EUROPEAN SCIENCE FOUNDATION

Fonds National de la Recherche Luxembourg

# How to Track Researchers' Careers

**A report by the ESF MO Forum on European Alliance for Research Careers Development**

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# Executive Summary

Organised in the framework of the ESF Member Organisation Forum "European Alliance on Research Career Development", the workshop "How to track Researchers' Careers" on 9–10 February 2012 in Luxembourg brought together some 100 participants from national and international funding organisations as well as research institutions and universities from over 20 countries.

As a result of a survey among ESF members carried out in 2011, the variety of concepts and practices as to tracking of researchers' careers became apparent[1]. In fact, among ESF Member Organisations, numerous funding schemes exist, designed to support individual researchers in their various career stages. Currently only few funders and few member states have on-going career tracking studies in place, although these are obviously delivering very precious information about career trajectories of researchers.

The main aim of the Luxembourg Workshop was, thus, to bring the issue of "career tracking" on the science policy agenda in Europe by asking why and for whom career tracking is important and how it should be carried out. Related objectives were to develop a common understanding of 'career tracking of researchers' and to develop a typology of career tracking approaches.

The following four categories of career tracking studies were identified with examples for each category taken up in the workshop report[2]:

- International initiative: the OECD CDH Project
- Nation- or region-wide initiatives: US, UK, Germany, Flanders
- Institutional initiatives including alumni-based surveys: Wellcome Trust; CIFRE fellowships; European University Institute; Alexander von Humboldt Foundation
- National/regional register data: Flanders, Denmark, Norway.

## Definition of "Career Tracking of Researchers":

*Initiatives that follow up researchers' careers over a certain time period to understand researchers' career pathways. Surveys that trace back careers over several years, cohort studies at several moments in time (not just one) or longitudinal surveys are considered to fit the definition.*

The main purposes of career tracking can be summarised as follows:

- **Tracking the quality of research training and skills:** By following up doctoral graduates and surveying them after graduation, tracking studies assess the suitability of funding and the quality of training and working conditions offered during the doctoral phase and explore whether the quality of doctoral training was appropriate to researchers for optimum career opportunities in or outside academia.
- **Tracking to find out where researchers move in their careers:** A major reason for carrying out career tracking studies is to provide information on career movements and understand international and intersectoral mobility as well as employment patterns of researchers throughout their careers.
- **Tracking for accountability:** Career tracking of doctorate-holders is motivated by the need for accountability vis-à-vis the funders of doctoral education, i.e. in most cases taxpayers. Career tracking studies indirectly measure impact, for example by informing about occupational patterns of researchers, not only in academia. Moreover, career tracking may be used as a strategic planning tool to monitor and improve the efficiency of grant schemes or doctoral education programmes as well as career development strategies.

[1] European Science Foundation: European Alliance on Research Career Development. A survey analysis by the ESF Member Organisation Forum, January 2012, available at: http://www.esf.org/careers_survey/
[2] See present Workshop Report, Section II "Overview of Career Tracking Studies"

## Key Conclusions and Recommendations

**Developing information on PhD holders and research careers avoiding duplication**

Career tracking studies may provide data on PhD holders and researchers in their various career stages that improve our knowledge about research careers. They complement official statistics, register data or data files on PhD holders. Europe lacks structured information on doctorates and research careers. There are examples of good practice such as the UK Higher Education Statistical Agency centralising information on PhDs in the UK, or the Scandinavian countries' register data. The ESF European Alliance on Research Career Development (EARCD) considers that it should be a high priority for Europe to improve statistics and information on PhD holders and researchers at the various stages of their research careers. Complementing basic statistical data on PhD holders and researchers by tracking studies or career surveys might be a very useful approach to obtain quantitative and qualitative information on research training, employment patterns, discipline-specific careers, life events and their impact on researchers' careers, etc. Some ongoing tracking studies are organised in a way where they regroup institutions under a centralised approach. This is the case in the UK, Germany and Flanders. It allows economies of scale, with institutions collecting the data which are centrally treated. Depending on the purpose of the career tracking studies, this might be a very sensitive approach. However, if the purpose is mainly the follow-up of fellows of a given funding scheme, a centralised nationwide approach might not be the best. Therefore, the purpose and scope of the study, the already existing statistical or institutional data, the available resources and the time period of the study should be well defined in advance in order to make the appropriate choice before starting a tracking study. Duplication of efforts should be avoided by any means. Wherever possible, initiatives of a similar nature should be regrouped or organised in a coordinated manner.

**Complementarity of tracking studies and programme evaluations**

PhD and individual career programmes are expensive and their outcome should be monitored. The ESF EARCD suggests that in the case of long-term support schemes to individual researchers, tracking studies can be very useful additions to (or part of) periodic programme assessments because they not only inform about programme performance, but their scope is mainly on the quality and efficiency of funding in terms of the researchers' professional development.

**Tracking studies compared to indicator based follow-up**

There is a trend to opt for developing indicator-based follow-up of researchers, relying principally on research outputs. Compared to an indicator-based approach, career tracking delivers complementary information on researchers' pathways and allows to analyse the moves in and out of academia and in and out of research. By monitoring careers over time, tracking studies serve to provide different insights into the actual contribution of researchers to economy and society. They also provide guidance for current researchers engaging in a doctorate to build their future careers.

**Career tracking helps to identify structural problems**

Besides the monitoring of programmes, the (national, regional or institutional) follow-up of researchers (for example through regular surveys) allows the detection of structural problems in the research system. To efficiently address any systemic weaknesses, tracking studies should actively involve stakeholders. An informed dialogue and involvement of researchers and institutional and political decision makers through an exchange based on an open dialogue proves to be most efficient (as is the case, for example, for the UK VITAE study "What do researchers do?").

**Setting up career tracking studies: choosing the right dimension**

Since career tracking studies are expensive and often long-term initiatives, they must be well planned. If the study is outsourced, a balanced approach between building up institutional competence (including statistical know-how) and outsourcing is needed, in order to take full

advantage of the study. In addition, if the study is outsourced to an external consultant, the commissioning and communication with the external consultant has to be organised and followed up internally. A realistic plan with budgetary and staff resources should be made before starting the study. The ESF MO Forum on Research Evaluation have also developed recommendations concerning the dimension, resources and outsourcing of career tracking studies[3].

**Terminology concerns**

In its first MO Forum, ESF illustrated research careers in the form of a tree. They might as well be represented as a patchwork. In order to structure career information, Europe has introduced a framework of four major career stages, "R1–R4"[4]. These of course only show a much reduced picture of the reality and do not represent the broad range of nonlinear career pathways. There is a need to develop a common terminology for research careers as well as for career tracking studies, as terminology is key and subject to different interpretation and pre-conceptions.

**Methodological awareness**

Before starting a career tracking study, a benchmarking of existing initiatives should be done. The purposes of the study and the intended objectives have to be clearly defined, as this will set the framework for the methods and resources needed. The workshop on career tracking has identified several initiatives of different nature and purpose. In addition, a recent project (TRACKIT) by the European University Association has collected a wealth of information concerning ongoing career tracking studies in its member universities and countries, by focusing on students.[5] Openness to new methodologies (e.g. life history research, identity studies) and tools (e.g. CV depositories, social media) are important, as they may bring along very different and new approaches to the analyses of research careers. Comparability should be envisaged[6], but not necessarily comparability of studies as such, given that the respective target audience and purposes might differ. Full account should be given to informed methodological decisions before starting the study (for example for how long will researchers be tracked and at what intervals? Should everybody be tracked or only specific cohorts? If a longitudinal approach is chosen, how is panel mortality addressed, etc.[7]).

**An international platform promoting researchers' career tracking and career surveys**

To conclude, the ESF EARCD recommends a joint initiative promoting career tracking studies as well as career surveys and statistical information on research careers across Europe and beyond, linking them through a platform that re-groups existing studies and new studies to be set up. Such a platform could integrate a broad range of information and publications on research careers, building a documentation and discussion forum. New approaches such as CV databases could be taken into account. The workshop has only been able to assemble some information on ongoing and past studies as well as practical guidance on why, for whom and how career tracking can be useful[8]. A joint international initiative should be envisaged as an initial step to set up a platform and regular meetings of experts working in the field of career tracking studies and career surveys. Several institutions have expressed their wish to participate in such an initiative. Support would be needed for the implementation of a (virtual) structure. After an initial implementation phase, the joint platform might be continued by the input of ongoing studies taking advantage of the knowledge exchange.

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[3] Link: http://www.esf.org/activities/mo-fora/evaluation-of-publicly-funded-research.html
[4] "Towards a European Framework for Research Careers", EU Commission DG Research and Innovation, Directorate B – Skills, 21.07.2011.
[5] Link to final report: "Tracking Learners' and Graduates Progression Paths TRACKIT": http://www.eua.be/eua-work-and-policy-area/building-the-european-higher-education-area/projects/tracking-learners-and-graduates-progression-paths.aspx
[6] For methodological concerns in view of comparability, the OECD CDH project's basic methodology should be taken into account: www.oecd.org/sti/cdh
[7] See present Workshop Report, section III "Tracking of Researchers' Careers – Why, For Whom and How".
[8] See present Workshop Report, section III "Tracking of Researchers' Careers – Why, For Whom and How".

# INTRODUCTION

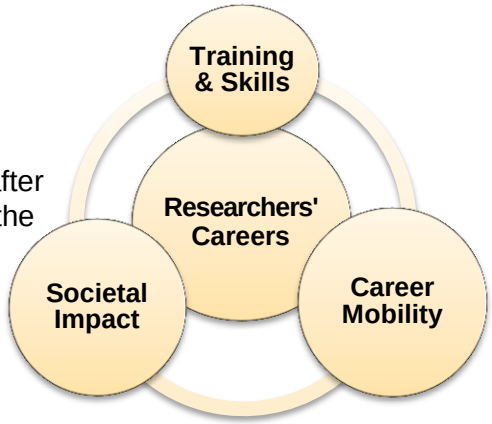
One of the key objectives of the Joint ESF and FNR Workshop on 9–10 February 2012 in Luxembourg was to reply to the identified need of the ESF Member Organisations to define a joint framework and guidance for the set up of surveys or studies tracking the careers of researchers.

