

# Engineering biology for a better world

Synthetic biology, says SynbiCITE commercial director **Dr John Collins**, is the answer to science's collective problems

**A**mong the numerous global challenges which the 21st century presents, the creation of low-cost vaccines and drugs to combat antimicrobial resistance and meeting growing consumer demands while reducing environmental impact, identify themselves as priorities on the agenda. We will soon run out of the materials we use in manufacturing if we continue to take them for granted and we are now charged, as a matter of urgency, to explore alternatives.

## **Biology forms a critical part of the solution**

Synthetic biology, which blends advances in engineering, biology, chemistry, computer science and design, provides technologies to enable the production of essential materials while replacing the use of finite resources.

It increases the speed and precision of transforming an idea into a product, while reducing cost and waste. This biology-based "toolkit" uses responsible innovation, computer-aided design and automated construction to change how we build biological systems and expand the range of possible products extracted from natural sources or manufactured for use in everyday goods. It can create viable equivalents of materials occurring in nature and generate entirely new materials as well, making the best possible use of bio-renewable resources and technology.

## **Engineering biology will facilitate global bio economic growth**

BCC Research estimated in its 2015 Emerging Global Markets report that at current growth rates the market for synthetic biology-generated materials, products, tools and services will be \$38bn by 2020. In Europe, the bio-economy turnover in 2013 was €2.1trn. According to the US National Academy of Science in its 2015 report "Industrialisation of Biology Roadmap", in 2012 alone the bio-based product market grew to more than 2.2 per cent of US gross domestic product, or more than \$353bn in economic activity. US business-to-business revenues from industrial biotechnology reached at least \$125bn.

## **The UK is leading the way**

Synthetic biology, though still in its infancy, is at the forefront in R&D and innovation. In the UK, more than 26 universities and 100 companies are engaged in synthetic biology R&D, product development and commercialisation. The UK has a government-led roadmap and strategy with considerable funding to progress and exploit synthetic biology. This has largely been led by SynbiCITE – the UK's national centre dedicated to promoting the adoption of synthetic biology by industry.

## **A catalyst for a new industry**

SynbiCITE is based at Imperial College London and – with its partners across UK academia and industry – is accelerating the commercialisation of emerging technologies. Its goals are to achieve significant economic impact, train skilled workers and create new jobs.

In December, SynbiCITE – associated with the Institution for Engineering and Technology (IET) – is holding a major engineering biology conference to further illustrate the reach of this science.

**Find out more at <http://conferences.theiet.org/synthetic-conference>**

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