



# Pushing the Boundaries at Innogen

**Dave Stevens**, freelance science writer, takes a look at the outside interests which are leading to a greater diversification at Innogen.

After almost ten years, the Network and its constituent centres have become established features in - what has ultimately become - a varied genomics landscape. Now this work is also being noticed beyond the extensive borders of the life sciences, with staff being actively sought out to apply their expertise in 'pastures new'.

This demand is clearly seen at Innogen, whose large membership and collaborations with national and international institutions, including those from the social sciences, natural sciences, law and medicine, are one demonstration of its interdisciplinarity both within and beyond the life sciences.

"Innogen is now the innovation centre in the life sciences. But it has also developed a range of approaches that are no longer seen as just being useful in the life sciences, and are already being used more broadly in the social sciences," says Innogen Director, Professor Dave Wield.

As Wield explains, one of Innogen's strengths – and what puts it in good stead for the future - is its strong academic vision, allied to a clear purpose. It might have begun as a centre to research the social sciences of genomics, but its research and engagement now goes well beyond the social science of science, technology and medicine.

"It's quite clear that beyond 2012 Innogen will maintain its emphasis on innovation and hopefully the tools, techniques and approaches we develop will continue to be more useful generally in the social sciences and beyond.

"For instance, we are strongly international, bringing together expertise in the health, food and energy sectors at a time when there is growing convergence of information and environmental technologies with the life sciences."

## **A QUEST for knowledge**

That such expertise is already having an impact outside the world of genomics is evident. Drawing on their collective experience in interdisciplinary research across the life sciences and beyond, Innogen researchers have sought to share their skills in the conduct, management and evaluation of interdisciplinary research with the wider research community through a series of Interdisciplinary Masterclasses. These training events were set up in order to develop a cadre of students, researchers and research managers who are better able to tackle the challenges of interdisciplinary research across a range of domains.

"The Masterclass model has worked extremely well as a way of conveying codified knowledge but also, crucially, tacit knowledge of how interdisciplinary research can

be conducted,” says Deputy Director, Dr Catherine Lyall. “By recognising that skills gaps persist at the early- and mid-stage in interdisciplinary careers, we have been able to develop a systematic approach through our short courses to a phenomenon that in the past has often been rather bespoke and craft-based.”

These Masterclasses have acted as an important catalyst for a wide range of other capacity-building activities which have consolidated Innogen’s position as an international leader in the field of interdisciplinary research spanning the social and natural sciences.

This expertise has already been acknowledged by NERC, who commissioned Innogen researchers, led by Lyall, to conduct a yearlong study centred on four interdisciplinary programmes: QUEST - Quantifying and Understanding the Earth SysTem, the Rural Economy and Land Use Programme, the Climate Change Research Programme at the Tyndall Centre and the UK Energy Research Centre to tease out the transferable lessons that would be of relevance to other interdisciplinary initiatives.

This same team has also produced the widely applicable, practical guidebook, *Interdisciplinary Research Journeys*, scheduled for publication in March by Bloomsbury Academic.

## **Sustainability**

And on a similar environmental theme, Innogen’s Dr Sarah Parry is part of the newly funded, UK-wide Sustainable Practices Research Group, which is focusing on understanding social, and specifically consumer, behaviour and how it might be encouraged to become more sustainable.

This, on the face of it, might seem a leap from Parry’s previous work looking at public engagement with stem cell research. But she says it illustrates perfectly just how one of Innogen’s approaches is finding new, wider applications.

“The main expertise I carry forward is analytical, trying to answer questions about the nature and role of different types of knowledge and expertise, especially as these relate to policy, and questions of power and influence therein.”

The Group, funded by the ESRC, DEFRA and the Scottish Government, will deliver an analysis of three environmentally-sensitive practices: eating, water-use and sheltering. Each research project will answer questions regarding how habits operate and identify the drivers of change. The programme is designed to enhance the social scientific understanding of how habits in areas of everyday consumption form, reproduce and may be changed.

The stem cell project Parry previously worked on had two aims: first, to explore the views of a wide range of publics and experts in Scotland and, second, to develop engagement methods for establishing a dialogue between the different groups. The sustainable consumption research will involve establishing new ways of thinking about behaviour in political, policy and public debate and will lend understanding to current policy-related processes concerning sustainable consumption.