While in Europe tracking studies are relatively recent, the situation differs in the US where this kind of initiative has gained increasing importance since the 1990s, in particular at the level of research intensive universities who follow up their PhD and masters student alumni over time.

The existing career tracking studies presented in the plenary of the workshop formed the basis of the discussion in the working groups and the World Café. They were complemented by a poster exposition on career surveys[9].

## Purposes of Career Tracking

Among the various purposes of career tracking studies, the most important ones identified were the following:




- **Tracking the quality of research training and skills**
  By following up doctoral graduates and surveying them after graduation, tracking studies assess the suitability of funding and the quality of training and working conditions offered during the doctoral phase and explore whether the quality of doctoral training was appropriate to researchers for the best career opportunities within or outside academia.

  Moreover, career tracking may be used as a strategic planning tool to monitor and improve the efficiency of grant schemes or doctoral education programmes as well as career development strategies.

- **Tracking to find out where researchers move in their careers**
  A major reason for carrying out career tracking studies is to provide information on career movements and understand international and intersectoral mobility as well as employment patterns of researchers throughout their careers. While the movement of researchers from academia to industry has often been and is still considered the "untypical" career, it is acknowledged today that movement between academia and industry provides a key channel for the transfer of knowledge and ideas and offers researchers a range of new opportunities. Promoting career mobility and moves between sectors appears to be an efficient driver towards innovation.

- **Tracking for accountability**
  Career tracking of doctorate holders is motivated by the need for accountability vis-à-vis the funders of doctoral education, i.e. in most cases taxpayers. It is difficult to directly assess the impact of researchers on economy and society. Therefore, career tracking studies indirectly measure impact, for example by informing about occupational patterns of researchers, not only in academia. Through their occupations in key sectors outside academia, such as industry, education, health and public administration, researchers contribute to creating knowledge and ultimately economic and societal prosperity.

[9] The posters can be viewed and downloaded at http://www.researcherscareers.lu/index.php?p=posters

## Brief Overview of the Workshop Report

In a **first section**, a **conceptual framework** of career tracking will be provided, formulated by Professor Maresi Nerad.

**Section two** will give an overview by presenting **categories of existing career tracking initiatives** and by giving examples in each category illustrating key methodology and results of these studies.

The **third section** will summarise the workshop discussions formulating a **practical framework** and guidance on setting up a career tracking study.

It is in not intended to be exhaustive, but to stimulate reflections on *Why* and *for Whom* career tracking can be useful and *How* it can be implemented. It may be considered as an initial step towards a European Guidance Framework – to be developed – as well as towards a future platform of exchange between existing and new career tracking initiatives, as started by the workshop.

Finally, the **fourth section,** denominated *Mirroring Workshop Findings from an External Perspective – Closing remarks at the Workshop* by Professor Michael Samuel reflects his final presentation wrapping up the workshop; this brings us back to **theoretical considerations** – linking to the first section by Professor Maresi Nerad and arguing in favour of improved theories and knowledge-building to increase our understanding of researchers' careers.

## Section I. The Context of Tracking Researchers' Careers: Towards a Conceptual Framework

*Contribution by Professor Maresi Nerad, University of Washington, USA*

Nations around the world are taking a fresh look at the development of their researchers. Since the 1990s, doctoral degree production and reform in doctoral education has moved to centre-stage in policy debates (EU/ CESSC, 2010), in national innovation strategies (Dill and van Vugth, 2010), and activities of national funding agencies, and research universities of the world.

Forgotten are the Cassandra voices of 1990s by media and policy makers talking about PhD overproduction and underemployment of these highly trained people. In the US industry leaders were complaining that science PhDs take too long to complete their studies, are too narrowly educated, and are ill prepared for the world outside academe (Nerad, 1997, 2004).

Today, no one would recommend curtailing the production of doctorates as was done just 20 years ago. On the contrary, country after country in Europe and elsewhere in the world, is planning to increase the number of researchers who can contribute to the "knowledge society" and its knowledge economy, to the national innovation potential and ultimately to economic growth.

What has happened? Why this nearly complete turnaround? Why a call for tracking the careers of researchers in Europe?

During the last two decades, just as in the last hundred years, postgraduate education, particularly doctoral education, has had to respond to demands from external forces as well as to the internal demands and dynamics among universities.

Economic theories of the "knowledge economy" locate the causes of economic growth in novel ideas leading to scientific, technical, organisational, and environmental or health innovations (Nerad, 2010). Innovations and technical changes are seen as the principal means of economic growth and sustaining international competitiveness. National governments have turned to masters' programmes and research training as way of educating innovators.

Governments are allocating substantial funds to increase the research and development capacities of their countries. It is not only the supply of highly skilled people, but also how widely academic knowledge is disseminated that has an influence on the economic and social development of a nation (Temple, 2012; Nerad, 2011). Research training increasingly is organised in a problem-solving approach, using multi-disciplinary teams, and including participants from various sectors of society. Transferable professional skills development – such as knowing how to present and teach complex knowledge to a diverse audience, how to write for multiple audiences, how to manage time, people, projects, and budgets, how to deal with ethical questions in one's research and field – has become a needed and sought after component of doctoral education.

It is in this context of increased spending by public and private sources on research and research training that an interest has arisen in knowing whether the increased funding does indeed contribute to societal advancement and economic growth.

Calls for accountability for the use of public taxes have contributed to a heightened attention in wanting to know what people with advanced research training have done after completion of their masters and doctoral degree. How and where do doctorates apply their knowledge? Was their education and training perceived useful for their subsequent careers? What was the quality of their research training? These are questions understandably asked by research and scholarship funders.

Doctoral training is undergoing scrutiny in terms of 'fitness for purpose', as stakeholders within various systems ask whether the programmes in place are optimally structured (Nerad and Heggelund, 2008).

Given a volatile labour market and the subsequent changing calls for demand and supply of researchers, career studies of masters and doctorates are wise to be designed with multiple purposes in mind. They should be more than a tool for narrow labour market concerns, but focus on understanding the diverse developments of individuals within the intersection of their private lives, institutional, and societal forces. And they should take into account the many attempts undertaken by national research funding agencies for innovative interdisciplinary programmes with international involvement.

Career tracking studies of researchers are labour-intensive, and require much financial and human resources. Therefore it will be wise to carefully design studies keeping in mind that people make career choices that fit their specific individual circumstances, their family, children and partnerships in relationship to political and economic considerations.

If we set out to investigate the training and lives of researchers, it is best done comprehensively with an understanding of the interaction of life circumstances and career. It needs multiple approaches to understand the interaction of the individual, institutional and societal forces, since the doctorate, to quote an English PhD from the US PhD – TEN+ Years Out study (Nerad and Cerny, 1999):

> *"...bolsters self-discipline, trains and stimulates the mind and imagination, develops the entire character. It is not just a specialised skill. In a good doctoral programme one learns to solve problems and develop insights in this spirit. All of these virtues are relevant to all of life and an educated electorate in a democracy."*

## Section II. Typology of Career Tracking Studies and Examples

When preparing the workshop, the ESF MO Forum's working group on research careers undertook a mapping exercise of existing career tracking studies, based on the following definition:

> **Definition "Career Tracking of Researchers"**
>
> Initiatives that follow up researchers' careers over a certain time period to understand researchers' career pathways.
>
> Surveys that trace back careers over several years are considered to fit the definition. Cohort studies at several moments in time (not just one) or longitudinal surveys are the typical career tracking studies.
>
> A one-off survey analysing the professional destination of researchers is **NOT** considered as a tracking study, because it only screens a specific moment in time and not a pathway.

Surprisingly, although many funding agencies and institutions raise the importance of career tracking to understand researchers' careers, the mapping exercise showed that there are only few initiatives in place. This is due to the fact that this kind of study requires high costs, resources and a long-term commitment by the engaging institution(s).

Four major categories of career tracking studies were identified that will be presented in the section hereafter:

1. **International undertakings**, in particular the OECD Careers of Doctorate Holders' Project offering a wealth of data and methodological guidance;
2. **Large-scale national or regional initiatives** such as the UK "Where do Researchers go?" series and the German "ProFile – Promovierendenpanel", both very recent initiatives, but designed as long-term strategic tools; or large-scale national US surveys conducted by the National Opinion Research Center (NORC) on behalf of six federal agencies: the Survey of Earned Doctorates (SED), and the Survey of Doctoral Recipients (SDR), as well as large-scale one-time national US surveys undertaken by Prof. Maresi Nerad and funded by the Andrew Mellon Foundation, the US National Science Foundation (PhDs – Ten Years later), the Getty Grant Foundation (PhDs in Art History – A Decade Later), and the Ford Foundation (Social Science PhDs – Five+ Years Out).
3. **Institutional initiatives** such as the Career Tracker of the Wellcome Trust, the survey of former CIFRE grant holders in France and the Flanders Senior Researchers Survey (regrouping the six Flemish Universities) as well as alumni-based tracking such as the annual database update of the alumni of the Alexander von Humboldt Foundation.
4. **Register data** mainly targeting researchers' professional career paths after their PhD, such as the "Human Resources in Research – Flanders" database and the register data of statistical agencies in Denmark and Norway.

