

The Lisbon Instituto Gulbenkian de Ciência: a different approach to life-science research

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The Gulbenkian Institute is bringing new blood and setting new standards in Portuguese research.

It is lunchtime on a glorious spring day in Oeiras, a small seaside town about 20km outside Lisbon (Portugal). Sitting around a few tables outside the canteen of the Instituto Gulbenkian de Ciência (IGC), students, postdocs, technicians and group leaders are taking their lunch break and making the most of the sunshine. They may have just come from a midday seminar or a lab meeting, or they may be discussing the latest decisions regarding grants and fellowships...or they may be deciding what to get a colleague as a birthday present.

After lunch, and the essential espresso coffee, everyone gets back to work, because, as in most research institutes, the pressure to produce good science is unrelenting. There are fellowship deadlines, and the group leaders know that they are expected to make a name for themselves, and their team, within five years.

The IGC is a unique life-science research institute for Portugal that, since 1998, operates as a 'host institution' to new research teams. Here, foreign and Portuguese research scientists are given the opportunity either to start or to develop their scientific careers: once accepted by the Scientific Advisory Board, researchers (be they young postdocs or experienced scientists) have complete freedom to set up their own groups and pursue their own research projects, with no conceptual or thematic intrusion from the Institute. The only requirement is that the research be of top quality!

Taking a closer look at the lunchtime crowd, one is struck (and several visitors have expressed their surprise) by how *young* most researchers seem to be. Indeed, since its change of direction in 1998, the IGC has become the main port of entry into Portuguese life-science research.

After several years of postgraduate research abroad, the IGC is an attractive site for Portuguese (and foreign) scientists to carry on the



research begun in a previous laboratory...but now leading their own team. For graduate students and postdocs, the IGC provides a stimulating intellectual environment, and research covering many of the most exciting and fast-moving fields.

A host institution

Underlying the host institution model is the assumption that during an initial five-year period the research team will produce a good enough track record to be able to pursue their research in another institution, either in Portugal or abroad. Indeed, there are virtually no permanent positions at the IGC. The model is highly innovative in Portuguese science, where a tenure-track system with a permanent position at the end is the norm.

The first five-year review took place last year (2003) and, signalling the success of the model, all of the group leaders included in the review have already obtained positions within Portuguese academia. Many group leaders are very much aware of how much the environment and *modus operandi* of the institute have contributed to make their career moves possible.

Apparently, a good balance is being struck at the IGC between what is good for science and the research institution – productivity and new sources of creativity – and what's good for the scientist – job security.

Research interests and approaches

The Institute's "scientific interests are focused on the genetic basis of development and evolution of complex systems," says its web site – a statement that is corroborated by the variety of research listed on the same page: from theoretical epidemiology to neural crest development, from immunology to functional bioinformatics. For one thing, this range of research interests and



approaches is a sure sign that seminars are varied – there is no fear of listening to immunology talks every week!

But a greater benefit of this variety is that collaborations are set up between groups in different fields (or in *apparently* different fields). The interactive and promiscuous nature of scientific research is felt every day at the Institute. Recently, for example, two developmental biologists collaborated on the question of left–right asymmetry in the chick embryo. One works on chick, the other is a plant developmental biologist! The collaboration arose when the chick developmental biologist needed to use the calcium-imaging techniques that the plant developmental biologist uses regularly. Their work contributed a major part of a *Nature* article published earlier this year.

Disease biology makes up a significant part of the IGC's research effort, from the genetics of complex diseases to autoimmunity and infections. Several groups work on malaria, tackling this devastating disease from different angles: the genetics of resistance or susceptibility to malaria, host–parasite interactions, immune system responses and epidemiological studies.

Across from the main building and just above the library, in the Oeiras Advanced Studies Centre several theoretical biology and functional bioinformatics groups are at work, relying, to a large extent, on experimental data produced by the 'wet' labs across the way. The mathematical

sciences have been a major part of the IGC since it's inception in 1961, and even more so today when they are seen as essential to further scientists' understanding of complex biological processes and systems.

From then to now

The IGC was founded and is maintained by the Fundação Calouste Gulbenkian, a world-renowned Portuguese charity created in 1956 by the will of Calouste Sarkis Gulbenkian, an Armenian oilman who bequeathed the Foundation's initial capital. The Institute fulfills one of the Foundation's statutory goals – to promote 'science' (the others being charity, art and education).

