

# THE FUTURE OF THE PH.D. IN IRELAND:

## EXCELLENCE IN RESEARCH - QUALITY IN TRAINING: ATTRACTING & RETAINING POSTGRADUATE RESEARCHERS IN IRISH UNIVERSITIES

### PROCEEDINGS OF A SYMPOSIUM HELD BY THE CONFERENCE OF HEADS OF IRISH UNIVERSITIES.

9<sup>TH</sup> /10<sup>TH</sup> NOVEMBER 2004, DUBLIN.

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Our society, our economy, our universities are changing and with them the nature and the role of doctoral research – the PhD. The last decade has seen major changes in terms of how we educate ourselves – half of us now go on to higher education<sup>1</sup> – how we work - unskilled manual work has halved and halved again - the majority of expanding occupations seek “brain workers”. We now consider our economy to be a “knowledge based economy”. Government Ministers are suddenly of one accord in the importance of “research” to our future economic well-being.

Funding has revolutionised the physical and human face of Irish universities and many Institutes of Technology. Researchers from across the World are now in our laboratories – both in the universities and in the recently established industrial research laboratories of multinational corporations. The rapidity and the profundity of these changes have challenged many traditional university assumptions. Suddenly, supervisors and Departments, who were used to dealing with one or two PhD candidates, deal with twenty or thirty doctoral students, or more, often through new interdisciplinary institutes or inter-university cooperative structures. Similarly, students increasingly find themselves working in large teams and faced, on completion of training, with a much greater diversity of available careers in research and in the wider labour market.

To address these issues, the Conference of Heads of Irish Universities brought together senior researchers, policy makers, university and business representatives from Ireland, Europe and the United States along with doctoral researchers to debate the future requirements and reforms in Irish research training at the doctoral level.

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<sup>1</sup> Transfer rates to third level education have increased from 35% in 1990 to 60% in 2001. DES 2001 Statistics.

This conference was in direct response to some of the recommendations made in a number of recent reports. These include, the *OECD Review of Higher Education in Ireland*<sup>2</sup> and *Building Ireland's Knowledge Economy - Ireland's National Plan for Promoting Investment in R&D to 2010*<sup>3</sup>. Many of the recommendations in these reports require direct action on the part of the government. However, there are areas where the universities exercise a large degree of control. Both of these reports clearly state that there must be a significant increase in the number of researchers at postgraduate and postdoctoral level. In this conference the focus was on the former, the PhD student. The universities are directly responsible for the quality and quantity of PhD training in Ireland. The debate however must focus on the sustainability of research at the doctoral level, if the national target of doubling the numbers is not to adversely affect the quality of PhD training or in any way undermine the key factor behind a PhD – the development of an independent thinker. This document is a contextualisation and summary of that debate.

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<sup>2</sup> OECD Review of Higher Education ([http://www.education.ie/servlet/blobServlet/oeed\\_review\\_national\\_policies\\_education.doc](http://www.education.ie/servlet/blobServlet/oeed_review_national_policies_education.doc))

<sup>3</sup> Building Ireland's Knowledge Economy- the Irish investment plan for promoting investment in R&D to 2010 (<http://www.entemp.ie/press/2004/20040809.htm>)

## The PhD – “Career Context”

In Western economies, over the last decade, and more,

- Researchers, on completion of their PhD, continue their careers in a large variety of employment sectors and occupations. Of the respondents covered in the HEA’s First Destinations Report, 2002, over 50% of doctorates were employed in Higher Education, with the remainder being employed in a variety of sectors<sup>4</sup>. These figures are comparable to those of the UK<sup>5</sup>. Thus; the location of high-level knowledge creation is diversifying.
- While it could be argued that the traditional 3 to 4 year PhD training period is and will remain dominant, a much greater variety of doctoral training paths have developed in other countries, particularly in locations where strong research and knowledge-based economies flourish and university-industry cooperation is well established. The influence of the Bologna process will also have to be taken into consideration in the future.
- Particularly in the physical sciences, there are concerns at both a national<sup>6</sup> and European level<sup>7</sup> about the decreasing proportions of school leavers taking science at university and the low transfer rate from undergraduate studies to postgraduate research in these disciplines.

Traditionally, research manpower was analysed using the “leaky pipeline” model. Students were “lost” from the research pipeline at school, undergraduate, post-graduate, doctoral and post-doctoral levels: they, in that pejorative term, “leaked out”. Only the chosen few survived to become internationally renowned research professors – the rest, somehow, failed. This, of course, is another rather unattractive version of the academic ivory tower model and the presumption being that either feeding or plugging the pipeline solves difficulties. Given the current research patterns – diversity of research careers, multiple training paths, links to school and undergraduate studies - a more conceptually useful model may be that of “The Tree”