## Section II.1. International studies

## "OECD Careers of Doctorate Holders (CDH) Project"

### Key Information

| | |
|---|---|
| **Organisation:** | OECD |
| **Type of study:** | International project based on multiple data sources, such as<br>- original surveys on PhDholders,<br>- register or census data, and<br>- data from existing national surveys such as the Labour Force Survey |
| **Date/period**: | Pilot in 2005; large scale data collections in 2007 and 2010<br>KnowINNO-CDH micro-data project: ongoing until 12/2012 |
| **Cycle/frequency:** | Tentatively once in three years |
| **Survey population:** | Individuals who fulfil the following criteria:<br>- Education at ISCED 6 level (doctorates) obtained anywhere in the world, and<br>- (non-)permanent residence within the national borders of the surveying country |
| **Contact persons:** | Dr Toshiyuki (Max) Misu and Laudeline Auriol), OECD, Paris, France (toshiyuki.misu@oecd.org; laudeline.auriol@oecd.org) |
| **Link:** | www.oecd.org/sti/cdh |

### Methodology

The CDH statistics are based on an output-harmonised approach. Countries are provided with a full model questionnaire, output indicator templates and definitions. Due to the diversity of the national statistical systems, the national compilation methods and survey instruments vary among countries.

**Survey type** (CDH 2010 data collection):

- Mainly CDH-dedicated survey (mostly stratified sampling)
- Belgium, Bulgaria, Spain, Latvia, Lithuania, Hungary, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Croatia, Iceland, Turkey, Israel, Russia, United States
- Some used other sources such as register data, Labour Force Survey data, population census data, etc. Denmark, Germany, Finland, Sweden, Norway, Switzerland, Chinese Taipei

Despite the continuing efforts to improve population coverage, data on foreign citizens, foreign-born and/or those having received their doctoral degree abroad are still underestimated in general.

Most important to mention is that

- the OECD CDH project has worked a lot on developing a common denominator methodology for future career tracking studies that everyone should take into account, in order that the chosen approach allows ex-post comparability.

### Selected Major Findings

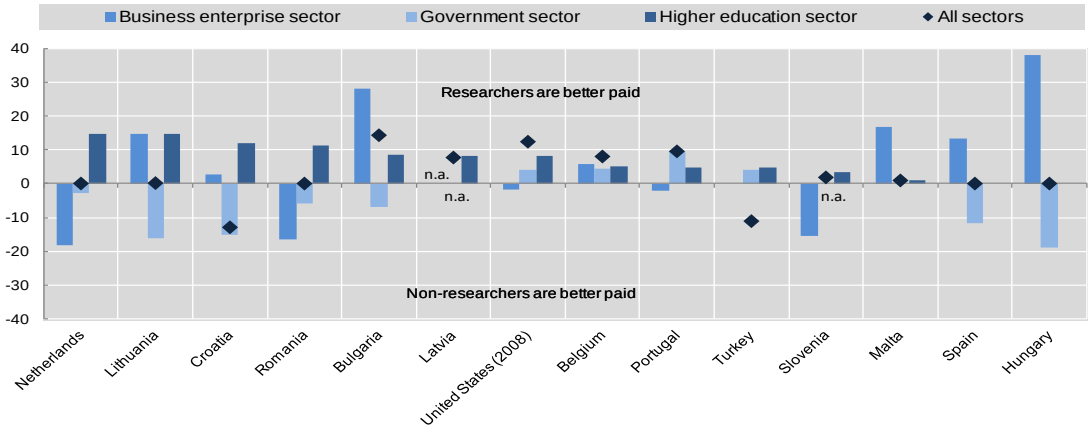
According to the latest CDH 2010 data collection, the employment rates of male doctorate holders tend to exceed those of females in most countries. While the major sector of employment is the higher education sector in most countries, the business enterprise sector also employs a large share of doctorate holders in the United States, Belgium, Denmark and the Netherlands. In general, a higher share of recent doctorate holders in the first five years after graduation is employed in fixed-term contracts than those who received their degree more than five years ago.

From the perspective of the return on investment of long academic training, gross annual earnings of doctorate holders employed as researchers exceed those of non-researchers in some countries, and it is particularly prominent for those hired in the higher education sector (Fig.1). In addition, it is also found that a non-negligible share of doctorate holders seem to be employed in non-related occupations in some countries (Fig. 2).

Regarding international mobility of doctorate holders over the past ten years, while the United States stands as the first destination, intra-European flows, especially towards France, Germany and the United Kingdom are also observed.

**Figure 1: Difference in median gross annual earnings of doctorate holders, 2009**

*As a percentage of median gross annual earnings of doctorate holders not working as researchers*




*Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010*
http://dx.doi.org/10.1787/888932485823.

**Figure 2: Employed doctorate holders' perception of job relation to their doctoral degree, by selected field of study, 2009**

| Country | Reference year | Natural sciences | | | Engineering | | | Social sciences | | | Humanities | | | All fields | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Related | Partly related | Not related | Related | Partly related | Not related | Related | Partly related | Not related | Related | Partly related | Not related | Related | Partly related | Not related |
| Belgium | 2009 | 30.7 | 31.7 | 37.6 | 36.8 | 36.3 | 26.9 | 54.5 | 27.7 | 17.7 | 53.0 | 23.1 | 23.8 | 39.2 | 32.2 | 28.6 |
| Bulgaria | 2009 | 85.8 | 9.6 | 4.6 | 81.3 | 12.5 | 6.2 | 84.0 | 12.2 | 3.7 | 84.2 | 9.7 | 6.1 | 84.7 | 10.7 | 4.7 |
| Croatia | 2009 | 73.6 | 20.2 | 6.2 | 75.4 | 21.4 | 3.3 | 80.8 | 17.9 | 1.4 | 82.9 | 14.5 | 2.5 | 73.6 | 22.3 | 4.1 |
| Hungary | 2009 | 85.3 | 12.1 | 2.5 | 72.6 | 19.8 | 7.6 | 82.6 | 12.6 | 4.8 | 83.5 | 11.9 | 4.6 | 80.8 | 14.6 | 4.6 |
| Latvia | 2009 | 38.4 | 31.4 | 30.2 | 45.6 | 33.6 | 20.8 | 47.6 | 41.0 | 11.3 | 50.7 | 37.6 | 11.7 | 45.2 | 35.2 | 19.6 |
| Lithuania | 2009 | 50.2 | 33.9 | 15.9 | 45.4 | 41.0 | 13.6 | 49.4 | 42.3 | 8.3 | 58.3 | 31.9 | 9.8 | 49.9 | 37.7 | 12.4 |
| Malta | 2009 | 78.2 | 15.5 | 6.3 | 78.7 | 12.9 | 8.4 | 81.4 | 12.2 | 6.4 | 76.5 | 17.4 | 6.1 | 78.3 | 14.6 | 7.1 |
| Netherlands | 2009 | 37.2 | 39.8 | 23.0 | 40.4 | 39.7 | 19.9 | 46.8 | 38.1 | 15.2 | 41.6 | 33.7 | 24.7 | 41.5 | 39.5 | 19.0 |
| Poland | 2008 | 83.6 | 12.1 | 4.2 | 70.7 | 23.0 | 6.3 | 82.8 | 12.4 | 4.8 | 74.4 | 16.6 | 9.0 | 76.8 | 17.2 | 6.0 |
| Portugal | 2009 | 53.4 | 45.9 | 0.7 | 52.4 | 46.2 | 1.5 | 57.2 | 41.8 | 1.0 | 47.4 | 51.5 | .. | 52.3 | 46.6 | 1.1 |
| Romania | 2008 | 83.9 | 12.7 | 3.4 | 83.5 | 11.5 | 5.1 | 82.2 | 14.6 | 3.3 | 80.6 | 15.6 | 3.8 | 81.0 | 14.3 | 4.7 |
| Russian Federation | 2009 | 74.0 | 22.2 | 3.7 | 71.4 | 23.1 | 5.6 | 73.6 | 23.0 | 3.4 | 70.5 | 24.5 | 5.1 | 73.6 | 21.9 | 4.4 |
| Slovenia | 2009 | 72.6 | 22.1 | 5.3 | 72.7 | 20.9 | 6.3 | 75.2 | 20.2 | 4.6 | 82.0 | 15.4 | .. | 74.5 | 20.2 | 5.3 |
| Spain | 2009 | 67.2 | 18.8 | 14.0 | 68.6 | 17.8 | 13.6 | 75.0 | 17.6 | 7.4 | 60.9 | 20.2 | 19.0 | 63.6 | 20.5 | 15.9 |
| Turkey | 2009 | 85.0 | 11.3 | 3.6 | 79.7 | 15.1 | 5.3 | 84.9 | 11.0 | 4.1 | 85.0 | 12.0 | 3.0 | 86.2 | 10.0 | 3.8 |
| United States | 2008 | 59.8 | 30.2 | 10.0 | 60.9 | 30.1 | 9.1 | 76.7 | 17.5 | 5.7 | .. | .. | .. | 65.7 | 26.0 | 8.3 |

*Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010*
http://www.oecd.org/dataoecd/44/36/49867563.xlsx.

## Section II.2. National/regional surveys – United States

## "The Survey of Doctorate Recipients" (SDR)

### Methodology

NORC conducts the Survey of Doctorate Recipients (SDR) for the National Science Foundation (NSF) and the National Institutes of Health (NIH). The SDR is a survey of science and engineering doctorate recipients who earned their degrees from institutions within the United States. This study is the only ongoing national source of data on the careers of science and engineering doctorate holders from US institutions, and it provides key data on the education and training, work experience, career development, and demographics of this important population.

The SDR sample is selected from the Doctorate Records File (DRF), a record of all research doctorate recipients from US universities since 1920. The DRF is updated annually based on data collected by the Survey of Earned Doctorates (SED). The SED is conducted annually by NORC for the NSF, the NIH and four other federal agencies.

The SDR employs an innovative mixed-mode data collection protocol that strategically integrates a traditional paper questionnaire with Computer Assisted Telephone Interview (CATI) and web-based data collection instruments. SDR data are incorporated into NSF's Scientists and Engineers Statistical Data System (SESTAT). Published data products for each round of the SDR include Information Briefs and Detailed Statistical Tables.

A list of recent publications of the National Science Foundation and their sources can be found in Appendix IV – References.

