SPOTLIGHT ON THE UNITED KINGDOM

Collaborative research: New opportunities for scientists in the UK

Significant investment in UK science has meant the development of new research collaborations between academic institutions, industry and other groups.

"To achieve the necessary level of interdisciplinarity, you're going to need to collaborate. It's as simple as that."

Jim Smith, National Institute of Medical Research

PAYING TRIBUTE to his colleagues as he collected his second Nobel Prize for Physics, the late US physicist, John Bardeen, remarked: "Science is a collaborative effort. The combined results of several people working together is often much more effective than could be that of an individual scientist working alone."

Bardeen's words on December 10, 1972, resonate even more four decades later. Across disciplines, borders and research sectors, new collaborative institutes and partnerships are springing up in the UK to concentrate expertise. Research funding agencies are looking more favourably at collaborative projects with partners from different fields and organizations. But what are the forces driving these changes? Is collaboration always a good thing, and how does the new environment affect the job opportunities of early-career scientists?

Jim Smith, director of the National Institute of Medical Research, is unequivocal: "in the past individual groups could make significant contributions on their own, but nowadays, to really achieve things, you need to involve more expertise than any single group can have," the developmental biologist says. "To achieve the necessary level of interdisciplinarity, you're going to need to collaborate. It's as simple as that."

Working together

Biomedicine's increasing dependence on other disciplines is why the Francis Crick Institute, at which Smith is a research director, sees fostering collaborations as a core priority. The institute is a £650 million alliance between University College London (UCL), Imperial College London, King's College London, the Medical Research Council, Cancer Research UK and the Wellcome Trust. Newly-appointed Crick scientists from these partner organizations will begin working at the institute's headquarters in London during the first half of 2016. Researchers at the institute will seek to better understand, prevent, diagnose and treat major illnesses such as cancer, heart disease, stroke and neurodegenerative diseases.

Other new institutes are also in the pipeline. The £235 million Sir Henry Royce Institute for Material Research and Innovation, known to some as the "Crick of the North", will be based at the University of Manchester with researchers collaborating from the universities of Sheffield, Leeds, Liverpool, Cambridge, Oxford and Imperial College London. Another recently announced initiative is the Alan Turing Institute where mathematicians and computer scientists from the universities of Cambridge, Edinburgh, Oxford, Warwick and UCL will collaborate on the collection, analysis and interpretation of "big data" projects. North of the border, the universities of Edinburgh and Glasgow will partner with US genetics technology leader, Illumina, to establish the Scottish Genomes Partnership. This will provide scientists and clinicians with state-of-the-art sequencing equipment for use in research as well as for rapid screening and diagnosis services.

While scientific collaboration is a long-established necessity, today they are more likely to take place within institutional structures linked to, but physically separate from, universities. Furthermore the traditional dividing line between academia and industry is becoming fainter. "When you get academics and industrial scientists approaching the same problem from different perspectives, good things happen," says Malcolm Skingle, director, academic liaison, at healthcare giant GlaxoSmithKline. "We've been looking to bring in new ideas from the outside, and have realized we need to work together with the academic base and even with our competitors to drive the science forward."

Finding funding

Funding agencies are also driving researchers to collaborate while increasingly asking for evidence of societal impacts. "They provide funding that requires these multi-centre relationships and want to see the science they are paying for having

HOK AND GLOWFROG

An artist's impression of the Francis Crick Institute in London, due to open in late 2015.

an impact," says Kenneth Seamon, director of scientific development at the Cambridge Cancer Centre, a collaboration between the University of Cambridge, independent institutes, the Cambridge University Hospitals NHS Foundation Trust and industrial partners that facilitate links between research scientists and clinical services.

While most scientists see these moves as positive, some also warn that associations driven by managers and funders may not always be the most productive. "It's great that larger groups are pooling their resources to tackle bigger problems," says David Hume, director of the Roslin Institute, the animal health and welfare research centre, part of the University of Edinburgh. "However, enforced collaborations can create artificial partnerships involving a lot of management but not much real gain. A more bottom-up approach with more input from scientists can be more productive."

Biochemist Jeremy Nicholson, of Imperial College London (**see box**), also fears independence and diversity could be sacrificed if funding is concentrated in fewer hands. "Putting these resources together does make Britain more competitive," says Nicholson, "but lots of fantastic, original ideas have come from people in small departments of small universities working on apparently crazy notions." To illustrate, he cites the work of George Gray and colleagues at the University of Hull who in 1973 published details of a new liquid crystal technology that is now used in billions of mobile phone screens, computers and televisions worldwide.