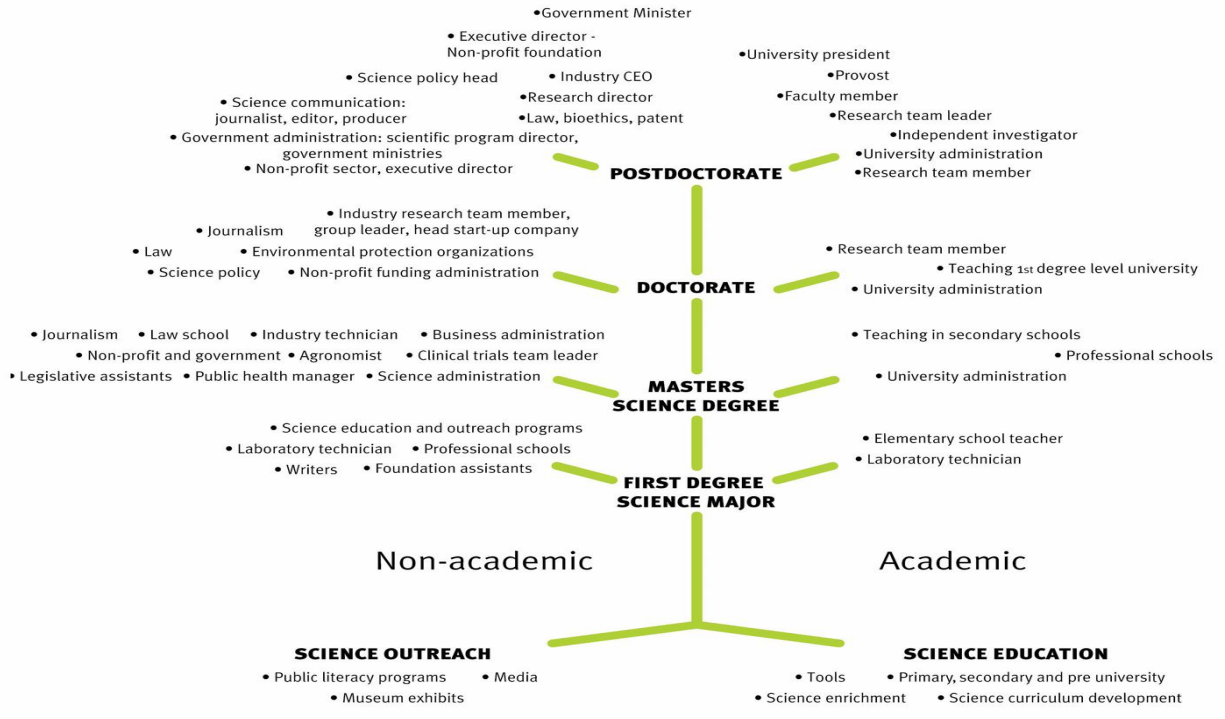
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<sup>4</sup> 2002 First Destinations Report, HEA <http://www.hea.ie/index.cfm/page/sub/id/771>

<sup>5</sup> What do PhDs do? 2004 Analysis of first destinations for PhD graduates. UK Grad Programme, ISBN 1 84016 113 2

<sup>6</sup> Report of the Taskforce on the Physical Sciences, [http://www.skillsireland.ie/press/relatedreports/pdf/taskforce\\_on\\_physicalsciences\\_report\\_2002.pdf](http://www.skillsireland.ie/press/relatedreports/pdf/taskforce_on_physicalsciences_report_2002.pdf)

<sup>7</sup> Increasing Human Resources for Science and Technology in Europe, EC 2003, [http://europa.eu.int/comm/research/conferences/2004/sciprof/pdf/final\\_en.pdf](http://europa.eu.int/comm/research/conferences/2004/sciprof/pdf/final_en.pdf)



This model emphasises the roots of research in our society and economy, the need for strong research training in the trunk and the branching out into many research-based and research-associated careers. It is a far more suggestive of the future needs in Irish doctoral training. For example, it suggests:

- Stronger links between doctoral research training and undergraduate - and even school studies - to increase the quality and numbers transferring into doctoral research areas.
- Better-planned access from doctoral training to the diversity of non-academic careers. Some 50% of Irish students move directly out of academia on completion of their PhD. Formal recognition, early planning of transfer and stepping-stones to these careers will make the doctoral experience more attractive.
- Support for a diversity of research training locations and training approaches. Unlike most large Western countries, industrial-based S&T doctoral studies have not developed in Ireland: the sophisticated base simply wasn't there. But things are changing with research-based companies now increasingly commonly locating here. Doctoral studies in the social sciences already have a strong base of information/analysis-intensive public and private service institutions.

Recognition and formal support to such developing trends in certain settings could render Irish doctoral training more effective. However, disciplines and universities are very different in their needs.

## Differences in Research Needs

In considering any changes, there is a need to recognise the heterogeneous nature of research disciplines and their implications for PhD programmes. Not only are there major differences between humanities, social sciences, engineering and the natural sciences, but within the natural sciences, for example, there are strong differences in the structures and supports needed in research and doctoral studies. And neither the nature of the research nor the form of the doctoral studies will remain constant. Disciplinary boundaries merge and re-divide over time: hence the constant emphasis on interdisciplinarity. It is essential that any proposals for the reform and development of Irish doctoral studies:

- Acknowledge the differences between disciplinary needs: no one shape or size can fit all. Similarly, different universities, different departments focus on different parts of the basic-applied research spectrum and hence have different needs in the way doctoral studies are operated. This becomes even more important in interfacing with doctoral research within the Institutes of Technology and developing a fully integrated national research strategy.
- Recognise that research structures are constantly changing and do not inhibit such change. Heavy-handed reforms in one area can slow the adaptation of the overall system.
- Ensure that reforms do not unreasonably increase the administrative burden – and that resources are forthcoming to deal with any such additional burden. Reform without the requisite resources can be worse than no reform at all.
- Recognise the differences in the ability of doctoral students. With the growing proportion of students transferring to doctoral studies across all disciplines and all types of higher education institution, there is a growing spread of abilities and expectations: systems need to be supportive of all students and diversity needs to be accommodated.