# Section II.2. National/regional surveys – United States

# "PhDs – 10+ Years Later"

## Key Information

**Organisation**: Graduate Division, University of California, Berkeley/CIRGE (Center for Innovation and Graduate Education), University of Washington, Seattle
**Funder**: Andrew Mellon Foundation and US National Science Foundation
**Survey date**: 1997
**Period:** 10 – 15 years retrospective
**Cycle/frequency:** One off
**Survey population:** All PhDs in six selected disciplines who earned their degrees between 1982 and 1985 from 61 universities; close to 6000 = 57% of the total PhD degrees awarded in these six fields during the three-year period
**Response rate:** Of the eligible PhDs, 3667 responded, yielding a response rate of 63% overall.
**Disciplines**: Six: biochemistry, computer science, electrical engineering, mathematics, political science and English
**Contact person:** Professor Maresi Nerad, Center for Innovation and Research in Graduate Education (CIRGE), University of Washington, Seattle, US (mnerad@u.washington.edu)
**Link :** www.cirge.washington.edu

## Methodology

*PhDs – Ten Years Later* is a nationally representative survey of PhDs in six disciplines from major fields of study: life science (biochemistry), engineering (computer science, electrical engineering), humanities (English), physical science (mathematics), and social science (political science). Surveyed in 1996–97, respondents provided 10 or more years of career data and evaluations of doctoral education. The sample included all PhDs from 61 doctoral-granting institutions selected for geographic diversity, a representative mix of public and private universities; no sub-sampling occurred; of 5858 PhDs, 3667 responded yielding a response rate of 63%.

**Survey content**

- The survey covered employment history including postdoc positions, job-search process and the factors influencing respondents' decision to accept their first and current positions, evaluation of doctoral education and its usefulness, demographics, information on the relationship between family and career, and suggestions and recommendations for doctoral programmes.
- It included open-ended questions asking about advice for beginning graduate students, for the first job search and questions about the value of the PhD education.
- In-depth interviews with 64 respondents provided supplemental information about the context of career decisions.

## Selected Major Findings

- Results revealed the high level of satisfaction most PhDs hold for their doctoral education and with their employment, whether in academia or in business, government, or non-profit sectors, 10 to 13 years after getting their degree.

- About half of the participants wanted to become professors at PhD completion. The variations among fields were great. Most English and political science PhDs (81% and 72%, respectively) sought academic careers, however only 19% of electrical engineering and 32% of biochemistry PhDs had academic career ambitions.
- Of those who wanted to become professors overall between 60 and 65% held faculty positions when surveyed. The other 40–35% of the PhD recipients were employed in business, government and non-profit sectors (hereafter referred to as the BGN sectors). The largest proportion of PhDs working outside academia was electrical engineers and computer scientists, followed by biochemists.
- The common assumption that the "best" people – measured by traditional standards of short time-to-degree, and multiple publications at time of PhDs – become professors held true only for English and political science in the fields surveyed for PhDs – Ten Years Later. Logistic regression analyses indicated that short time-to-degree and number of publications was not associated with tenure status (life-time professor positions) at survey for PhDs in biochemistry, electrical engineering and mathematics. Having graduated from a higher ranking PhD programme was associated with higher likelihood of holding a permanent professor position. However, in fields with an attractive job market outside academia such as computer science and electrical engineering, the association with rank was not significant.
- Many people started out in non-tenure-track academic positions (not permanent professor positions) and over a period of about four years switched to tenure track positions, meaning, if approved by their peers, they will become permanent professors. This finding underscores the need to observe PhD career paths for several years after graduation, rather than relying on surveys on doctorate employment one or two years after degree completion.
- In biochemistry 86% held postdoctoral appointments, and the average length of time spent in these appointments was nearly four years. In mathematics, where pursuing a postdoc after completing the PhD has not yet become the norm. While 31% held postdoctoral appointments for an average of 2.5 years, 40% of all postdocs did more than one postdoc. Biochemists had the shortest time to doctoral degree among the six disciplines. However, due to the time spent as postdocs, they had the largest proportion (46%) of untenured faculty 10 to 13 years after completion of the PhD In mathematics, where fewer postdoctoral appointments are available, these postdoctoral positions significantly improved the odds of gaining a faculty position in the top quarter of research doctorate programmes.
- International PhDs had different return rates to their home countries. International PhDs who intended to become professors were more likely to return home and more mathematicians than electrical engineers intended to become professors. International PhDs whose doctoral study was primarily funded by their employers were much more likely to return home. PhDs coming from Japan and Korea were more likely to leave the US, and those coming from South-west Asia (the Indian subcontinent) were more likely to stay in the US. The most important factors are "ties that bind" – ties to the employer, ties to the home country, ties to the family.
- Both men and women experienced difficulty combining family and career; combining the two has particular consequences for women and their careers. A total of 61% of the women PhDs had a highly educated partner (PhD, MD, JD), but only 27% of men. Women were far more concerned that their partners also had a good opportunity than were men. The difference can be explained by the fact that the women tended to live with someone who could not easily give up one job and find another a similar one in any location. The majority of men were partnered with someone who was more mobile; these partners had less invested in getting a higher education degree. Thus men did not need to be as concerned about the partner's mobility as women were. This finding implies that the pursuit of careers is far more complicated for the women than for men.

- In the PhDs – Ten Years Later study managers and top executives in business, government and non-profit organisations were the most satisfied with their employment, and not the permanent faculty. The reason for their high job satisfaction was not salary, but intellectual challenge of work and autonomy at the workplace. Both of these are job qualities that we traditionally have attributed to an academic work setting. Tenured faculty ranked third in job satisfaction among those surveyed for PhDs – Ten Years Later.

## Implications

(1) The doctoral degree itself is put to many different uses in a variety of employment sectors.

(2) Doctoral education has been a passport to a successful career path in many sectors.

(3) The university as a workplace is not the only attractive destination, as commonly assumed.

Such empirical information is essential in order to prepare doctoral students for the future. PhD education proves to be useful and valuable for doctoral recipients.

## Section II.2. National/regional surveys – United States

## "Social Science PhDs – Five+ Years Out"

### Key Information

| | |
|---|---|
| **Organisation**: | CIRGE (Center for Innovation and Graduate Education), University of Washington, Seattle |
| **Funder**: | Ford Foundation |
| **Survey date**: | 2005–06 |
| **Period:** | 5+ years retrospective |
| **Cycle/frequency:** | One off |
| **Survey population:** | All PhDs in six selected disciplines who earned their degree between July 1995 and June 1999 from 65 doctoral-granting institutions; 3025 respondents |
| **Response rate:** | Of the 6770 eligible PhDs, 3025 participated, yielding a response rate of 45% overall. |
| **Disciplines**: | Six: anthropology (AN), communication (CO), geography (GE), history (HI), political science (PS), sociology (SO) |
| **Contact person:** | Professor Maresi Nerad, Center for Innovation and Research in Graduate Education (CIRGE), University of Washington, Seattle, US |
| **Link:** | www.cirge.washington.edu |

### Methodology

*Social Science PhDs – Five+ Years Out* is a nationally representative survey of PhDs in anthropology, communication, geography, history, political science and sociology who earned their degree between July 1995 and June 1999. Surveyed in 2005–6, respondents provided five or more years of career path data, information on the relationship between family and career, and evaluations of graduate education. The sample included all PhDs in the six selected disciplines from 65 US doctoral-granting institutions selected for geographic diversity and a representative mix of public and private universities. The selected universities granted 10,882 PhD degrees in the six disciplines, accounting for 69% of all PhD degrees in these disciplines in that time period; no sub-sampling occurred: 3025 respondents yielded a response rate of 45%.

#### Survey content

The survey included questions about career path and employment history, relationship events and parenthood, graduate school achievements, the quality of their PhD programme, mentoring by their dissertation advisor and the usefulness of their doctoral education. In open-ended questions they were asked to write about the trade-offs between work and family life, experiences with mentoring, advice they would offer beginning graduate students, advice they would give to graduate programmes in their field, experiences with diversity and experiences related to gender, racial/ethnic, class or personal identities.

### Selected Major Findings

- Not every PhD wanted to become a professor. The intent to become a professor increased during the doctoral study period. It ranged from a high of 78% of historians to a low of 57% of geographers at the start of PhD studies and at PhD completion, 84% of historians and 65% of geographers wanted to become professors.
- Overall between 50 and 60% of respondents held faculty positions when surveyed. Men and women were equally likely to hold permanent professor positions. The other 40–50% of the PhD recipients were employed in business, government and non-profit sectors; 2% of respondents were out of the labour force at the time of the survey.

- Most respondents reported using knowledge of their degree field, subfield, and dissertation topic "often" or "sometimes." Even among those working in business, government, and non-profit (BGN) sectors half used specific knowledge of their dissertation topic sometimes or often, and more than three-quarters reported using "sometimes" or "often" knowledge of the social sciences, their PhD field and PhD subfield.
- About one-third of the PhDs began their careers in a tenure-track position, but over half (63%) of all PhDs had ended in a tenured, or tenure-track position at the time of the surveys. This finding implies that academic career paths are not linear. Many people start out in non-tenure-track positions and over a period of four or more years switch to tenure-track positions.
- Social science PhDs considered themselves generally "very satisfied" with several aspects of their jobs. The study compared job satisfaction on three dimensions that were constructed from 20 items with a factor analysis: (a) satisfaction with the work itself, (b) satisfaction with status, and (c) satisfaction with overall quality of life. Overall social science PhDs indicate high levels of satisfaction with their work itself. They are less satisfied with their status (a dimension that includes income and advancement opportunities) and satisfaction with the quality of life (a dimension including work/family balance) fell in between. Comparing permanent professors to other academic employees (including non-tenure-track faculty and senior professional positions), and to people working in BGN sectors revealed few differences in patterns of satisfaction. Permanent professors in the social sciences were more likely to be very satisfied with their work itself, while those employed in academia but not on the tenure track are more likely to indicate being very satisfied with their overall quality of life. Employees in the BGN sector and those in tenure-track professor positions were equally likely to be very satisfied with status and with quality of life. BGN employees were somewhat less likely to indicate being very satisfied with their work itself.
- PhDs in social science doctorate programmes were well prepared for their careers in a number of ways, but they need additional training in essential professional competencies and better career preparation in order to fully utilise the knowledge and analytical skills they acquired during doctoral education.
- Women's share of PhDs in the social sciences has risen steadily and in some fields, such as anthropology and psychology, women now earn the majority of doctoral degrees. Among cohorts of social science PhD recipients who graduated between 1995 and 1999, SS5 found equality in early careers of men and women. In spite of the eradication of legal barriers to women's equality in employment, in spite of college and university commitments to gender equity, in spite of the cultural normalisation of working mothers, and − in social science fields in particular − in spite of the rapid increase of women among PhD recipients and full-time faculty, as a group women seem to be "subsidising" gender equality in careers by paying higher personal costs than men.
- Time-to-degree (TTD) is a common concern expressed policy-makers. It is associated to quality and efficiency of PhD programmes. Shorter TTD consistently correlated with an "excellent" rating quality of training and mentoring, as perceived by the doctoral graduates. Shorter TTD was also associated with higher ratings of professionalisation activities, such as socialising students into an academic community, encouraging students to take initiative and career preparation, and it was associated with higher quality of skills training, including training in what are considered "professional" skills needed for project management, communication and teamwork. Social science respondents who completed their PhD more quickly were more likely to obtain tenure-track professor positions. Married students and parents took slightly longer than singles and non-parents to complete the PhD; this held true for both men and women.