Assessing science

The UK government distributes £2 billion a year in block grants to higher education and research institutions. Grants received for 2015-16 will be determined by a new method of assessing the quality of research, which was introduced by the Higher Education Funding Council for England (HEFCE). The Research Excellence Framework (REF) exercise, whose results were published in December 2014, weighs a measure of the societal impacts of the research conducted. It's a system that does not apply to separate collaborative research institutions, which have their own funding arrangements, however some have begun to wonder whether it is inevitable that they will be subjected to a formalized assessment of societal impact.

For David Sweeney, director of HEFCE, achieving significant societal impacts is central to the rationale for the very existence of the new research institutes, but it does not follow that a REF-like system should be applied to their public purse funding. "You couldn't conceive of something like the Crick or the Turing without, in the next breath, talking about their wider impacts," he says. "But that's not to say you should assess impact in the same way as universities."

Seamon agrees that while the "impact agenda" will continue to be important in the calculations of funders, differences in the structures and objectives of the organizations involved would thwart any attempt to impose a common impact assessment system. "Funding organizations are putting more and more effort into evaluating the impact of work they fund, but I doubt that it will be formalized at a higher level because each funding organization has its own requirements and aims."

New opportunities

This changing landscape has important implications for early-career researchers. For one thing, this new environment favours those who are good at interacting with others and promoting their ideas. "The greater emphasis on collaboration means scientists with good networking and communications skills are more likely to prosper," says Hume.

As well as breaking down barriers between academia and industry, researchers are finding new opportunities in other sectors, as illustrated by the Cambridge Conservation Initiative, a collaboration between the University of Cambridge and various conservation organisations. It funds research proposals that include combined inputs from academia and conservation groups. "It enables a number of postdocs to be employed for short periods with groups that want to make a difference," says zoologist Bill Sutherland, of the University of Cambridge, who adds that several have gone on to work with government bodies and NGOs.

There are also new opportunities for those who wish to pursue fundamental research. The Crick, for example, will appoint its group leaders earlier in their careers than normal, giving them longer to achieve their aims with 12-year appointments, reviewed mid-stage. "It now takes longer to achieve something really important than it used too, so we want to give people a good long time," says Smith. "I began my own independent career at 28-29, but nowadays it's closer to 38-39. That's 10 years people are losing and I think people are often at their most interesting and productive earlier in their careers."

This content was commissioned and edited by the Naturejobs editor

JEREMY NICHOLSON, IMPERIAL COLLEGE LONDON

Strategic partners

From digesting food and making vitamins, to triggering immune responses and modulating mood, our understanding of the roles of the bugs in our bodies grows almost by the week.

Yet the complexity and variability of the human body make translating these insights into useful applications a difficult job – one that researchers at the MRC-NIHR National Phenome Centre (NPC) have enthusiastically embraced.

The NPC, a collaboration between Imperial College London and King's College London, is developing new ways to analyse the metabolites and metabolic profiles in samples such as urine, plasma and tissue to identify markers of disease risk, provide better patient stratification and a better understanding of treatment efficacy for individuals.

The centre's real power stems from its ability do this on a huge scale, analysing up to 100,000 samples per year, thanks in large part to the state-of-the-art mass spectrometry and high-throughput nuclear magnetic resonance equipment it inherited from the drug testing facility of the 2012 London Olympic Games.

Part of the NPC's workload involves characterising the metabolic markers of variations in gut bugs and, with its strategic partner, the US lab equipment company Waters, developing assays for conditions including ulcerative colitis, Crohn's disease and colon cancer.

Jeremy Nicholson, a biochemist at Imperial College London, and NPC director, says that working with partners from industry is key to the team's success.

"Translational medicine is about taking some science and making it work in the clinic," he says. "For it to work in a clinic, not only does it have to be scientific robust, and validated, somebody has to make the kit or machine. So having strategic partners with the expertise to take things to market and a commercial interest in doing so is a huge advantage."

IMMUNOCORE
targeting T cell receptors

Milton Park, Oxfordshire

ABOUT IMMUNOCORE

Immunocore was founded in 2008, originally out of Oxford University, and is based just south of Oxford; it now has a vibrant, diverse workforce of over 140 members.

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To be considered for this position, please apply to Mrs C. Canuto, 90 Park Drive, Milton Park, Oxfordshire, OX14 4RS (e-mail: hr@immunocore.com).

We will be holding first interviews in April.