Thanks largely to the support of the Foundation, researchers have at their disposal state-of-the-art technical equipment and excellent service facilities, including animal house facilities, library and biocomputing services, automated DNA sequencing and 'genotyping', GeneChip™ technology. The common equipment (such as multiphoton and electron microscopes and the high-speed cell sorter) are freely accessible, on a booking system, to *all* researchers, in what constitutes another break with tradition in Portuguese research.

With the concerns of how to acquire major (and expensive!) equipment out of their minds, group leaders can dedicate more time to their team and to obtaining the funding for each project. Apart from funding by the Portuguese national funding agency, IGC scientists receive backing from the European Union, the USA's National Institutes of



Health as well as Portuguese and international charities.

Further underscoring the success of the IGC is the institute's striking contribution to the scientific

publications of Portuguese research centres. In the past three years, the IGC's 200 or so researchers published a total of 184 publications, 18 of which were in journals with an impact factor above 15, representing a significant fraction of all the highly competitive science produced in this country. This underscores the trend of the last decade or so: that excellent science is being produced in Portugal, encouraging many to join the effort.

Teaching and entrepreneurship

Many young faces at the IGC are apprentice scientists – graduate students of either the Gulbenkian PhD Programme in Biomedicine or its sister programme, the IGC PhD Programme. Graduates of these programmes are pioneering research fields in Portugal (in developmental biology, for example).

IGC researchers are encouraged to be enterprising, not only in their own research, but also in identifying possible technological applications. Biotechnology start-ups leading on from research done at the Institute, are strongly supported. The most recent IGC start-up is based on the GeneChip technology available at the IGC (and nowhere else in Portugal): services are provided free of charge to academia, but industry is a paying customer.

On the third Friday of every other month, the main lecture hall of the IGC fills up with a different kind of crowd. Biology teachers from schools in and around the Lisbon area come to listen to scientists talking about their field of research: the latest developments and how they go about answering the big questions. There are questions asked from both sides and friendly discussions as to how best to take the experience of real-life scientific research to schools.

Every other week, the foyer fills up with the voices of excited teenagers who have come on a school visit to some of the IGC labs. The electron microscope is a big hit, as are the chick embryos. The teachers that bring them – not all of them biology teachers – are as excited and fascinated as their students.

Such two-way, direct communication forms the basis of the Public Engagement in Science programme at the IGC. The audiences vary, but all events and activities are designed keeping in mind the need to allow feedback between scientists and their audience.

As for any research institute, journalists are a key target audience. Apart from the traditional press-office activities that inform the media of IGC achievements, the Institute regularly invites the small community of Portuguese science journalists to meet informally with the scientists and learn more about a specific field.

The aim of these meetings is not to provide information for a story – no recorders or cameras are allowed. Rather, the journalists take from these meetings a feel for what research is about. The scientists, on the other hand, learn more about the workings of the media and are able to talk about their work in a relaxed, off-the-record, environment. After almost two years of such meetings, the ice between the journalists and scientists is cracking a little.

Before September 2003, if you asked an Oeiras resident what kind of research is done at the IGC, the most likely answer would have been, "I have no idea." Or worse – many would not even be aware that a scientific research institute exists in their little town. But last September, a group of local people spent a weekend debating with IGC scientists. The agenda was set by the so-called 'lay-panel'; the topics ranging from cancer and genetics, to science in Portugal and how to attract young people into scientific research.

This weekend has had important repercussions within Oeiras: IGC scientists have been invited to schools, to small round-tables and to borough-wide debates organized by the local council.

But science is not the only form of knowledge in modern societies, and scientists long ago left the ivory tower to become active players in society. So the IGC researchers are invited to mingle with the at times seemingly foreign worlds of art, literature, history, money and media in the series of conferences 'This world and the other', a follow-up to last year's conferences, 'The Thinking of Art'.

School pupils, their teachers, journalists, the general public, decision makers, even scientists – for each audience, specific events, but with one prevailing aim: to engage all citizens in scientific research, the driving force of modern societies.

Link

Instituto Gulbenkian de Ciência (see also for PhD programmes) <http://www.igc.gulbenkian.pt/>

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