## Section II.2. National/regional surveys – United Kingdom

## "What do researchers do?" series

# Key Information

| | |
|---|---|
| **Organisation:** | Vitae |
| **Funder:** | RCUK |
| **Survey date:** | Six months after graduation and three-year follow-up of respondents by HESA |
| **Cycle/frequency:** | Annual first destination survey; three-year follow-up pilot in 2006, surveys in 2008, 2010 |
| **Survey population:** | UK and other EU domiciled doctoral graduates from all UK institutions; approximately 9000–10,000 per annum |
| **Response rate:** | 65–70% @ six months; 45% @ three years |
| **Contact person:** | Dr Janet Metcalfe, Chair and Head, Vitae (janet.metcalfe@vitae.ac.uk) |
| **Links:** | www.vitae.ac.uk/wdrd; www.hesa.ac.uk |

## Methodology

The data source is the UK Higher Education Statistics Agency (HESA) annual Destination of Leavers from Higher Education (DLHE) census survey approximately six months after graduation and more recently a three-year follow up survey of respondents (L DLHE) for selected cohorts (pilot 2002/03; 2004/5 and 2006/7). Institutions conduct the first destination survey and provide the contact information for the central three-year follow up survey. A combination of online questionnaire, postal survey and telephone interviews are used. www.hesa.ac.uk

The L DLHE includes additional questions on individual career progression over time, type of qualification, reasons for undertaking a research degree, how the research was funded, skills used when undertaking study, impact of the research degree and perceptions of achievement.

"What do researchers do? Doctoral destinations and impact three years on" presents a new classification for doctoral occupations based on the population of people with doctoral qualifications employed in different employment sectors and occupations according to the UK Labour Force Survey (LFS). www.vitae.ac.uk/wdrdmethodology

## Selected Major Findings

### What do researchers do? First destinations of doctoral graduates by subject, Vitae, 2009

First destinations of UK-domiciled doctoral graduates from UK institutions by subject (36 groupings), 25,000 respondents from 2003–2007. Overall patterns of employment consistent over the period. On average, 35% went into research roles across all employment sectors. Higher education is a main destination, where 23% of all respondents were employed as research staff and 14% as lecturers. The subject level analysis presents data on the main employment sectors and occupations.

### What do researchers do? Doctoral destinations and impact three years on, Vitae, 2010

2073 respondents approximately 3.5 years after graduation (2004/05). Analysed by occupational cluster and broad disciplinary groupings (arts and humanities, biological sciences, biomedical sciences, physical sciences, and social sciences).

- 86% employed in five specific doctoral occupation clusters; for 82% a doctorate was a formal requirement or important in current job.

- 91% use generic skills and 82% use research skills developed during doctorate some or most of the time in their current job.
- 75% employed in jobs which fit their career plans; 67% doing exactly the type of work they want to do.
- Doctoral qualification enables progression towards long term goals (90%) and enhances quality of life (88%).
- 90% make a difference in the workplace.
- 92% are creative/innovative at work.
- 70% have supervisory responsibilities.

**What do researchers do? Career paths of doctoral graduates, Vitae, 2011**

Tracking of individual pathways of 2073 doctoral graduates within and between occupational clusters approximately 3.5 years following graduation, their typical occupations and differences by broad discipline groupings.

- 71% stayed in the same occupational cluster throughout the 3.5 years, 45% in the same job.
- Over the survey period 40% moved out of HE research, while 25% had moved into HE research from other clusters.
- Job titles provided evidence of career progression within the survey period.
- Between a quarter and two-fifths of respondents in each occupational cluster at the survey point had moved there from a different occupational cluster.

**What do researchers want to do? The career intentions of doctoral researchers, Vitae, 2012**

One-off survey of current doctoral candidates in 2010 analysed by broad disciplinary groupings, stage of programme and mode of study. Over 2500 responses (UK, non-EU and international) from 130 institutions.

- 73% motivated to undertake doctoral study by interest in the discipline; 46% as essential for their intended career.
- 87% felt doctorate was essential or preferred for intended career.
- 46% with definite career in mind were aiming for a career in higher education; 23% in research outside higher education.
- 65% would have benefited from additional careers advice and support.
- 35% had study-related work experience during their doctoral degree; 58% described it as very helpful.

# Section II.2. National/regional surveys – Germany

# "ProFile – Promovierendenpanel"

## Key Information

| | |
|---|---|
| **Organisation:** | iFQ: Institut fürForschungsinformation und Qualitätssicherung |
| **Funder:** | DFG |
| **Survey date:** | Since April 2009 |
| **Period:** | April/June and October/December (depending on participating institution) |
| **Cycle/frequency:** | Yearly |
| **Survey population:** | Nine universities plus DFG, DAAD and two foundations |
| **Sample size:** | 7374 unique respondents (March 2012) |
| **Response rate:** | 22% (March 2012) |
| **Disciplines:** | Not limited/open to all disciplines |
| **Contact persons:** | **Dr Anna Fräßdorf**, project leader, iFQ (fraessdorf@forschungsinfo.de),<br>**Kalle Hauss,** research associate, iFQ (hauss@forschungsinfo.de);<br>**Marc Kaulisch**, research associate, iFQ (kaulisch@forschungsinfo.de) |
| **Links**: | http://research-information.de/Projekte/ProFile/projekte_profile.asp |

## Methodology

ProFile has been designed as a three-wave panel study and will be carried out through online surveys. Besides recording details on the educational biography of participants, the first wave will focus on the conditions of doctoral training, on the supervision provided, on the quality of the teaching, and on the resources made available, plus questions of financing. Once running, the first wave will reflect the situation at the start of the doctoral phase.

Essentially, the second wave will cover the transitional phase between doctoral training and entry into the labour market. The questionnaire will concentrate on academic achievements (participation at conferences, publication activity and final grades), on qualifications, skills and competencies that have been obtained during the training and on personal networks. Additionally, the second wave focuses on the individual's position in the labour market at the time of graduation.

The third wave will take place around three years after graduation and will aim to analyse the occupational career patterns and the influence of doctoral training on them.

During the research training (between starting and completing the doctorate) additional surveys will be carried out annually to generate information on the specific conditions for doctoral candidates in the form of a programme evaluation. Data will be collected on how satisfied doctoral candidates were with their supervision and with the teaching that was delivered. The evaluation results will be made available to the participating institutions as well as to participating doctoral candidates. Doctoral candidates can opt to request a personal profile that reflects their personal answer pattern in respect of key aspects of the doctoral programme (supervision, quality of teaching, courses and resources made available to them) and compares this with the profiles of the other participants.

## Selected Major Findings

Reforms have changed the structure of doctoral education: members of doctoral programmes have more supervisors, spend more time on their thesis, meet more frequently with supervisors, more often have written agreement on supervision and take part in a larger variety of courses compared to non-members.

But this is not reflected in higher satisfaction with supervision and a smaller discrepancy between demand and supply of supervision. However, members of doctoral programmes are more confident about their chances in the labour market.

The rationale behind the newly emerging doctoral programmes is that they are expected to provide candidates with optimal research and training conditions. Structured doctoral programmes can function as instruments that will bring about improvements in doctoral education in general. Furthermore they provide a means to contribute to the integration of foreign doctoral candidates into the scientific community. Our findings suggest that foreign doctoral candidates are well-integrated into the research environment in both the traditional and the structured programmes.

# Section II.2. National/regional surveys – Flanders
# "Survey of Senior Researchers"

## Key Information

| | |
|---|---|
| **Organisation:** | University of Ghent – ECOOM |
| **Funder:** | Project funds Flemish Government |
| **Survey date:** | Spring–summer 2010 |
| **Cycle/frequency:** | Every four years |
| **Survey population:** | All academic personnel with a PhD degree at Flemish Universities |
| **Response rate:** | 40% |
| **Disciplines:** | All academic fields |
| **Contact person:** | Karen Vandevelde, Centre for R&D Monitoring–Department of Research Affairs, Ghent University (Karen.Vandevelde@UGent.be) |
| **Links:** | http://www.ecoom.be/en/research/doctoralcareers |

## Methodology

All researchers with a PhD from the five Flemish universities (Ghent University, Free University of Brussels, University of Antwerp, Catholic University of Leuven and the University of Hasselt) were questioned. At one university (KU Leuven) a representative sample of this population was selected. The online survey was conducted in the summer of 2010. A total of 40% of the addressed researchers accepted the invitation. After data adjustment, the following results are based on information provided by 1565 researchers.

Themes being addressed were: career mobility (intersectoral and international), career prospects, supervision, publishing, collaboration, work–family balance and work satisfaction.