### **The NSF IGERT Programme**

Integrative Graduate Education and Research Traineeship Programme, the [IGERT Programme](http://www.nsf.gov/home/crssprgm/igert).

<http://www.nsf.gov/home/crssprgm/igert>, focuses on the support of multidisciplinary Ph.D. programmes and aims to be a new model of “education and training that is innovative, flexible, and responsive to emerging research opportunities that cross disciplinary boundaries”. Each IGERT project is an interdisciplinary grouping of PhD training awards and possibly associated new equipment. It is based at a U.S. university, though some are partnerships among several universities and international collaboration is encouraged. The Programme particular advantages of 1) funding different Departments to come together without having to use own-resources for non-Departmental work, and 2) providing long-term support to train high quality PhDs in a new area, 3) providing sufficient resources to develop critical, self-sustaining mass in a

However, recognition of diversity does not mean that a common, concerted and coherent approach across Irish universities is not an issue. The need for professionalisation of doctoral studies in Ireland, the rights of doctoral students and career paths for students all need to be examined within the context of Irish economic and social development, and its associated requirements.

## The Irish Domestic & International Environment

In relative terms, the overall Irish university system is small, and the university units themselves are small<sup>8</sup>. Until the last five or so years, investment in research was cripplingly low, with universities being dominated by the teaching load – and many departments still are. The advent of the Programme for Research in Third Level Institutions, Science Foundation Ireland and the Research Councils has started to transform this situation. However, in terms of the proportion of GDP invested in university R&D, we still lag well behind most EU-15 countries<sup>9</sup>. Industrial R&D investment is similarly lagging. But the Government is committed to continued investment.

This environment - small overall size, small unit size at the same time as new investment into previously teaching orientated colleges – has implications as to how we develop our doctoral training structures:

- The need for new interdisciplinary/inter-departmental approaches within universities. Internationally, the increasingly interdisciplinary nature of research has forced universities to break down traditional disciplinary divisions. This is most often seen in the development of doctoral graduate schools, where the critical mass and variety of changing disciplines needed to pursue leading research and associated training can be more easily assembled, developed and then accessed by students.
- The need for cooperation between universities and with Institutes of Technology. Irish universities are small. Gaining critical mass and developing world-class graduate schools need our small-scale resources to be pulled together and cooperate across institutional boundaries.

In international terms, all forms of labour are becoming increasingly mobile and competitive – including researchers and trainee researchers. Within the EU, the commitment to open borders and integrated labour markets for researchers is seen in the development of the European Research Area and is backed by many mobility measures including the Marie Curie research training programme. In addition, doctoral studies are now coming under the “Bologna Process”- an attempt to develop a level of commonality and mutual recognition for different national doctoral systems across the EU.

The issues of mobility and human resources in research have been to the forefront on the European field for some time. The European Commission set up a Steering Group on Human Resources and Mobility (HRM) in the European Research Area (ERA) in 2003, replacing and building on the work carried out by its forerunner - the Steering Group on the Implementation of the Mobility Strategy. In response, CHIU initiated the establishment of a National Steering Group on Human Resources and Mobility – the Research Careers Ireland Group

### Networking of Resources

The National Institute of Regional & Spatial Analysis (NIRSA) <http://www.nuim.ie/nirsa/> was established in 2000 with NUI acting as a hub for five higher education institutions across Ireland (NUI Maynooth, Waterford, Sligo and Galway-Mayo Institutes of Technology and Mary Immaculate, Limerick) to undertake interdisciplinary and comparative analysis of global process as they impact on regional and spatial development in Ireland.

<sup>8</sup> In 2002/3 there were 77,000 full time students (41% Male, 59% Female). This about the size of Leeds/Leeds Metropolitan University in the UK (62,000) or Manchester/Manchester Metropolitan (68,000). Similarly, the actual university unit size in Ireland is small 10 to 15,000 compared to 20 to 25,000 in the UK.

The scope of these Steering Groups - both EU-wide and nationally - include the development of perspectives on Human Resources and Mobility in research and encompass the Commission policy initiatives and the respective Council Resolutions including the Mobility Strategy for the European Research Area<sup>10</sup>, the Researchers' Careers Communication<sup>11</sup> and the relevant actions contained in the 3% Investment Action Plan<sup>12</sup>

The Irish Researcher's Mobility Hub has been established (with co-funding by the EU Commission and the Department of Enterprise, Trade and Employment) in order to strengthen the assistance structures in Ireland for researchers undertaking mobility, and create a dynamic and proactive national support network covering all sectors. A mobility support portal has been set up at [www.researchcareersireland.com](http://www.researchcareersireland.com) covering all aspects of relocation to or from Ireland as a researcher.

Internationalisation presents Ireland with two challenges:

- Ensuring that our own research training integrates doctoral students into the international networks.
- Globally, drawing the best doctoral students to Ireland and retaining a proportion of them after graduation.

