Synthetic Biology Companies Boston

HESTER MAGDALENA

Frontiers of Engineering Proceedings of Synthetic BiologySynthetic Biology is an emerging discipline that seeks to accelerate the process of engineering biology. As such, the tools are broadly applicable to application areas, including chemicals and biofuels, materials, medicine and agriculture. A characteristic of the field is to look holistically at cellular design, from sensing and genetic circuitry to the manipulation of cellular processes and actuators, to controlling metabolism, to programming multicellular behaviors. Further, the types of cells that are manipulated are broad, from in vitro systems to microbes and fungi to mammalian and plant cells and living animals. Many of the projects in synthetic biology seek to move biochemical functions across organisms. The field is highly interdisciplinary with faculty and students spread across departments that focus on engineering (biological, chemical, electrical, mechanical, civil, computer science) and basic science (biology and systems biology, chemistry, physics). While there have been many one-off workshops and meeting on synthetic biology, the 2014 Synthetic Biology: Engineering, Evolution and Design (SEED) was the first of an annual conference series that serves as a reliable place to pull together the involved disciplines in order to organize and exchange advances in the science and technology in the field. Further, the SEED conferences have a strong focus on industry, with many companies represented and actively participating. A number of these companies have started major efforts in synthetic biology including large companies (e.g., Pfizer, Novartis, Dow, Dupont, BP, Total), smaller companies have recently gone public (e.g., Amyris, Gevo, Intrexon), and many start-ups (e.g., Teslagen, Refactored Materials, Pivot, Genomatica). There are a number of loosely affiliated Synthetic Biology Centers, including ones at MIT, Boston University, UCSD, UCSF, UC-Berkeley, Imperial College, Oxford, and ETH. SEED 2015 will serve as the primary meeting at which international synthetic biology centers and related infrastructure (synthesis/software/foundries) meet to discuss technology, standards, and education. SEED2015 will be the second in an annual series of meeting held to bring researchers from industry and academia in the area of Synthetic Biology. The first SEED conference was highly successful, attracting 285 attendees with varying backgrounds from academia, industry and government. The SEED series provides leadership in the development of the field of synthetic biology and serves to broaden the participants in the field by appealing to broad sectors in industry and providing a means for young investigators and those outside of the field to participate. Further, the series closely integrates with groups such as the SBCC to provide a means by which the synthetic biology community can communicate with policy makers. Further, we will pursue making the meeting the center for the exchange of educational materials as centers for synthetic biology emerge globally. Proceedings will be published each year in the journal ACS Synthetic Biology. After each SEED meeting, surveys are distributed to assess the success of the conference and to help guide changes year-to-year. The diverse application areas further extend the expertise needed from people in areas such as plant biology, agriculture and soil science, environmental science, medicine, and the chemical industry. These areas could have a widespread impact on society in a number of ways. For example, the CRISPR/Cas9 system that serves to immunize bacteria from phage has provided the fundamental chemistry that is used to edit the genomes of diverse organisms, including human stem cells, crop plants, and livestock animals.The Science and Applications of Synthetic and Systems Biology
A new science is reengineering the fabric of life. Synthetic biology offers bold new ways of manufacturing medicines, clothing, foods, fragrances, and fuels, often using microbe fermentation, much like brewing beer. The technology can help confront climate change, break down industrial pollutants, and fight novel viruses. Today, researchers are manipulating life forms and automating evolution to create vegetarian “meat,” renewable construction materials, and cancer treatments. In the process, they are changing our concept of what life science can achieve. Is this a new industrial and information revolution—or dangerous tinkering that could unleash unintended consequences? Programmable Planet is a grand tour through the world of synthetic biology, telling the stories of the colorful visionaries whose ideas are shaping discoveries. Ted Anton explores the field from its beginning in fighting malaria in Africa to the COVID vaccines and beyond. Covering medical and agricultural triumphs and blunders, he examines successes in energy production, plant gene editing, and chemical manufacturing, as well as the most controversial attempts at human gene enhancement. This book reports from the front lines of research, showing policy makers’ struggle to stay abreast of the technologies they aim to regulate. Even-handed, lively, and informative, Programmable Planet gives a glimpse of the promise and problems of a new biology-based industry.
Plunkett's Biotech & Genetics Industry Almanac 2008: Biotech & Genetics Industry Market Research, Statistics, Trends & Leading Companies SAGE Publications
