Applied Biologics and Biochemistry

Advancement in technologies for the life sciences has been continuous for centuries, and this has led to the rise of big pharma and specialist biotechs. More recently, we have seen a greater crossover of biology with physical sciences, engineering, maths and computing and this has in turn provided more applied roles within this tech sector. It is this very nature of applied science that is being propagated within industry, providing demonstrable technologies that can be productised.

A very brief history…

Science never stays still. A look at how genetics has evolved and we have the past exploits of gentleman scientists such as Mendel working on pea genetics, to modern day use of recombinant DNA. A big milestone was in 2003, when ahead of schedule the completion of the human genome project was globally announced. Initiated in 1990, efforts by both private and public labs (including those in the US, UK, France, China, and Australia) had collaborated to sequence and thus unlock the human genetic blueprint – and with it, new avenues in understanding diseases, evolutionary processes, and molecular medicine.

Fast-forward from then, and a plethora of start-ups and university spins-outs have appeared to work on DNA based tools to decipher the basic blocks of life, disease and everything in between. Universities and research institutes took a strong lead in specialist research on isolated gene variants or genetic mutations, with industry taking a more process driven attitude. This has also been mirrored with proteomics, peptides and protein based technologies.

All of these developments have played out under the backdrop that lab science moved away from chemicals and in-house recipes to a more kit based approach – a nod to uniformity, robustness and efficiency. With product endorsed science gaining approval based on the central pillar of scientific reproducibility, "*lab research*" tools and applications as a market exploded.

Synthetic biology – trend or new technology platform?

In the late 1990s and early 2000s we had the uptake of microarrays in projects. RNAi came in the mid-2000s, and this was followed with the widespread use of CRISPR gene editing in 2010s. With the latest DNA engineering expertise, synthetic biology is the latest to grab industry's attention. Synthetic biology is an archetypal modern-day technology discipline, combining both engineering and science including biotechnology, genetics, biophysics, computer science, and chemical engineering. Simplistically, it is the…

> "***design and construction of biological modules, biological systems, and biological machines or re-design of existing biological systems for useful purposes*** [Nakato et al., 2013]***"***

…with applications including biological computers, biosensors, designed proteins, industrial enzymes, gene circuits, materials production, and synthetic life.

The whirlwind of technological advancements in synthetic biology has become a new arms race, with everyone trying to gain an upper hand in this wild frontier. This has led to bioethics and security issues, with regulatory bodies playing catch-up. However, regulators have learnt from past lapses and there does seem to be a concerted effort to have guidelines and future-proofing in place.

Synthetic biology is rooting itself with the establishment of a viable ecosystems being built and older parts maturing within. Reports from SynbiCITE (the UK's national centre for the commercialisation of synthetic biology) show a doubling of start-ups every 5 years, with many of these clustering together (focusing around London, South-East, Scotland, North-East and around Cambridge). This has been supported through government investment of £300m (2009 to 2016) and the explosion of degree courses at top UK universities (including Cambridge, Edinburgh, Imperial, Birmingham and Newcastle). This is mirrored in other countries with Germany, US, Japan, Canada and India leading in innovative research and development in this area.

With the money spent in this area, synthetic biology does look like a platform / ecosystem that will itself further develop or be the springboard of hybrid / collaborative disciplines working together. The future therefore looks rosy for those who have the skills and key experience to work on modern projects in industry.

Are you keeping yourself current? Has your PhD, postdoc or last projects given you the experience that industry is looking for? Our take home message is to always think about the bigger picture – your career / future aspirations. Work on projects you enjoy, just make sure you don't build up skills in areas that are less desirable or valuable if you're keen to transition to other areas.

About ECM

ECM is a specialised science and technology recruitment consultancy, helping bright candidates find exciting roles in science, computing and engineering. We work closely with candidates to help you get the job you're after, and can advise on all aspects of your application to maximise your impact with a hiring manager. If you liked this article, and want to see how we can help you when you're next looking to move on, why not get in touch: info@ecmselection.co.uk.