

Methods in Microbiology is the most prestigious series devoted to techniques and methodology in the field. Established for over 35 years, *Methods in Microbiology* will continue to provide you with tried and tested, cutting edge protocols to directly benefit your research.

Synthetic Biology is a rapidly growing discipline that builds on well-established principles of genetic engineering and biotechnology by integrating computational and engineering approaches to the design and construction of novel biological systems. The potential applications of synthetic biology are huge, varied and well recognised and likely to impact on agriculture and food, bioprocessing, energy, bioremediation, biosensors, fine and specialist chemicals, medicine and healthcare.

Currently, the refactoring of a biological system for bioexploitation is, in most cases, still carried out by a domain expert using ad-hoc approaches. However, one of the major challenges in biological systems design arises from the fact that molecular interactions on the genome scale are extremely complex. Synthetic biologists can no longer rely on manual approaches for designing synthetic systems on a genome-wide scale. As the complexity of systems design increases, too is the need to utilize automated, computer-aided design processes.

Two leading experts in the field edit volume 40 of the *Methods in Microbiology*. It presents a series of critical reviews outlining experimental, computational and engineering approaches to biological systems design.

Key Features:

- The Computational infrastructure for Synthetic Biology
- The application of computational intelligence
- Circuit Design and Simulation
- Evolutionary computation
- Design constraints of synthetic bacterial chassis
- Compartmentalisation and shaping
- Reframing the social dimensions of Synthetic Biology
- Engineering microbial biosensors
- Noise and stochasticity in gene expression
- Noise and heterogeneity in gene expression
- Measuring and engineering noise in biological systems
- The *Bacillus subtilis* Gram-positive chassis
- Genome management and analysis of gene function
- Computational Tools and Resources
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