Biotech Juggernaut: Hope, Hype, and Hidden Agendas of Entrepreneurial BioScience relates the intensifying effort of bioentrepreneurs to apply genetic engineering technologies to the human species and to extend the commercial reach of synthetic biology or "extreme genetic engineering." In 1980, legal developments concerning patenting laws transformed scientific researchers into bioentrepreneurs. Often motivated to create profit-driven biotech start-up companies or to serve on their advisory boards, university researchers now commonly operate under serious conflicts of interest. These conflicts stand in the way of giving full consideration to the social and ethical consequences of the technologies they seek to develop. Too often, bioentrepreneurs have worked to obscure how these technologies could alter human evolution and to hide the social costs of keeping on this path. Tracing the rise and cultural politics of biotechnology from a critical perspective, Biotech Juggernaut aims to correct the informational imbalance between producers of biotechnologies on the one hand, and the intended consumers of these technologies and general society, on the other. It explains how the converging vectors of economic, political, social, and cultural elements driving biotechnology’s swift advance constitutes a juggernaut. It concludes with a reflection on whether it is possible for an informed public to halt what appears to be a runaway force.
Synthetic Biology MIT Press
This volume, written by well-known experts in the field, covers all aspects of Anti-Neutrophil Cytoplasmic Antibody (ANCA) Associated Vasculitis (AAV). The expression refers to a group of diseases, characterized by destruction and inflammation of small vessels. The clinical signs vary and affect several organs, such as the kidney, lung, skin, nervous system and others. The opening chapters give some historical hints, explain the genetic basis of the disease and provide insights into the pathogenesis derived from recent experimental studies and guides the reader through classification and nomenclature. A large part of the book is then devoted to a detailed description of the specific related diseases and their clinical presentations, the disease course, and potential complications. The advice regarding treatment is based on the best currently available evidence in this constantly evolving area. The book is part of Springer’s series Rare Diseases of the Immune System, which presents recently acquired knowledge on pathogenesis, diagnosis, and therapy with the aim of promoting a more holistic approach to these conditions. AAVs are systemic autoimmune diseases of unknown cause that affect small (to medium) sized blood vessels. They include granulomatosis with polyangiitis (formerly Wegener's granulomatosis), microscopic polyangiitis, and eosinophilic granulomatosis with polyangiitis (formerly Churg–Strauss syndrome). This volume will be an invaluable source of up-to-date information for all practitioners involved in the care of patients with these diseases.
The Billion-Dollar Molecule Springer
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cellular design, from sensing and genetic circuitry to the manipulation of cellular processes and actuators, to controlling metabolism, to programming multicellular behaviors. Further, the types of cells that are manipulated are broad, from in vitro systems to microbes and fungi to mammalian and plant cells and living animals. Many of the projects in synthetic biology seek to move biochemical functions across organisms. The field is highly interdisciplinary with faculty and students spread across departments that focus on engineering (biological, chemical, electrical, mechanical, civil, computer science) and basic science (biology and systems biology, chemistry, physics). While there have been many one-off workshops and meeting on synthetic biology, the 2014 Synthetic Biology: Engineering, Evolution and Design (SEED) was the first of an annual conference series that serves as a reliable place to pull together the involved disciplines in order to organize and exchange advances in the science and technology in the field. Further, the SEED conferences have a strong focus on industry, with many companies represented and actively participating. A number of these companies have started major efforts in synthetic biology including large companies (e.g., Pfizer, Novartis, Dow, Dupont, BP, Total), smaller companies have recently gone public (e.g., Amyris, Gevo, Intrexon), and many start-ups (e.g., Teslagen, Refactored Materials, Pivot, Genomatica). There are a number of loosely affiliated Synthetic Biology Centers, including ones at MIT, Boston University, UCSD, UCSF, UC-Berkeley, Imperial College, Oxford, and ETH. SEED 2015 will serve as the primary meeting at which international synthetic biology centers and related infrastructure (synthesis/software/foundries) meet to discuss technology, standards, and education. SEED2015 will be the second in an annual series of meeting held to bring researchers from industry and academia in the area of Synthetic Biology. The first SEED conference was highly successful, attracting 285 attendees with varying backgrounds from academia, industry and government. The SEED series provides leadership in the development of the field of synthetic biology and serves to broaden the participants in the field by appealing to broad sectors in industry and providing a means for young investigators and those outside of the field to participate. Further, the series closely integrates with groups such as the SBCC to provide a means by which the synthetic biology community can communicate with policy makers. Further, we will pursue making the meeting the center for the exchange of educational materials as centers for synthetic biology emerge globally. Proceedings will be published each year in the journal ACS Synthetic Biology. After each SEED meeting, surveys are distributed to assess the success of the conference and to help guide changes year-to-year. The diverse application areas further extend the expertise needed from people in areas such as plant biology, agriculture and soil science, environmental science, medicine, and the chemical industry. These areas could have a widespread impact on society in a number of ways. For example, the CRISPR/Cas9 system that serves to immunize bacteria from phage has provided the fundamental chemistry that is used to edit the genomes of diverse organisms, including human stem cells, crop plants, and livestock animals.