“It’s the more fundamental conceptual approaches that underpin the two projects that make the links between them,” says Parry. “It’s the analysis of public engagement and its role in policy and politics that is being taken forward, not public engagement itself.

“The interesting thing for me is that the [Sustainable] Practices work doesn't so much as overlap with the stem cell work, but it's more that it starts where the public engagement work ended.”

### **Knowledge economy**

With a significant proportion of Innogen's research looking at the life science economy, it is not that surprising this expertise is now being exported into other sectors facing similar issues.

Economic Director, Professor Mariana Mazzucato is interested in the feedback between technological change, firm performance and industrial market structures in pharma and biotech, but her work has taken her well beyond the boundaries of the life sciences, and into the personal computer and car industries.

Her research has highlighted the origin and evolution of persistent differences between firms and the evolution of these differences over their industry's life-cycle.

This understanding has been applied to the EC-funded FINNOV (Finance, Innovation & Growth) research programme, through which seven European Institutions are collaborating with the aim to understand the relationship between changing financial markets, innovation dynamics, and economic performance.

The project studies how these relationships influence economic growth as it is experienced by individuals, businesses and the wider economy. According to Mazzucato, the project's coordinator, this will assist policy makers and European industry to understand the sources, implications and management of positive and negative changes in financial markets.

“The core lessons from my Innogen research, regards the need to understand the company-specific and industry-specific conditions under which investments in R&D and patenting will lead to actual innovation and company growth.

“To prevent R&D spending resulting in a dry hole, policymakers should target these conditions, which will vary across sectors. The FINNOV project is extending this research into the finance domain, looking at the conditions under which financial markets have penalised rather than rewarded innovative firms.”

Mazzucato says these lessons are also informing her study of the early green-tech sector to see whether there is some bubble-like behaviour (as occurred with biotech), where high expectations over growth fuel stock-price increases - changes that aren't representative of the actual innovative capacity of the sector.

### **Tools of the trade**

And in the cut-throat globalised economy, businesses don't just need to be innovative to succeed; they require an environment in which they can flourish.

At various times policymakers have attempted to address the particular wants of the life science, biotech and medical technology industries, but often the result is narrow support for an individual company's research and development, or 'band-aid solutions' to specific market failures.

Now work being done at Innogen will hopefully contribute to more effective policy frameworks that support innovation and economic growth in the life science-based sectors - and beyond.

Dr Alessandro Rosiello, along with his colleagues from across Europe, have developed a toolkit to help countries think differently about how they can (or can't) support a biotech industry; it includes the key factors countries should consider when trying to get this industry off the ground, and for developing it further.

The kit aims to replace the 'one-size-fits-all' approach that countries have been using to grow their biotech industries, and has been developed after analysing different policy structures from across the globe, in places as diverse as Singapore, North Carolina, Israel and France.

“It will hopefully help policymakers form a strategic road map which can be used to determine possible interventions that would lead to a performing system of biotech innovation within a country or region,” says Rosiello. “If it works, there is no reason it couldn't be applied to other sectors.”

The toolkit underwent in-depth review by senior policy makers and development agencies during focus groups held last December, and Rosiello and colleagues are presently road testing the toolkit with policymakers in Spain, Lithuania and Slovenia to determine how it should be implemented.

Interestingly, this type of cross boundary knowledge transfer isn't all one way. In other work looking at productivity, Rosiello is researching the relative ability of pharmaceutical firms to move products to market and one of the indicators he plans to use – predictive control – is a tool that has until now, mostly been used by engineers.

### **The future is bright**

It's clear then that many of the techniques and approaches developed at Innogen over the last decades have attracted considerable attention outside of their original spheres of use, and have drawn some staff into new and unexpected areas of research; areas probably never envisioned as within its remit during the Network's conception. Such greater application puts Innogen, the Network and UK Social Science in a stronger and more visible position heading into the next decade.

Wield sums it up best: “Our vision is to find ways of doing new science, technology and medicine that value and embed the contribution of the social sciences. Innogen and post-Innogen futures depend on our continued enthusiasm and creativity to build a new social science.”