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Closing date: 31 May 2015

The University actively fosters a culture of inclusion and diversity and seeks to achieve true equality of opportunity for all members of its community. In addition, the School's Athena SWAN Silver Award recognises its commitment to promote women in science, engineering and technology.

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University of Glasgow

University of Glasgow
College of Medical, Veterinary and Life Sciences
Research Institute of Molecular Cell & Systems Biology

Bioinformatician

Ref: 010231
Salary: Grade 6 £27,057 - £30,434 per annum

The post-holder will contribute to a Biotechnology and Biological Sciences Research Council-funded project FlyAtlas2, working with the Principal Investigator, Professor Julian Dow.

Specifically, this post requires expert knowledge high-level bioinformatic, web authoring and programming skills for this project to generate tissue-specific RNA-seq data for the model organism Drosophila melanogaster. This will provide an update to the worldwide online expression resource, flyatlas.org (Nature Genetics 39: 715-720).

There is considerable opportunity to produce novel meta-analyses of the resulting data, and the successful candidate will be expected to drive research to provide high-profile publications from the work, in addition to providing data analysis, web authoring and semantic web underpinnings for the resource. Although the workplan is primarily informatic in nature, there is also scope for a suitable candidate to perform some wet work (for example transcript validation by PCR, and generation of transgenic Drosophila).

The post-holder will also be expected to contribute to the formulation and submission of research publications and research proposals as well as help manage and direct this complex and challenging project, as opportunities allow.

This post is full time and funded for 18 months in the first instance.

Apply online at www.glasgow.ac.uk/jobs

Closing date: 19 April 2015

The University has recently been awarded the Athena SWAN Institutional Bronze Award

The University is committed to equality of opportunity in employment.

The University of Glasgow, charity number SC004401.

Athena SWAN Bronze Award

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University of Glasgow

University of Glasgow
College of Medical, Veterinary and Life Sciences
Research Institute of Molecular Cell & Systems Biology

The following posts will contribute to a project by an EU-funded consortium nEUROSTRESSPEP, for development of new, neuropeptide-based insect control agents (http://neurostresspep.eu), coordinated by Professor Shireen Davies and supervised by the Principal Investigators Professor Julian Dow and Shireen Davies.

These posts will work as part of a highly skilled insect molecular research group, focussed on use of functional genomics, molecular techniques and understanding molecular mechanisms of stress tolerance in Drosophila and other insects, to develop novel neuropeptide-based insect pest control agents.

Post 1: Technician

Ref: 010226
Salary: Grade 5 £20,781 - £24,775

The successful candidate will be exoordinator/PI obligations on for the nEUROSTRESSPEP consortium to meet and exceed agreed milestones, and to maximise opected to carry out a defined experimental programme and to support the post-doctoral Research Assistants to fulfil University/Cutput on the grant above.

This post is full time and funded for 2 years in the first instance.

Post 2: Bioinformatician/Web Developer

Ref: 010232
Salary: Grade 6 £27,057 - £30,434 per annum

This post involves curation and deposition of research databases and large datasets including RNAseq and metabolomics data; and initiation, curation and maintenance of the nEUROSTRESSPEP.eu website; as well as social media - for internal (consortium-facing) and external communications to ensure effective reach into a range of stakeholder groups.

The post-holder will also be expected to contribute to the formulation and submission of research publications and research proposals as well as help manage and direct this complex and challenging project, as opportunities allow.

This post is full time and funded for 4 years in the first instance.

Post 3: Research Assistant

Ref: 010233
Salary: Grade 6 £27,057 - £30,434 per annum

This post requires expert knowledge and experience of insect molecular science, insect physiology, neuropeptides and in vivo insect techniques; and working knowledge of Drosophila genetics.

The post-holder will also be expected to contribute to the formulation and submission of research publications and research proposals as well as help manage and direct this complex and challenging project, as opportunities allow.

This post is full time and funded for 3 years in the first instance.

Post 4: Research Assistant

Ref: 010267
Salary: Grade 6 £27,057 - £30,434 per annum

This post requires expert knowledge and experience of insect molecular science, insect physiology, neuropeptides and in vivo insect techniques; and working knowledge of Drosophila genetics.

The post-holder will also be expected to contribute to the formulation and submission of research publications and research proposals as well as help manage and direct this complex and challenging project, as opportunities allow.

This post is full time and funded for 3 years in the first instance.

Apply online at www.glasgow.ac.uk/jobs
Closing date: 19 April 2015

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