Indispensable Yale University Press

Scientific advances over the past several decades have accelerated the ability to engineer existing organisms and to potentially create novel ones not found in nature. Synthetic biology, which collectively refers to concepts, approaches, and tools that enable the modification or creation of biological organisms, is being pursued overwhelmingly for beneficial purposes ranging from reducing the burden of disease to improving agricultural yields to remediating pollution. Although the contributions synthetic biology can make in these and other areas hold great promise, it is also possible to imagine malicious uses that could threaten U.S. citizens and military personnel. Making informed decisions about how to address such concerns requires a realistic assessment of the capabilities that could be misused. Biodefense in the Age of Synthetic Biology explores and envisions potential misuses of synthetic biology. This report develops a framework to guide an assessment of the security concerns related to advances in synthetic biology, assesses the levels of concern warranted for such advances, and identifies options that could help mitigate those concerns.

The Business of Healthcare Innovation National Academies Press

Proceedings of Synthetic Biology

White Biotechnology Academic Press

The author helps readers figure out which leaders matter, why, and when - and what lessons they can learn from those who do matter. Leaders from politics and business are profiled, they include: Abraham Lincoln, Neville Chamberlain, Woodrow Wilson, Thomas Jefferson, Winston Churchill, Jamie Dimon, Al Dunlap, Sir Jacky Fisher, and Judah Folkman.

The Annotated and Illustrated Double Helix Springer

Synthetic Biology provides a framework to examine key enabling components in the emerging area of synthetic biology. Chapters contributed by leaders in the field address tools and methodologies developed for engineering biological systems at many levels, including molecular, pathway, network, whole cell, and multi-cell levels. The book highlights exciting practical applications of synthetic biology such as microbial production of biofuels and drugs, artificial cells, synthetic viruses, and artificial photosynthesis. The roles of computers and computational design are discussed, as well as future prospects in the field, including cell-free synthetic biology and engineering synthetic ecosystems. Synthetic biology is the design and construction of new biological entities, such as enzymes, genetic circuits, and cells, or the redesign of existing biological systems. It builds on the advances in molecular, cell, and systems biology and seeks to transform biology in the same way that synthesis transformed chemistry and integrated circuit design transformed computing. The element that distinguishes synthetic biology from traditional molecular and cellular biology is the focus on the design and construction of core components that can be modeled, understood, and tuned to meet specific performance criteria and the assembly of these smaller parts and devices into larger integrated systems that solve specific biotechnology problems. Includes contributions from leaders in the field presents examples of ambitious synthetic biology efforts including creation of artificial cells from scratch, cell-free synthesis of chemicals, fuels, and proteins, engineering of artificial photosynthesis for biofuels production, and creation of unnatural living organisms Describes the latest state-of-the-art tools developed for low-cost synthesis of ever-increasing sizes of DNA and efficient modification of proteins, pathways, and genomes Highlights key technologies for analyzing biological systems at the genomic, proteomic, and metabolomic levels which are especially valuable in pathway, whole cell, and multi-cell applications Details mathematical modeling tools and computational tools which can dramatically increase the speed of the design process as well as reduce the cost of development.

Safeguarding the Bioeconomy Hachette UK

In the final years of the twentieth century, émigrés from engineering and computer science devoted themselves to biology and resolved that if the aim of biology is to understand life, then making life would yield better theories than experimentation. Armed with the latest biotechnology techniques, these scientists treated biological media as elements for design and manufacture: viruses named for computers, bacterial genomes encoding passages from James Joyce, chimeric yeast buckling under the metabolic strain of genes harvested from wormwood, petunias, and microbes from Icelandic thermal pools. In Synthetic: How Life Got Made, cultural anthropologist Sophia Roosth reveals how synthetic biologists make new living things in order to understand better how life works. The first book-length ethnographic study of this discipline, Synthetic documents the social, cultural, rhetorical, economic, and imaginative transformations biology has undergone in the post-genomic age. Roosth traces this new science from its origins at MIT to start-ups, laboratories, conferences, and hackers' garages across the United States—even to contemporary efforts to resurrect extinct species. Her careful research reveals that rather than opening up a limitless new field, these biologists' own experimental tactics circularly determine the biological features, theories, and limits they fasten upon. Exploring the life sciences emblematic of our time, Synthetic tells the origin story of the astonishing claim that biological making fosters biological knowing.