Many Member States have developed complementary programmes to cope with and exploit such international mobility:

- Most countries, and Scandinavian countries in particular, have put in place supports to encourage experience abroad for their own doctoral students, while at the same time often opening their offer of doctoral studentships to all nationalities. Some permit the full doctoral support to be taken abroad; others press students to take at least six months abroad during their studies. Some countries, especially the larger ones, have long-standing dedicated programmes to attract the best foreign doctoral students to their universities. For example, in Germany, the Alexander von Humboldt Foundation manages grant programmes with the objectives to enable highly qualified researchers of all nationalities to undertake a research stay in Germany. The German Academic Exchange Service (DAAD) grants support for a research stay of foreign doctoral candidates or post-docs. In Denmark - positions financed by the Research Councils are open to foreign applicants. There are various support measures to attract researchers from abroad, like post-doc fellowships reserved for foreigners and international announcement of professorships
- However, for those doctoral students who have studies abroad, relatively few countries have specific programmes, which support their return.

In Ireland, Science Foundation Ireland (SFI) has specifically targeted high-level researchers in a number of its funding programmes. Approximately 50% of the funding allocated by SFI goes to non-Irish researchers or returning Irish researchers. Specific programmes exist also for new researchers (recent PhD) and returning researchers. As a general principle, jobs are advertised internationally and senior academic and industry appointments routinely involve international experts in recruitment panels.

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<sup>10</sup> COM(2001)331 final, 20.6.2001 and Council Resolution of 10 December 2001, OJ C367, 21.12.2001

<sup>11</sup> COM(2003)436 final, 18.7.2003 "Researchers in the European Research Area: one profession, multiple careers" and Council Resolution of 10 November 2003, 14636/03 RECH 194, 12.12.2003

<sup>12</sup> COM(2003)226 final, 30.4.2003 and Council Resolution of 22 September 2003, OJ C250, 15.10.2003

Universities need to press for finance and develop such international and international dimension to all training – the more so since the small size of our research system and its constituent institutions imply that the main intellectual community – the peer group - of most researchers necessarily lies outside Ireland. Supporting doctoral students in integrating into this global community is essential.

Finally, there is no doubt but that there is an international market for the best doctoral researchers -a market in which the attractiveness of the system (quality of research, research facilities, training and financial supports, future career prospects, etc.) is central. As part of any move to a knowledge based economy, Irish universities must be a participant in this competition through the development of a world class research, research facilities and research training. This we now consider from the four viewpoints represented at the conference: the doctoral researcher, the supervisor and the university, industry and the research funding agencies. There are, of course, many tensions and differences of opinion across and even within these groupings. An overall tension summed up in the rhetorical question “*Whose PhD is it anyway?*”: the student as part of a career, the supervisor as part of developing world class research, industry as training for work, or the funding agency / government as investment for economic and social development.

## A Research Student Perspective

There are about 5500 full-time university-based research students (3200 at PhD and 1300 at MSc<sup>13</sup>) in Ireland, currently with a slight predominance of males to females (54% to 46%). There are also about 900 part-time research students. There is a common commitment by universities and government to substantially increase these numbers over the coming years in line with the Lisbon Declaration, and more importantly, in line with Irish industrial policy and moving to higher value added activities within the economy.

The vast majority of full-time doctoral students are relatively young, in their early to mid 20s, and have transferred straight from being undergraduates – and, sometimes, to continuing to be seen as, and always *formally and administratively treated as*, “students”. This has major implications for their lives. At a time when their age-cohort is earning well, possibly investing in mortgages, having children and developing a solid career base, the doctoral student is:

- Usually receiving a studentship of up to €12,700 (typical range of €5,000 - €12,700) per annum from most funding agencies<sup>14</sup>. Variations in this figure cause tensions. Lower payments, sometimes much lower, cause genuine hardship. Two students in the same lab, doing essentially the same work, can see a multiple of two to three in the funding which they receive. It is essential that all studentships are brought up to what has been established by the main funding agencies as the national standard – and that this sum is regularly reviewed to account for inflation and cost of living. As for the admittedly less frequent high studentships, while there are some free-market arguments for differences between disciplines, these are less strong within disciplines. Overall, some (upward) smoothing of studentship funding across funding agencies should be undertaken.
- Treated as a “student” by legal, tax and social welfare systems. While the doctoral studies period of 3 or 4 years must retain some particular features of “studentship”, most obviously the fixed and limited period of any contract, a move towards “employee” status for doctoral students has become a feature of many research systems.

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<sup>13</sup> HEA 2002/3

<sup>14</sup> SFI and the marie Curie Schemes pay fellowships of up to €22,500

However in the UK and US, the opposite is true. Here in Ireland, as research systems develop, the previously loose somewhat feudal master-apprentice arrangement moves towards a system under which the doctoral student obtains a recognised status, with the normal payments made towards the national health, social welfare and pension systems and the associated benefits in terms of unemployment insurance, sickness, pregnancy, longer term pension rights, etc. whilst not affecting the student status. Such a move would strengthen the general professionalisation and recognition of doctoral studies, which is such a feature of the recent decade and more.

