



Making scientific strides

The Stokes Professorship and Lectureship Programme is luring top academics to Ireland to propel scientific research to the next level

THE Government's Strategy for Science, Technology and Innovation 2006-2013 has set challenging targets to enable Ireland's transition to a knowledge-based economy. One of the targets is to double the number of PhDs, as Ireland has approximately half the number of the leading high-tech economies.

To deliver on this target, the existing research base must be expanded. Figures from Science Foundation Ireland (SFI) have indicated that about 30 new research teams are required each year.

SFI has developed a number of programmes to attract world-class researchers to Ireland. These include the SFI Research Professor Award and the ETS Walton Visitor Award. Last year, SFI introduced a new programme called the Stokes Professorship and Lectureship Programme. The programme is named after Sir George Gabriel Stokes (1819-1903), the Irish mathematician and physicist who was born in Skreen, Co Sligo, and who made several important contributions to fluid dynamics, optics, maths and physics.

The programme is aimed at recruiting senior world-class research academics as well as entry-level academics and senior post-doctoral researchers to Ireland. Successful candidates are internationally competitive, research-active academics, performing at the highest level appropriate to their career point.

Glycoscience leadership

One such individual is Professor Lokesh Joshi, who recently took up his post as Stokes Professor of Glycosciences at the National Centre for Biomedical Engineering Science (NCBES) at National University of Ireland (NUI) Galway. He was one of eight NUI Galway awardees under the Stokes programme.

"As a visiting professor, I was amazed to see the enthusiasm in Ireland for innovative research, especially the way it is supported by Government and industry," he says. "It's a very high honour for any academic researcher moving to Ireland to receive this award. Stokes

was one of the most prominent researchers from Ireland, who made several significant contributions to science and held the same chair as Newton in Cambridge." Minister for Enterprise, Trade and Employment Micheál Martin TD has said the Stokes Programme is a key element in achieving the next phase of our national development ambitions.

"The central role of education and in particular higher education in Ireland's economic success is beyond debate. We require significant support for new posts at Higher Education Institutes. We also need to build on the growing international recognition that Ireland is an attractive location for research. Of the 32 Stokes professorships awarded, 30 are being allocated to scientists from outside Ireland. It is an extremely positive signal that such eminent researchers have chosen to further their scientific careers here."



Professor Lokesh Joshi of the National Centre for Biomedical Engineering Science

'It is my dream that Ireland should become the epicentre for the future of glycoscience globally'

Joshi grew up in India, in the State of Rajasthan, where he completed his BA in chemistry and biology and an MA in zoology. From an early age he wanted to understand the mechanisms controlling complex biological systems.

Awarded with a British High Commission Fellowship to study in the UK, Joshi received his PhD in biological sciences at Bath University, where he worked on the strategies adopted by pathogenic fungi to colonise their hosts. Following graduate work, he joined the Boyce Thompson Institute at Cornell University at Ithaca, New York, where he completed post-doctoral and research associate experience in molecular fungal pathology and glycobiology. From Cornell, Joshi moved to Arizona State University where, until recently, he was an associate professor in the Bioengineering Department and director of the Centre for Glycosciences and Technology.

Research focus

At NUI Galway, Joshi's team is currently made up of ten scientists, including four researchers from the US. Their research centres on complex sugars (glycans), which are present on every living cell and are key modulators of chemical communication between molecules and cells.

"People have heard about genomes (our genetic make-up) and protein molecules in living organisms. Glycans represent the third very important class of molecule in our body. Glycoscience is a relatively new and inter-disciplinary area and so far has not received the attention it deserves. There are many biological questions, but our technologies are still very limited. In Ireland, the aim is to establish next-generation technologies for glycoscience exploration for use by industries, clinicians and academics in the future," he says.

"It is my dream that Ireland should become the epicentre for the future of glycoscience globally and it excites me that it has most elements needed for a world-class team. Ireland is not entrenched in any one model yet — we have the opportunity to bring the best

of European and US models and scientists together and leap-frog in this area of research to remain internationally competitive."

Joshi's primary interest with his research is to explore biological questions, such as in relation to cancer, neuro-regeneration and cell differentiation/communication. "We realise the technology is not there to study these processes in a rapid manner. Part of my group is developing technologies that will enable this. We are also recently involved with the Martin Ryan Institute and the Marine Institute in Oranmore, Co Galway. The marine environment is Ireland's treasure and the least explored biosphere on the planet. We ought to look and learn from nature to discover novel biomaterials and biotherapeutics," he says.

In keeping with the maritime theme, Joshi likens Ireland to a "speedboat", whereas other countries are more like large vessels. "Stokes awards are created for targeted hires in strategic areas for universities as well as the economy. The professorship has helped me to establish good collaborations all across the country since I've been here. The size of Ireland is attractive, as it makes the country very agile."

NUI Galway appealed to Joshi as he was impressed with the way NCBES was structured when he visited.

"With the new NUI Galway president, Professor Jim Browne, there is tremendous enthusiasm here and it will continue to grow at a rapid pace," he says.

Joshi is also the associate director of the Centre for BioAnalytical Science (CBAS) funded by Bristol Myers-Squibb and IDA Ireland and being co-ordinated at both Dublin City University and NUI Galway. Joshi comments: "It was the foresight of Bristol Myers-Squibb and IDA Ireland to establish CBAS, which is a unique global model, where a biopharma leader, government agency and academic institutions, in collaboration with SFI, have come together to develop novel solutions to industrial needs."