## Selected Major Findings

### Career prospects

The average time-to-professorship after the first postdoc appointment varies according to scientific field, ranging from 7.4 years for researchers in natural sciences to only 2.6 years in social sciences.

The rate of institutional and international mobility of Flemish researchers is very low: 76% of the postdoctoral participants still work at the same institution that granted their doctorate; 22% completed their PhD at another Flemish university and only 3% obtained their doctorate at a foreign institution.

The overwhelming majority of postdoctoral researchers would prefer an academic career in the future, but they give themselves only a 23% chance to stay at their current institution and a 34% chance to obtain a permanent position at another institution. Only 36% consider their postdoc as a preparation for a non-academic career.

### International and intersectoral mobility

A total of 71% of the participants report that in their field international mobility is required to succeed in an academic career. Nevertheless not all researchers are prepared to go abroad for their research. Only 16% are prepared to leave Belgium for more than one year; 23% would consider an appointment at a foreign institution. Family and other professional responsibilities are the most important barriers; 49% of participants have already been mobile in the past.

Foreign researchers moving to a Flemish university were mainly motivated by the research environment (research infrastructure), the presence of top researchers, the working conditions and the contacts they already had with Flemish researchers. Issues with immigration rules and social integration in Belgium are the most frequently reported problems.

A total of 31% of the researchers had already spent more than three months in a non-academic sector in the past – mostly in a hospital, a private firm or a government institution. Although intersectoral mobility is often considered counterproductive for academic output, 78% of the participants state that their mobility experience stimulated their scientific productivity.

**Publishing, selection and evaluation**

International peers have the strongest impact on the publication pattern of researchers, and researchers are also influenced by the criteria according to which research funds are allocated.

The publication pattern of researchers has changed significantly in the past five years: 60% of the respondents now publish more than they did five years ago. They now pay more attention to the position of the last author, publish more often with co-authors, in scientific journals, and in English.

Senior researchers are rather sceptical about selection and evaluation committees: 39% adjudge the selection procedures for the allocation of research funds within their institution as not objective or transparent, and 41% point at the lack of objectivity and transparency for the allocation of research funds at the Flemish level. In addition, the selection procedures for the appointment and promotion of academics are adjudged by 45% of the participants as not objective and transparent.

**Work, pressure and balance**

The supervision of students and junior researchers is one of the main tasks of full professors. They have on average six masters students, 4.3 junior researchers and 1.5 postdoctoral researchers under their supervision. Postdoctoral researchers also take on supervision tasks themselves: they supervise on average 2.6 masters students, 1.7 junior researchers and 0.3 (other) postdoctoral researchers.

Postdoctoral researchers spend on average 68% of their time on research. Teaching, (social) service and administration take each around 10% of their time. Full professors devote on average 38% of their available time to their research activities, 25% on research, 17% on (social) service and 20% on administration. The broader job responsibilities of full professors result in a higher work pressure: in an average week full professors work seven hours more than postdoctoral researchers.

Postdoctoral researchers are more satisfied with the time they can spend on their different job responsibilities and their total amount of working time. The overwhelming majority of full professors complain about the time they have to devote to administrative tasks and the limited time left to conduct their own research activities. As a result nearly half of the full professors (43%) are not satisfied with their average weekly working hours.

## II.3. Institutional data and surveys – ANRT France

## "CIFRE Grants"

### Key Information

| | |
|---|---|
| **Organisation:** | Association Nationale de la Recherche et de la Technologie, France |
| **Funder:** | French Ministry of Higher Education and Research |
| **Survey date:** | 2011 |
| **Period:** | 2000 to 2011 |
| **Cycle/frequency:** | Three years |
| **Survey population:** | 5794 former CIFRE PhDs |
| **Response rate:** | 34%, 1973 respondents |
| **Disciplines:** | All |
| **Contact person:** | Clarisse Angelier, Head of CIFRE department, ANRT (angelier@anrt.asso.fr) |
| **Link :** | www.anrt.asso.fr |

### Methodology

The CIFRE process offers doctoral training that allows PhD candidates to carry out their research in the framework of a partnership between academia and business. In fact, the doctoral candidate is employed by the company involved in the research partnership. For more than 30 years, CIFRE grants have awarded more than 14,000 PhD. Today, CIFRE brings together 3800 PhD students, more than 1000 companies and 900 laboratories, in all activity sectors and scientific disciplines. Every three years, the PhDs' gradual change and type of career is observed through a survey.

This survey is focused on the CIFRE PhD awarded from 2000 until 2011. The response rate is 34%, with a good representation of disciplines; however, the number of responses is higher for the PhDs awarded in the more recent period.

### Selected Major Findings

The most interesting point is the short time that it takes for the CIFRE PhD holders to get a job, although only 35% of respondents remain with the company that hired them during the doctoral training. Ex-CIFRE fellows have a good ability to move from one company to another, their scientific and professional competencies being recognised by the business world in a variety of contexts: 39% are employed by large companies (more 2000 employees), 5% by medium-sized companies (500 to 2000 employees), 22% by small companies (fewer than 250 employees), and 30% by an academic body.

For all scientific branches, in 50−75% of cases, the specific "CIFRE PhD" was a deciding factor for being recruited by a company; as were, in almost 75% of cases, the "bicultural competencies" of CIFRE PhD holders, covering both academia and business. The PhD has offers a good start to the beginning of a career, but also helps holders to get a promotion inside the company or to move to another company. Nevertheless for 25%, the PhD has not been a criterion for reward yet.

With regard to the job setting, more than 75% of CIFRE PhD holders confirm that their ability to work in an interdisciplinary framework and with/within a team is required, as well as their ability to network. Just 50% need to work on an international stage or to build a strategy for their company. But for all these required competencies, CIFRE PhD holders retrospectively assess that the training during the PhD period was not sufficient.

Salaries range on average between 40 and 60 k€ per year, the older respondents commanding a better salary than the younger ones.

## II.3. Institutional data and surveys – Wellcome Trust UK

## "Wellcome Trust Career Tracker"

### Key Information

| | |
|---|---|
| **Organisation and Funder**: | Wellcome Trust |
| **Survey date**: | Since 2009, three waves have been conducted; Wave 4 is in progress (Summer 2012) |
| **Period:** | 2009 – (ongoing) |
| **Cycle/frequency:** | Annually |
| **Survey population:** | Basic science PhD studentship (PhD)<br>Sir Henry Wellcome Postdoctoral Fellowship (SHWPF),<br>Early career fellowship<br>Research and Career Development Fellowship (RCDF),<br>Intermediate Career Fellowship<br>International Senior Research Fellowship (ISRF) |
| **Response rate:** | Wave 1 (2009) – 79%<br>Wave 2 (2010) – 84%<br>Wave 3 (2011) – 81% |
| **Disciplines:** | Basic Biomedical Sciences |
| **Contact person:** | Joanna Scott, Evaluation Officer, Wellcome Trust, UK (J.Scott@wellcome.ac.uk) |
| **Link :** | www.wellcome.ac.uk/careertracker |

### Methodology

The Wellcome Trust Career Tracker – launched in 2009 – is an online survey tool that enables us to track the career destinations of key cohorts of Wellcome Trust-funded researchers. It gives us an understanding of the career choices that award holders make and helps to inform the Trust's provision of research and career support.

Each year, specific cohorts of Wellcome Trust-funded researchers receive a short online survey, focusing on career destination. A new cohort of grant holders, in the final year of their grant, is added to the Tracker every year.

### Selected Major Findings

The findings from the third year of the Basic Science Career Tracker are allowing us to identify potential trends in the data, because we are now able to report on actual career destinations among most cohorts, rather than intentions.

Former PhD grant holders reported high levels of employment, with approximately three-quarters taking a first position in academic research.

Three years after completing their PhD training, 95% of the 2003/04 cohort reported being employed in full-time positions, with 60% remaining in academia.

For this early PhD cohort, the percentage of men employed in academia has remained high over the three years, but the percentage of women has fallen from 67% to 46%. There is also a trend for students to conduct postdoctoral work outside the UK, with an increasing proportion taking up positions in the UK.

No major career destination changes have been observed over the past three years in former RCDF holders. Almost all (97%) were employed in academia, among whom nearly half (n = 32, 47%) enjoyed a high level of independence as researchers in receipt of Wellcome Trust funding in their own right.

The former ISRFs were also well established in their academic careers: all (except one) were employed in academic positions where they continued to do the same or similar research as they had been doing during their award.

Because the majority of Sir Henry Wellcome Postdoctoral fellows have not completed their award, the analysis primarily provides a snapshot of their career intentions. All fellows (n = 15) who were still on the award expressed their commitment to undertaking academic research after finishing their fellowship.

Given the trends emerging among the PhD cohorts – particularly women's more pronounced departure from academia – we are conducting some more in-depth analysis of career motivations and investigate the match between career intentions and actual destinations.

## II.3. Institutional data and surveys – European University Institute (Italy) "EUI"

### Key Information

**Organisation and Funder**: European University Institute (EUI)

| | |
|---|---|
| **Survey date**: | 2012 |
| **Cycle/frequency:** | Every five years |
| **Survey population:** | EUI alumni who enrolled in an LLM or PhD programme between 1976 and 2006 |
| **Response rate:** | 45% (965 out of 2140 alumni) |
| **Disciplines:** | Economics, history, law, social and political science |
| **Contact person:** | Judith Przyrowski, Academic Service/Human Resources (judith.przyrowski@eui.eu) |
| **Link :** | www.eui.eu |

### Methodology

The EUI is a European research institute in the above disciplines offering masters, PhD and postdoctoral programmes. The great majority of the participants in the PhD programme come from 19 European states, the EUI contracting states, which are not only EU member states. These countries pay for a certain number of grants for their citizens to finance the four-year PhD programme. Every year, a total of around 150 researchers in the four disciplines are accepted to this programme. Of these, 90% finish their doctorate within four years.