Strange Natures Springer Nature

The Business of Healthcare Innovation is the first wide-ranging analysis of business trends in the manufacturing segment of the health care industry. In this leading edge volume, Professor Burns focuses on the key role of the 'producers' as the main source of innovation in health systems. Written by professors of the Wharton School and industry executives, this book provides a detailed overview of the pharmaceutical, biotechnology, genomics/proteomics, medical device and information technology sectors. It analyses the market structures of these sectors as well as the business models and corporate strategies of firms operating within them. Most importantly, the book describes the growing convergence between these sectors and the need for executives in one sector to increasingly draw upon trends in the others. It will be essential reading for students and researchers in the field of health management, and of great interest to strategy scholars, industry practitioners and management consultants.

Proceedings of Synthetic Biology Springer Nature

Published to mark the fiftieth anniversary of the Nobel Prize for Watson and Crick's discovery of the structure of DNA, an annotated and illustrated edition of this classic book gives new insights into the personal relationships between James Watson, Frances Crick, Maurice Wilkins, and Rosalind Franklin, and the making of a scientific revolution.

Preparing for Future Products of Biotechnology Cambridge University Press

In this history of extinction and existential risk, a Newsweek and Bloomberg popular science and investigative journalist examines our most dangerous mistakes -- and explores how we can protect and future-proof our civilization. End Times is a compelling work of skilled reportage that peels back the layers of complexity around the unthinkable -- and inevitable -- end of humankind. From asteroids and artificial intelligence to volcanic supereruption to nuclear war, veteran science reporter and TIME editor Bryan Walsh provides a stunning panoramic view of the most catastrophic threats to the human race. In End Times, Walsh examines threats that emerge from nature and those of our own making: asteroids, supervolcanoes, nuclear war, climate change, disease pandemics, biotechnology, artificial intelligence, and extraterrestrial intelligence. Walsh details the true probability of these world-ending catastrophes, the impact on our lives were they to happen, and the best strategies for saving ourselves, all pulled from his rigorous and deeply thoughtful reporting and research. Walsh goes into the room with the men and women whose job it is to imagine the unimaginable. He includes interviews with those on the front lines of prevention, actively working to head off existential threats in biotechnology labs and government hubs. Guided by Walsh's evocative, page-turning prose, we follow scientific stars like the asteroid hunters at NASA and the disease detectives on the trail of the next killer virus. Walsh explores the danger of apocalypse in all forms. In the end, it will be the depth of our knowledge, the height of our imagination, and our sheer will to survive that will decide the future.

Micro- and Nanoengineering of the Cell Surface OECD Publishing

Building on an increasingly sophisticated understanding of naturally occurring biological processes, researchers have developed technologies to predictably modify or create organisms or biological components. This research, known collectively as synthetic biology, is being pursued for a variety of purposes, from reducing the burden of disease to improving agricultural yields to remediating pollution. While synthetic biology is being pursued primarily for beneficial and legitimate purposes, it is possible to imagine malicious uses that could threaten human health or military readiness and performance. Making informed decisions about how to address such concerns requires a comprehensive, realistic assessment. To this end, the U.S. Department of Defense, working with other agencies involved in biodefense, asked the National Academies of Sciences, Engineering, and Medicine to develop a framework to guide an assessment of the security concerns related to advances in synthetic biology, to assess the level of concern warranted for various advances and identify areas of vulnerability, and to prioritize options to address these vulnerabilities. This interim report proposes a framework for identifying and prioritizing potential areas of concern associated with synthetic biologyâ€"a tool to aid the consideration of concerns related to synthetic biology. The framework describes categories of synthetic biology technologies and applicationsâ€"such as genome editing, directed evolution, and automated biological designâ€"and provides a set of initial questions to guide the assessment of concern related to these technologies and applications.