- Unsure of his/her rights as a doctoral student. The doctoral student – or the funding agency on the student’s behalf - pays the university fees for undertaking doctoral studies: a prima facie contract between the student and university for the provision of services to the student. However, the obligations and nature of the services sometimes remain largely tacit. Rather than have them clarified in the courts – as is starting to happen at undergraduate level, a clear contract of responsibilities on both parties would substantially aid the continued development of doctoral studies. The Irish Universities Quality Board’s recent code-of-conduct *Good Practice in the Organisation of PhD Programmes in Irish Universities* is a major step forwards towards setting down the rights and duties of doctoral students, supervisors and the universities.
- Facing an uncertain career path. Save for the very best, career paths are not clearly evident for most doctoral students. There is much to be done in providing such clear, transparent and openly competitive academic research career paths through post-doctoral studies and on to associate, assistant and full professorships. There is also much more to be done, in providing and supporting career development for the majority of doctoral students who move on to non-academic posts on finishing their PhD.

## A Supervisor & University Perspective

Improving the quality and quantity of research is essential to national and institutional strategies, and one foundation stone is the doctorate. Supervisors want world-class teams and universities want world-class rankings. However, for the individual supervisor this is a clearer imperative than for the typical Irish university.

For the supervisor, creating success in doctoral studies is clear:

- A core of scholarly acumen, critical and original thought and possibly novelty. In the social sciences utility to a wider non-academic community may have importance. But immediate relevance and utility is most often not an issue, nor is a strongly vocational dimension of doctoral studies.
- Publication of a number of papers in the best scholarly journals. Some universities now emphasise publications

### The UK GRAD Programme

The Programme (<http://www.grad.ac.uk>) is funded by the Research Councils. It supports universities, supervisors and doctoral students in developing skills related to undertaking and managing research, encourages good practice in doctoral programmes and supports the development of interfaces to industrial research employment. It takes an approach, which emphasises that:

- The most important output is the researcher, rather than the research.
- The PhD is a training programme as well as a research study.
- The future employment and career needs of students are of major importance.
- However, the PhD is not a vocational qualification and work is necessary in ensuring that potential employers understand the potential value of the PhD.

Following the Roberts Report on the supply of science and engineering skills in the UK, funding was made available for two weeks worth of generic skills training for doctoral students. An effort to develop a system of “personal development projections (research progress, competences acquired, future direction, etc.)” for students’ own guidance has also been undertaken.

during the PhD with the final thesis becoming an analytic summary of the publications with the papers annexed.

- Completion within the given time of 3 to 4 years depending on the discipline.
- Access to good research facilities to undertake the research training and to a group of researchers to stimulate and cross-fertilise the students' ideas. Here, particularly in areas of the life sciences, doctoral studies within a research team have become a necessity and the PhD becomes very much part of a team effort. In other areas the development of graduate schools is decreasing the once common pattern of a doctoral student working alone with only a supervisor for advice. However, in some parts of the system, there is still some work to be done in creating the shared intellectual environment for doctoral studies. But certainly the days of the individual supervisor with his/her individual student(s) are over.
- Clarity in terms of the responsibilities of the supervisor and the student. There will no doubt be some discussions about any future Code of Practice – voluntary or not - for doctoral studies, but there is a common wish for clarity and openness.

However, while there is general agreement on the above points, there are strong differences among supervisors in the introduction of “generic skills” and broader discipline based courses as a part of the modernisation / professionalisation of the PhD. Here, there are three main issues:

- The formal time and resources, if any, to be provided for such skill provision or courses. The two arguments run thus:
  - Such formal, generic skill acquisition deflects the student from his/her work and eats into the very short time they have to complete their studies. The PhD is about research skills not IPR or management or enterprise: that comes later. And anyway, the student is bright enough to pick up such things along the way, if interested.
  - Formal courses are essential. The narrow 3 to 4 year exploration of a specific problem is inadequate nowadays. 1) Good research training is focused on the research methods of the discipline. Narrow topic focused research leaves the student out of date, intellectually isolated and inflexible by the time the thesis is finished. 2) Skills such as IPR, research project management, entrepreneurship are important to all – both the majority transferring out of academia, and those continuing to a post-doc level.
- The nature of any such courses. Again there is a division
  - Yes, there may be good arguments for a broader discipline based approach to early research training: it equips the student with additional tools useful in the real research training. It also helps them better choose and develop their research topic. And our large grouping of research teams and our Graduate Schools permit us to do this. But IPR and management are still distractions from the real business of training world-class researchers.
  - And those who maintain the need for both the discipline and generic based skills are still vocal.
- The structure of such courses. Here there are divisions too:
  - At one level, the Masters in Research (M.Res.) is promoted. This provides a formal sound basis in research techniques and research management associated with a short preliminary research thesis. It permits those who want to move out of academic research to exit with a good skill base and recognised qualification. Those who remain have a sound research techniques foundation and an ability to more quickly define their PhD topic.

- No. This is not true. It would shorten the already short PhD period. Complicate funding support. Make recognition of the Irish PhD by industry and internationally more difficult. And, worst, it would lower the quality of the final research and research training. Any such skills should be acquired within the formal period of doctoral studies, as an integral part of the studies.
- Whether the additional skills training is to be provided at the beginning of the PhD or “when needed” over the full period of the PhD, then becomes an additional but potentially divisive issue.