Every five years, we run a survey to find out where the PhD holders work (Alumni Survey). Such surveys have been organised for the last 25 years. Since 2007, the questionnaire is more extensive and more detailed especially regarding questions about, for example, type of job, job satisfaction, evaluation of the doctoral programme as preparation for a career, etc. The objective is not to gain information about the complete career path of the alumni but to find out what they are doing at the moment of the survey (e.g. in the last survey participants were asked to give information about their first job and their current job, but not about any potential jobs in between). The last survey was run in March 2012. Analysis is not yet finished.

### Selected Major Findings of 2012 Alumni Survey

- 60% employed in universities/higher education institutions or research institutes, the second and third most important occupation fields being European Institutions (10%) and the public sector outside academia (9%).
- 44% in academic jobs work as professors or associate professors, 17% as assistant professors and 14% as lecturers/academic teachers.
- 53% are very satisfied with their job, 37% satisfied.
- 23.1% have a second job, most of them at a university or research centre.
- 48% work in a country other than their country of origin.
- Most of the male PhD graduates have a postdoc position as their first job (30%), whereas most of the female PhD graduates have position as a lecturer or academic teacher as a first job (27%).
- Of those who enrolled in an EUI programme between 1976 and 1986, 75% have a position as a professor or an associate professor as their current job. Of those who enrolled 10 years after (cohorts 1987 to 1996) this is still the case for 67%. 20 years after (cohorts 1997 to 2006) this figure has decreased to 20%.
- 89% say that their PhD/LLM degree was important for their career advancement.

## II.3. Institutional data and surveys – Germany

## "The Alexander von Humboldt Foundation's Research Fellowship Programme"

### Key Information

| | |
|---|---|
| **Organisation:** | Alexander von Humboldt-Stiftung/Foundation (AvH) |
| **Funder:** | Federal Foreign Office (AA), Federal Ministry of Education and Research (BMBF), Federal Ministry for Economic Cooperation and Development (BMZ), Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) |
| **Survey date**: | May – July 2010 |
| **Cycle/frequency:** | Ex-post programme evaluation |
| **Survey population:** | Humboldt Research Fellows (postdoctoral researchers < 4 years after PhD, Experienced researchers < 12 years after PhD) |
| **Funding period:** | 1970–2009, during which a total of 16,875 fellows were sponsored |
| **Sample size:** | 12,148 fellows with contact email address |
| **Response rate:** | 6940 respondents, 41% (population), 57% (sample) |
| **Disciplines and Nationalities:** | Scientists and scholars of all nationalities and disciplines |
| **Contact person:** | Dr Anita Schlögl (anita.schloegl@avh.de), Dr Christina Schuh (christina.schuh@avh.de), Division Evaluation, Statistics |
| **Link:** | http://www.humboldt-foundation.de/web/evaluation-hfst-en.html |

In April 2009, Technopolis was contracted to evaluate the Alexander von Humboldt Foundation's Humboldt Research Fellowship Programme. The Foundation's fellowship programme was first announced in 1954. Since then, more than 22,000 academics from all over the world have conducted a research stay in Germany on the strength of one of the Humboldt Foundation's research fellowships. These fellowships are granted to exceptionally qualified scientists and scholars from abroad to promote long-term research stays at research institutions in Germany. They are dedicated to facilitating a research project of the fellow's own choice in cooperation with an academic host.

### Methodology

The evaluation used an impact analysis to examine whether the programme achieved its objectives over the period 1970–2009, during which a total of 16,875 fellows were sponsored. Both quantitative methods (analysis of the Humboldt Foundation's sponsorship and contact data as well as an electronic survey of fellows and hosts at German research institutions) and qualitative methods (interviews, case studies) were used.

### Selected Major Findings

The major global objectives of the Humboldt Research Fellowship Programme are to contribute to the internationalisation of the German research landscape by promoting excellent academics from abroad, to foster the development of influential "connoisseurs and friends of Germany" by this means and, finally, to build and develop an enduring, world-spanning network of elites.

The Humboldt Research Fellowship Programme fulfils these objectives to a very high degree.

## Career development of Humboldt Fellows

Every fifth fellow who received a fellowship 20 or more years ago now holds, or did hold, a top leadership position; 80% of alumni working at a university or higher education institution 20 or more years after the fellowship are full professors. Thus, all over the world, Humboldtians hold leading positions, above all, at academic and research institutions, but also in politics, culture and industry.

### In which sector are you working?

| | Life Sciences | Social Sciences, Humanities | Engineering | Sciences | Total |
|---|---|---|---|---|---|
| At a university | 65% | 82% | 69% | 67% | 71% |
| At a non-university research institute | 16% | 6% | 15% | 20% | 15% |
| In industry | 4% | 1% | 6% | 5% | 4% |
| In the public sector | 2% | 1% | 1% | 1% | 1% |
| Self-employed | 3% | 1% | 1% | 1% | 1% |
| I am no longer working (e.g. retirement) | 6% | 6% | 6% | 5% | 6% |
| Other | 4% | 2% | 2% | 2% | 2% |
| n* | 1,289 | 1,798 | 780 | 3,015 | 6,882 |

* Funding period 1970–2009

### What is your current primary position?

| Position at a university | Experienced researcher | Postdoctoral researcher | Total |
|---|---|---|---|
| Full Professor | 90% | 80% | 85% |
| Associate Professor | 6% | 16% | 11% |
| Assistant Professor | 1% | 2% | 1% |
| In another position | 3% | 2% | 2% |
| n* | 422 | 412 | 834 |

* Funding period 1980–1989

## Follow up contacts and collaboration

Research stays are academically productive and provide a sound basis for further cooperation. More than 70% of hosts and fellows continue the scientific collaboration they have developed during the fellowship stay. Fellows often cooperate beyond the boundaries of the host institute; humanities scholars, in particular, cooperate especially frequently with other academics from Germany and with other Humboldtians. By comparison, engineering scientists most frequently continue their scientific cooperation with their host or host institute.

## II.4. Institutional data and surveys – Flanders

## "Human Resources in Research – Flanders database"

### Key Information

| | |
|---|---|
| **Organisation:** | University of Ghent – ECOOM |
| **Funder:** | Project funds Flemish Government |
| **Survey date:** | Permanent monitoring |
| **Cycle/frequency:** | Annual updates |
| **Survey population:** | Register data from all academic staff at Flemish Universities, including PhD registrations |
| **Response rate:** | Full population statistics |
| **Disciplines:** | All academic fields |
| **Contact person:** | Karen Vandevelde, Centre for R&D Monitoring–Dept. of Research Affairs, Ghent University (Karen.Vandevelde@UGent.be) |
| **Links:** | http://www.ecoom.be/en/research/doctoralcareers |

### Methodology

Administrative data of all researchers who are enrolled for a PhD degree and of all researchers with an academic position at one of the five Flemish universities (Catholic University of Leuven, Ghent University, Free University of Brussels, University of Antwerp and University of Hasselt) have been aggregated into one database containing comprehensive data since 1990–91. Through an independent intermediary organisation, these data are aggregated, anonymised and attributed with a random ID, before being made available for analysis. Updates are performed annually with the participation of each of the universities.

The data contain personal information (gender, age, nationality) as well as employment-related information (type of scholarship/funded position, research field, academic position, starting date, completion date, etc.)

The information enables annual monitoring of the stock and flow of doctoral researchers, doctoral completion rates, academic staff, promotions, HR policies, etc., while fully in line with privacy protection regulations. Every year ECOOM provides the Flemish universities with a set of indicators monitoring academic HR personnel, PhD trajectories and completion rates, focusing on key characteristics such as gender, nationality, field of research and funding routes. From 2012 onwards ECOOM is extending these indicators to include quantitative data and analyses on senior academic staff.

### Selected Major Findings

So far only analyses on junior academic staff have been carried out, focusing on completion rates, time-to-degree and factors influencing these performance-based indicators. At the moment, the HRRF contains information about the careers of 29,229 junior academic staff.

Of all PhD researchers who started in the academic year 1990–1991, 43.6% obtained their PhD degree within eight years – a period we consider as a "reasonable time". Ten years later, for PhD researchers starting in 2000–2001, this success rate had increased to 62.4%. This increase continues into the more recent cohorts, even though their PhD track has not yet been observed for the full eight years in the HRRF-database. These calculations are limited to those researchers who either have an obligation to do PhD research (e.g. bursary recipients) or an intention to do PhD research (e.g. registered as PhD student).

The way a PhD project is funded is the most significant predictor of PhD success. The competitive selection process required to obtain a PhD bursary from FWO (Research Foundation Flanders), IWT (Agency for Innovation by Science and Technology) or the university's own research funds (BOF), has continuously resulted in high success rates over the past two decades: 75% to 85% of recipients of these competitive bursaries have completed their PhD degree in a reasonable period of time.

Research in natural sciences, life sciences or applied sciences more often leads to the completion of a PhD degree than research in humanities or social sciences.

PhD graduates at Flemish universities who defended their PhD in 2008–2009 needed a median of 4.81 years (58 months) to complete their degree. We observe an increasing standardisation in the PhD time-to-degree: ultra-short PhD tracks of less than two years (e.g. researchers who have already completed a large share of PhD-related research abroad or in their spare time before registering at a Flemish university) or extremely long PhD trajectories lasting 10 years or more have become rather exceptional. In parallel with success rates, the duration of a PhD track varies significantly across disciplines.

PhD researchers often combine various funding schemes and research appointments in order to complete their PhD degree. When the standard period of four years' full time funding is completed, many receive top-up funding through contract appointments. Another trend observed in research contract hopping is that more and more researchers are first "groomed" into research through appointments by temporary contracts before they succeed in obtaining the most prestigious, competitive PhD bursaries.

While the proportion of foreigners from inside or outside the EU was a mere 6% among new researchers at Flemish universities in 1990–1991, this figure increased to 30% two decades further on.