Synthetic Biology 2020: Frontiers in Risk Analysis and Governance University of Chicago Press

"A meticulously researched tour de force" on politics, big agriculture, and the need to go beyond farmers' markets to find fixes (Publishers Weekly). Wenonah Hauter owns an organic family farm that provides healthy vegetables to hundreds of families as part of the Community Supported Agriculture (CSA) movement. Yet, as a leading healthy-food advocate, Hauter believes that the local food movement is not enough to solve America's food crisis and the public health debacle it has created. In Foodopoly, she takes aim at the real culprit: the control of food production by a handful of large corporations—backed by political clout—that prevents farmers from raising healthy crops and limits the choices people can make in the grocery store. Blending history, reporting, and a deep understanding of farming and food production, Foodopoly is a shocking, revealing account of the business behind the meat, vegetables, grains, and milk most Americans eat every day, including some of our favorite and most respected organic and health-conscious brands. Hauter also pulls the curtain back from the little-understood but vital realm of agricultural policy, showing how it has been hijacked by lobbyists, driving out independent farmers and food processors in favor of the likes of Cargill, Tyson, Kraft, and ConAgra. Foodopoly shows how the impacts ripple far and wide, from economic stagnation in rural communities to famines overseas, and argues that solving this crisis will require a complete structural shift—a change that is about politics, not just personal choice.

Earth Grab Springer Nature

This book examines policy issues in synthetic biology including R&D funding, company investment, PPP arrangements and innovative financing, infrastructure requirements, education and training, intellectual property (IP), regulation, and public engagement.

GEN Guide to Biotechnology Companies Frontiers Media SA

Medical innovation as it stands today is fundamentally unsustainable. There is a widening gap between what biomedical research promises and the impact that it is currently achieving, in terms of patient benefit and health system improvement. This book highlights the global problem of the ineffective translation of bioscience innovation into health system improvements and its consequences, analyses the underlying causative factors and provides powerful prescriptions for change to close the gap. It contrasts the progress in biomedicine with other areas of scientific and technological endeavour, such as information technology, in which there are faster and more reliable returns for society. The author's career has spanned pharmaceuticals, diagnostics and health informatics and he draws lessons from a host of case examples in which bottlenecks have

prevented progress, such as in dementia and antibiotic-resistant infections, and from many in which these barriers have been overcome, such as HIV therapy and targeted cancer treatment. The new era of precision medicine holds the greatest promise of closing this 'innovation gap'. Along with techniques such as open innovation and adaptive development, powerful new genomics and digital health tools are poised to transform the productivity of life sciences. Bioscience-Lost in Translation? lays out a fresh and provocative strategy for advancing the innovation process, shaping the right policy environment and building an ecosystem to deliver the 21st century cures that are urgently needed.

Saved by Science Simon and Schuster

As greedy eyes focus on the global South's resources this book 'pulls back the curtain on disturbing technological and corporate trends that are already reshaping our world and that will become crucial battlegrounds for civil society in the years ahead.

Biodefense in the Age of Synthetic Biology Routledge

How we can harness cutting-edge biology and manufacturing to fight waste and pollution. In Nature, there is little chemical waste; nearly every atom is a resource to be utilized by organisms, ensuring that all the available matter remains in a perpetual cycle. By contrast, human systems of energy production and manufacturing are linear; the end product is waste. In Brave Green World, Chris Forman and Claire Asher show what our linear systems can learn from the efficient circularity of ecosystems. They offer an unblinkered yet realistic and positive vision of a future in which we can combine biology and manufacturing to solve our central problems of waste and pollution.

Synthetic National Academies Press

This directory provides the reader with quick-access to information on more than 8000 companies, research centres and academic institutions involved in new and established technologies. This edition offers more than 600 all-new organization listings, including new listings in Europe.

Synthetic Biology-Guided Metabolic Engineering CRC Press

This book addresses the design of emerging conceptual tools, technologies and systems including novel synthetic parts, devices, circuits, oscillators, biological gates, and small regulatory RNAs (riboregulators and riboswitches), which serve as versatile control elements for regulating gene expression. Synthetic biology, a rapidly growing field that involves the application of engineering principles in biology, is now being used to develop novel systems for a wide range of applications including diagnostics, cell reprogramming, therapeutics, enzymes, vaccines, biomaterials, biofuels, fine chemicals and many more. The book subsequently summarizes recent developments in technologies for assembling synthetic genomes, minimal genomes, synthetic biology toolboxes, CRISPR-Cas systems, cell-free protein synthesis systems and microfluidics. Accordingly, it offers a valuable resource not only for beginners in synthetic biology, but also for researchers, students, scientists, clinicians, stakeholders and policymakers interested in the potential held by synthetic biology.

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