A final point of some concern to supervisors is the support model for the PhD. While there may be issues as to how funding is applied across say inter-university institutions or new research centres set up outside or paralleling the Departmental structure, there is general agreement that:

- There should be a better recognition for staff undertaking supervision, particularly in terms of rebalancing teaching and administrative work-loads with those who are not research-active.
- The provision of proper levels of associated support staff, possibly developing a formally recognised function of research manager/assistant supervisor. The current role of the supervisor as combined supervisor, lecturer, researcher, writer and publisher, administrator and fund-raiser is seen as untenable given the need to professionalise research and research training and,
- Some recognition of or linkage to the parent Department, particularly if funding it to a new semi-autonomous research unit. Here the concern is that the links between research and teaching may fall away, and the interface for undergraduates to transfer into research weakens.

For Irish universities, the rhetoric of world-class doctoral studies can present dichotomies too:

- World-class, particularly in a small scale system, can mean specialisation with the attendant difficulties in choice of area. Such specialisation can take place in new semi-independent units, leaving the traditional departmental research and teaching structure weaker in terms of offering PhDs. It can also lead to greater inter-university cooperation, again changing the role of the traditionally autarkic university. Universities are currently grappling with such issues.
- World-class research training can also entail the concentration of investment in the universities likely to succeed and a greater concentration on teaching for the remainder: a trend very evident in the UK and US. Choosing those likely to succeed implies an open and transparent method of evaluation. While some are quite enthusiastic about such a measure – mostly those who believe they will be the successful, the implications for weaker disciplines / departments / universities could be problematic.
- More generally, the expansion of doctoral studies, and particularly part-time and non-traditional approaches has become a two-edge sword. While the expansion of such studies energises and reflects well on the university, the financial support, especially for the associated administrative staff is often not there. Increasing research funding and doctoral students requires a parallel increase in the *whole* infrastructure which supports these activities – not just the laboratory and equipment, but tasks from additional security for more late-night and weekend working to another desk and administrative assistant to register students, check qualifications and visas, process and pay stipends, etc.
- Finally, moving away from traditional grant systems towards more competitive ones which reward research excellence and the attraction of doctoral students will cause

adjustment difficulties, even within a single university, even a single department. Parts of the Irish university system, because of a historical lack of funding, have not been research active nor familiar with running larger-scale, doctoral research programmes. Depending on the approach taken to necessary changes, these not-insignificant groupings represent either a major factor in re-energising the universities or an overhang and weight on the development of research training.

## An Industrial Perspective

Industry, including the public and service industries, is a growing employer of new Irish PhD graduates. However, 90% of R&D carried out in Irish industry is by non-PhD grades. It is important to recognise however that the destination for approximately 50% of PhDs is in academia. Thus it is essential to balance national targets of doubling PhDs with the current reality of industrial demands. Yet the traditional European PhD is still often seen as tailored to the research needs of academia, but hardly ever to a prospective industrial employer. In Ireland, this has not mattered given the lack of demand from nearly all sectors; fine chemicals and pharmaceuticals being the exception. But in the last decade, particularly the last two or three years, this has changed. Wythe, IBM, Bell Labs and others are developing research facilities. The IDA has targeted such facilities as the vanguard of future industrial development. And the opportunities are there for major new developments by universities to complement and support their core basic, academic research effort. The degree of industrial involvement in collaborative PhD training is through a number of mechanisms:

- Joint funding of industry relevant research studentships which are growing rapidly (e.g. The Irish Research Council's Embark Cooperative Awards [http://www.ircset.ie/grant\\_schemes/postgrad.html](http://www.ircset.ie/grant_schemes/postgrad.html) ) and are likely to continue to increase in number and popularity.
- SFI's Centres for Science Engineering and Technology
- Industry relevant doctoral training based on research funded by or for industry, which has a much longer tradition in Ireland.

Other mechanisms might be explored to the mutual benefit of universities and industry including:

- As research based industry develops, in-company based doctoral studies – an approach already common in the pharmaceutical industry abroad.
- Doctoral studies as an element in life-long learning / continuing education – an area in which the sciences and social sciences might learn from the humanities in developing such an approach.
- Doctoral studies as a mechanism towards the accreditation of prior learning.

Elements within more traditional doctoral studies, which would support the transition from university-based research to industrial research. For example, use of or work in industrial laboratories during the doctoral studies and placement in industry for part of the research

If we, as we are committed to, are serious about our intention to double PhD numbers over the coming years, then some of these non-traditional routes to developing research skills must be put in place. This is not devaluing the PhD; rather recognising that such skills are now more widely spread and employed both in our economy and our society. Is a PhD in journalism likely to be of higher quality from a middle aged Irish Times journalist, or a never-employed early 20s postgraduate? The answer is not obvious. Is a PhD with IBM or Bell Labs name attached likely to be of inferior intellectual quality – possibly not?

However, some industry, particularly cutting-edge research companies are much less interested in the specifically vocational element to doctoral studies, and more in the quality and speciality of the research undertaken and the access which such research can give the company in newly developing research areas. A balance has to be developed across the research system, possibly with some more oriented to direct industrial research interfacing, others to academic research; but both recognising the worth of the other.

