by HIV. In 2010 the competition had grown from the original four teams (in 2005) to 130 teams from all over the world: Asia (38), Europe (38), the US (37), Canada (10), Latin America (4) and Africa (1). The ideas presented by these student teams were amazing, inspiring, brilliant. A team from the Swiss Federal Institute of Technology at Lausanne aimed to stop malaria propagation by acting on the vector, that is, the mosquito itself, by coaxing the bacterium that naturally lives in the mosquito’s gut to express an immunotoxin that can prevent the malarial agent from infecting the mosquito, thereby eliminating transmission of the parasite to humans. A team from Polytechnic University of Valencia, Spain had a plan to change the climate of Mars (yes, the planet) by building an engineered yeast, resistant to temperature changes and able to produce a dark pigment which will be responsible for a global

temperature increase.(They received a gold prize for their efforts). A team from the University of Washington in Seattle were attempting to synthesize antibiotics, starting with Anthrax for the competition. In my view, this is an idea of staggering proportions given the current crisis in antibiotic resistance. (This same same team went on to win the North American competition the following year for engineering E. coli to produce both diesel fuel and an enzyme to break down gluten in the digestive tract.) Also receiving a gold prize was a team from the Chinese University of Hong Kong for creating a living data storage system. Apparently, you no longer need to rely exclusively on micro-chips anymore to store an absurd amount of data in a small space. And the big winner was once again the team from Slovenia for coming up with an "assembly-line" molecule for DNA engineering. I don't pretend to fully understand it, but Church likens it to the moment in the industrial revolution when standardized nuts and bolts, machine-tools and assembly-line production systems were introduced. There was a time when to build a machine you had to build everything basically from scratch, custom made and hand-tooled. But around the turn of the 18th century a wave of standardized machinery became the norm, accelerating the process of invention and industrialization exponentially. Apparently, the judges thought the "assembly-line" molecule was potentially at that level of importance. Church's larger point here is that we are on the cusp of assembly-line genetic engineering. Expect an explosion in innovation.

I've met people who really like this book, and people who hate it. I am one of the people who really liked it.This is one of the most interesting science books I've ever read (with my major being molecular and cellular biology). He brought up so many revolutionary, interesting things you can do with synthetic biology, from resurrecting extinct animals like the Pyrenean Ibex, to using E. Coli to fight cancer. Oh and biobricks. Can't forget biobricks. Or mirror life.I will admit that it is very very long. Not in terms of pages, but in terms of the complexity of his ideas. Nothing in science is simple, and Church knows that. I actually appreciated this. A lot of science books out there dumb it down for the general population, but Church didn't (at least not to the same extent). We me being a researcher, it was really nice.

I love parts of this book, but others are hard to get through. I picked it as a summer book because I am a biotechnology teacher - but it is not a quick read at all. It is good, but not what I envisioned it would be.

I actually emailed Dr. Church after reading this and asked if I come to Boston would he meet me. He

said yes!GREAT GUY! Very smart.

The human race has entered a period in its history where, a century from now, humans will be as different from humans today as monkeys are to humans now. There is no better person to describe what is coming than George Church. His book is a little too technical for those not well versed in the terminology of synthetic biology but, if you don't try to understand all the details, you can get an excellent overview of where things stand in the field today. What is impressive is that the techniques can be mastered by high school students in a school lab and thousands of kids worldwide are busy making changes to various genomes. We know today that the smallest genome of a virus has about 3500 base pairs. In theory, if George and his followers are right, it should be possible to assemble those base pairs from scratch in the right order and produce a living, working virus. An announcement of whether they have achieved this should be coming in a few years if not sooner. There is much more to mention but this should be enough to get you interested.

A very slow beginning, but improves as it goes along. A bit daunting if you are not already somewhat familiar with the field. It glosses over the early challenges and bureaucratic challenges and doesn't deal with the irrational attacks on the growing use of the new technologies.It also fails to point out with any emphasis the industrial uses of the technologies drastically reduce energy requirements.The subject could use a good non-technical book. Pity this isn't it

Written in kind of a weird, self indulgent style, as if it were written strictly for the author's pleasure rather than informing the reader. I could probably pile on ugly criticisms, but I did not have the energy to finish this book and do not have the energy to trash it. Maybe that is my main beef .. it bored me .. a lot.Read "Life at the Speed of Lght" or "March of the Microbes" instead.

I've never taken chemistry or biology or anything, but this book is captivating. I am voraciously reading it like someone starved for the knowledge.

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