## **A Funding Agency & Government Perspective**

Perhaps more than any other actor, the funding agencies and their Boards are sensitive to the tensions across the doctoral research system: seeking, justifying and accounting for financial investment from government on the one hand and distributing it either as research projects or individual studentships on the other. The recent creation of an informal funding agency coordination structure<sup>15</sup> has seen solid recent developments most notably consistency in funding individual doctoral studentships. However, over and above simply increased funding, there are still a number of major opportunities for funding agencies to directly contribute to the development of Irish doctoral studies.

- The conditions attached to scholarships and research grants have a major impact on the doctoral procedures and structures developed in universities from the length of studies and rewards for high completion rates to the content and the enforcement or simply recommendation of any doctoral programme Quality Guidelines.
- At a national and institutional level, the development of specialist training sites or even full-scale graduate schools can be instigated and directed through the supply of funding.

While supporting university PhD development can be challenging, the interface with government can be equally testing for the funding agencies:

- Securing stable finance is essential in establishing high-level, high-quality, professional doctoral programmes in universities. Building up a stable world-class research team with the capability to deliver excellence in training is usually a decade-long activity. Fluctuations in funding and the flow of doctoral researchers are most destructive. This, of course, does not imply any lessening in competition – some teams will fail, but there needs to be a stream of consistent, competitive funding.
- While funding agencies coordinate informally, developing a strong common research policy, coordination across the different parent Government Departments can be more difficult. Issues ranging from final decisions on the status of PhDs to a truly coherent policy on strong Graduate Schools may need cross Departmental agreement and support.
- Finally, doctoral studies have to be recognised as only one part, albeit an important part, of a much wider system. Strategic system planning, as the OECD termed it, along with longer term capacity building in personnel, buildings and projects are recognised as essential by all: funding agencies, Government Departments and universities. The strength and long term attractiveness of doctoral studies to potential students in Ireland and Globally, is part of a much broader set of university reforms which the Irish Universities Association will tackle in future symposia.

Government, represented at the symposium by Ministers of Education and Science and Industry and Employment, in turn, very much represent the needs and wishes of the Irish public. Government does not see, nor wish to see, the details of the reform of doctoral studies; these are the domain of the universities. It does, however, wish to see and have report of:

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<sup>15</sup> Standing Committee of Research Funders – Merrion Group

- Openness, transparency and accountability for the major investments being made,
- Proper treatment – both in an ethical and legal sense – of doctoral students whether they be formally “students” or “employees”.
- An explicit return from their investment not only in the attraction of inward investment, but also in health, environmental improvement and areas such as improved quality of life and social inclusion.

If the government is to invest in the doubling of PhD numbers over the coming five to six years in line with the Lisbon Declaration and retain its commitment to building the knowledge economy through university-based research, then the pace of university and doctoral studies reform cannot slacken. Moves to new professionalised PhD structures, training within strong research teams, Graduate Schools, appropriate interfaces with industry, full internationalisation of the system, etc. must take place – as well as the mechanisms to be able to report clearly, understandably, to Government, the benefits accruing from its investments.

Finally, and most controversially, notions of inclusiveness in developing advisory structures and research directions are starting to develop. Generally, particularly in the applied research and social science areas, there is an understanding of how industry, health boards, local councils might, and indeed should, interface with the university research agenda. But there are now calls for broader public advisory structures for research – and hence research training. Such calls tend to stress the need for public support for science, their democratic rights to involvement in science and avoidance of debacles such as seen in GM foods, nuclear power and stem cell research in some countries. And while some countries are developing approaches to these issues and the path ahead is not at all clear, Irish universities might start to prepare a response.

## **Future Directions: Conclusions and Recommendations**

While there is a recognition of the absolute necessity for diversity in doctoral studies to permit different disciplines and different university orientations to develop, and a recognition of a natural diversity of opinions on the shape of the future, some conclusions and recommendations came through the symposium as near unanimous:

### **Conclusions:**

- The Irish economy is transforming into a knowledge-based economy. Research and research training are becoming a more necessary and more ubiquitous in the associated economic and social development.
- Irish universities and research are going through a period of unparalleled expansion, concomitant with the current economic growth. This is generating the need for parallel major changes in Irish university structures and practices. Doctoral research is undergoing analogous changes in terms of expanding numbers and the development of PhD training frameworks.
- The PhD itself is changing - both in terms of the changing profile of the researchers undertaking this career path, as well as the multiple career options open to them upon completion.
- The PhD is a unique means to develop a strong independent thinker and researcher. No structures or frameworks to be developed in the future should undermine this key principle, and the targets to increase the numbers of PhDs should not be at the expense of the quality of training provided and received.

- Ireland will not be able to meet its projected doubling of PhD researchers by 2010 from its national pool of undergraduates alone. Other sources need to be examined such as international/returning graduates as well as work-based postgraduate training. A key challenge will be ensuring sustainable careers into the future in a variety of sectors

### **Recommendations:**

1. The adoption of a meaningful code of practice for the supervision and training of PhDs, as laid down in the IUQB Code of Practice
2. The development of a national framework for the establishment of advanced training through graduate schools, PhD programmes or other appropriate means.
3. Proper recognition and improvement of the status of PhDs, in terms of remuneration and social security status
4. A full assessment of the capacity of our HE sector in terms of infrastructure and supervisory load
5. An analysis of projected industry R&D human resource needs in terms of overall numbers, supply and demand and sectoral breakdown
6. Improved access for overseas researchers to the Irish system in terms of entry requirements etc. through the adoption of the Third Country Directive<sup>16</sup> for researchers and other practical means

### **Implementation Plan**

Note: each numbered point in the Implementation Plan corresponds directly to the numbered Recommendation above

1. Adoption of the IUQB Code of Practice in the Irish Universities under the guidance of the IUQB and with broad consultation, with the Vice Presidents/Deans of Research and Deans of Postgraduate Studies and USI etc. Incorporation of the Code of Practice or aspects of the Code, as appropriate, into the Terms & Conditions of publicly funded national research programmes. (Responsibility: Merrion Group in consultation with the IUQB) – *Expected delivery –ongoing to end of 2005*
2. Further development of PhD training initiatives, both for generic and subject-specific skills, using this document and the CHIU Research Strategy Document as templates, to result in a detailed implementation plan. Responsibility: Vice Presidents/Deans of Research and Deans of Postgraduate Studies - *Expected delivery – ongoing to end of 2005*
3. On-going study of the social security status of PhD students by C.H.I.U, Department of Social and Family Affairs (DSFE) and Department of Enterprise Trade and Employment (DETE) to assess the issue of insurability (PRSI) of PhD students. Advise Merrion Group as to the development of this study. *Expected delivery –ongoing to end of 2005*
4. In-depth Study of HE Capacity in collaboration with CHIU, IUQB, research funders, Department of Education and Science and Forfas. *Expected delivery – Sept 2005*

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<sup>16</sup> <http://europa.eu.int/scadplus/leg/en/lvb/i23023.htm>

5. In-depth Study of Projected Industrial R&D Human Resource requirements.  
Responsibility: Expert Group on Future Skills Needs. *Expected delivery date – Sept 2005*
6. National Implementation of the Third Country Directive for Researchers.  
Responsibility: Government – Department of Enterprise, Trade and Employment, Department of Justice in consultation with the Research Careers Ireland Group and the Irish Mobility Network. *Expected delivery date – Sept 2005.*



Conference of Heads of Irish Universities

## “Strength and Numbers – Attracting and Retaining Postgraduate Researchers in Irish Universities”

9<sup>th</sup> – 10<sup>th</sup> November 2004

Conrad Hotel, Earlsfort Terrace, Dublin 2

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Tuesday, 9<sup>th</sup> November 2004 - 2:00pm – 6:00pm

### ***Building the foundations in postgraduate research***

***Chair: Prof. Aine Hyland***

- 2:00 Opening Address – Mary Hanafin, Minister for Education and Science
- 2:20 Address by Dr. Hugh Brady, President, UCD
- 2:35 Implications of the OECD review for PhD and research careers – Dr. Karsten Brenner
- 3:00 The European Context – Dr. Georges Bingen, DG Research, European Commission
- 3:30 *Coffee and Networking*
- 4:00 Policy into Practice in PhD Training

- The future for the IUQB Code of Practice – Dr Padraig Walsh, IUQB
- NIRSA – a case-study in PhD training – Dr. Rob Kitchin, NUIM
- UK developments in PhD Training– Dr. Janet Metcalfe, Director, UK GRAD Programme
- PhD Research Supervision from the Front Line - Prof. Chris Dainty, NUIG

5:20 Panel Discussion

6:00 Close

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Tuesday evening, 9<sup>th</sup> November

Chair: Dr. Hugh Brady, President, UCD

6:45 Reception and Keynote Speech: Dr. Barry McSweeney, Chief Science Advisor

7:30 Conference Dinner

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Wednesday, 10<sup>th</sup> November – 9:00am-2:00pm

*Double – vision: Expanding the numbers of PG researchers*

**Session 1: The PG research Environment**

- 9:00 Official Launch of the Irish Mobility Network - Micheál Martin, Minister for Enterprise Trade and Employment;  
Address by Prof. Iognáid Ó Muircheartaigh, President, NUI-Galway  
Address by Georges Bingen, DG Research, European Commission
- 9:30 Can we achieve our Double Vision? Conor O’Carroll
- 9:50 Reality Check – can we support the expansion in PhD numbers? Prof. Marina Lynch, Dept. of Physiology, Trinity College Dublin
- 10:10 Funding sustainable increases in PhD numbers – Martin Hynes, Irish Research Council for Science, Engineering and Technology

*10:30 Coffee*

**Session 2: The practicalities of international mobility and research**

- 11:00 Down to brass tacks – living and working as a PG researcher in Ireland – Aoife Braiden, Union of Students of Ireland, Postgraduate Officer
- 11:20 Recruiting, Training and Valuing the Next Generation of Social Scientist" – Prof. Dr Colm Harmon, UCD
- 11:50 Operating in an International Market – the industry perspective – Dr. Ian Hayes CEO EiRx Therapeutics
- 12:10 Attracting international researchers – Dr. David E. Schindel, Smithsonian Institute
- 12:30 Panel Discussion and closing comments
- 13:30 Conference Lunch, with demonstrations of the [researchcareersireland.com](http://researchcareersireland.com) portal