New indicators dealing with postdoctoral and professorial staff at Flemish universities are in preparation, such as:

- Doctorate holders starting in a postdoctoral position by institution where they obtained their PhD (same institution or other institution), and by nationality (Belgian or not) or population of postdoctoral researchers by nationality (Belgian or not)
- Researchers starting as professor by institution where they obtained their PhD (same institution or other institution) and by nationality (Belgian or not)
- Population of professors by nationality (Belgian or not)

This HRRF database will keep a finger on the pulse of academic career opportunities for doctoral graduates at Flemish universities, being able to differentiate between disciplinary fields, nationality and gender. While the impact of new HR-policies and developments in gender balance, for example, will be closely monitored with reliable data, ECOOM will continue to find explanations for observed trends through a combination with survey data qualitative research methods.

## II.4. National/regional register data – Denmark

## "Statistics Denmark PhD Register" and "ISOLA"

### Key Information

| | |
|---|---|
| **Organisation:** | Statistics Denmark |
| **Funder:** | Statistics Denmark |
| **Survey date:** | Ongoing |
| **Cycle/frequency:** | All PhDs at start, during the programme, at graduation resp. at drop out |
| **Survey population:** | Register data for all individuals: educational register; employment register and PhD register |
| **Response rate:** | Full population statistics |
| **Disciplines:** | All academic fields |
| **Contact person:** | Poul Schjørring (posc@vus.dk) |
| **Links:** | http://www.ubst.dk/uddannelse-og-forskning/statistik/ph-d-1 (Danish only) |

In Denmark, the following registers on researchers exist:

#### Statistics Denmark

Statistics Denmark has information on each person (based on the personal identification number, CPR), including PhD graduates. For example, the education register covers all education activities (diploma achieved) since 1970. The employment register contains data on e.g. employment for PhDs (job function, related to their graduation, and field) and stays abroad (shorter or longer).

A special register is dedicated to PhDs. The PhD register covers individual information about the type of PhD programme, affiliation, education background, financing, stays at other national research institutions and abroad, the PhD project, e.g. scientific field. The register consists of three different data sets: 1) from before 2006, 2) 2006–2008 and 3) 2009 and onwards. All PhD students are surveyed when they begin their PhD programme, during the programme and when graduating or dropping out.

#### ISOLA

The ISOLA register covers individual information (based on the personal identification number, CPR) about researchers yearly income and position at the Danish universities. Data is provided by the universities. Data covers 2004 and onwards.

### Selected Major Findings

The PhD register is used annually in an analysis of intake, population, completion rates, average duration and the distribution on gender, age, institutions, scientific fields, etc. Furthermore, all registers are used on an ad hoc basis and as part of specific studies. Thanks to the personal identification number, it is possible to combine the different registers and track all persons.

### Examples of analyses

#### 1. Study of the impact of PhD graduates on productivity in private sector enterprises

The study is based on a sample from the education register and the business register of Statistics Denmark in the period from 1999 to 2008. The sample of persons covers approximately 1.26 million people employed in the private sector of whom approximately 4000 have a PhD degree. The PhD graduates work in 990 different enterprises (defined by their number in the Central Business Register).

The sample of enterprises covers approximately 8000 mainly rather large companies employing approximately 750,000 persons of whom approximately 3200 have a PhD degree.

The study shows that the average labour productivity in enterprises with minimum one PhD graduate is approximately 34% higher compared to enterprises with the same mix of educations and skills but without a PhD graduate.

The study has been conducted by the Centre for Economic and Business Research at Copenhagen Business School on behalf of the Danish Agency for Science, Technology and Innovation (report in Danish only at http://www.fi.dk/publikationer/2012/ansaettelse-af-phder-og-produktivitet).

## 2. Analysis of the intake of PhD students in 2010

Drawing on the PhD register, the analysis focuses on the intake of the PhD students in 2010 in order to determine the share of PhD students which pursue a PhD programme at the university they graduate from.

The analysis shows that 45% have a masters degree from the same university, 17% have a master degree from another Danish university and 38% either come from a foreign university (the majority) or pursue a PhD programme with an integrated masters degree (the minority). Looking at the different categories across the different scientific fields, there is some variety (report in Danish only at http://www.ubst.dk/uddannelse-og-forskning/statistik/ph-d-1).

## 3. Analysis of the entry of PhD graduates to the labour market

The entry of PhD graduates to the labour market is analyzed annually. In brief, it is registered if the PhD graduates reside in Denmark on the 1st of January the year after graduation. In week 48, the status at the labour market (employed, unemployed or outside the labour market, e.g. on leave) of those who reside in Denmark is counted.

Looking at the persons who received their PhD in 2010, 78% were employed, 14% were abroad, 2% were unemployed and 6% were outside the labour market. There have only been minor changes in the results over the last couple of years (report in Danish only at http://www.ubst.dk/uddannelse-og-forskning/statistik/ph-d-1).

## II.4. National/regional register data – Norway

## An overview of Norwegian databases

### Key Information

| | |
|---|---|
| **Organisation:** | NIFU − Nordic Institute for Studies in Research, Innovation and Education |
| **Funder:** | Research Council of Norway |
| **Survey date:** | Ongoing |
| **Cycle/frequency:** | All PhDs at start, during the programme, at graduation respectively at drop out |
| **Survey population:** | Register data for all individuals: educational register; employment register and PhD register |
| **Response rate:** | Full population statistics |
| **Disciplines:** | All academic fields |
| **Contact person:** | Bo Sarpebakken, NIFU (bo.sarpebakken@nifu.no); Hebe Gunnes, NIFU (hebe.gunnes@nifu.no) |
| **Links:** | http://www.nifu.no |

In Norway, the following registers on researchers exist:

### The Register of Research Personnel

**Population**: Register data covering academic staff in the Norwegian Higher Education Sector, research institutes and health trusts
**Response rate**: Full population statistics
**Disciplines**: All academic fields

The Register of Research Personnel covers researchers/university graduate personnel that participate in R&D at Norwegian higher education institutions, research institutes and health trusts. Firms and enterprises are not included. The data are applied for statistical and scientific purposes.

The register includes information on gender, age, position, institution, the institution's field of science, education and doctoral degree (if earned), distinguishing between awards in Norway and awards abroad. The time span covered is 1961–2011, whereas electronic data are available from 1977 onwards.

The register is updated annually (biannually prior to 2007) from information supplied by the R&D performing institutions.

### The Doctoral Degree Register

**Population**: Register data covering all persons awarded a doctoral degree in Norway
**Response rate**: Full population statistics
**Disciplines**: All academic fields

Data on earned doctoral degrees in Norway are compiled in the Doctoral Degree Register of NIFU, including all doctoral and licentiate awards from all Norwegian institutions through the ages (1817–2011). Awards from non-Norwegian institutions are not included in the register. The data are applied for statistical and scientific purposes.

The data include type of degree (title), at which institution and in which year the degree was awarded, the field of science of the dissertation, the gender and the educational background of the doctor, and his or her citizenship.

The register is updated regularly twice a year from information supplied by the awarding institutions.

# Section III. Tracking of Researchers' Careers: Why, for Whom and How?

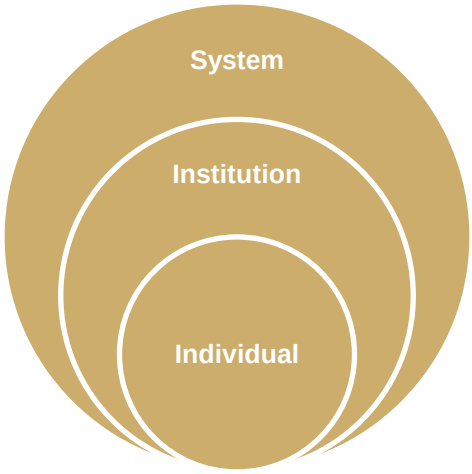
## Summary from Workshop Working Groups and World Café

The workshop discussions were based on the following two major conceptual steps in the set-up of career tracking studies:

- **Section III.1**. Identification of purpose and stakeholders: **Why** and **for Whom** do we track researchers' careers?
- **Section III.2.** Implementation: **How** do we track researchers' careers?

## Section III.1. Career Tracking – Why and for Whom? (Stakeholders)

As summarised by Professor Maresi Nerad for the workshop report, "cycles of proclaimed overproduction and fear of underemployment of people with doctorate degrees have alternated throughout the history of the education and training of researchers. Currently, in light of the idea of the knowledge economy and the knowledge society, governments invest much in the development of research and training of researchers. In this context researchers' career tracking has become important in order to inform the necessary (strategic) choices made by the various stakeholders that work in the field of research careers."




Career tracking studies serve multiple audiences and purposes. The three levels of stakeholders concerned are: individuals (in particular individual researchers), institutions (higher education institutions, research performing institutions, research councils, funders, etc.) and the research system including society at large. Depending on the focus of the study, certain stakeholders gain more or less importance, but career tracking studies generally provide a wealth of information, which at the same time is considered useful for stakeholders in each of the three levels.

## Career Tracking – Why and for Whom?

| For Whom | Why |
|---|---|
| **The System**<br>- Society at large<br>- Research system<br>- Government<br>- Policy makers<br>- Industry/ Employment sector<br>- Taxpayers etc. | ▪ **Enhance effectiveness and efficiency**<br>- Optimising resources/investments<br>- Measure return on investment<br>- Role and value of public funding in PhD training?<br>- Measure outcomes of doctoral education and contribution to society/economy<br>- Alignment of PhD training towards economic needs<br>▪ **Structural approach to research careers and the labour market for researchers: capacity building according to supply/demand**<br>- Analyse the need of support per career stages (R1–R4)<br>- Develop strategies in relation to the research workforce and the economy of the country/understand career moves (family, social security)<br>- Identify and ensure a balanced supply of highly skilled people for academia, industry, business, government and third sector<br>- Identify gaps in expertise/skills, e.g. "Does scientific training also bring about ethical or social skills that can be used outside academia?"<br>- Analyse the contribution (economic, social and cultural impact) of researchers to economy and society<br>▪ Benchmarking: positioning of the national PhD workforce against other European or non-European countries' PhDs<br>▪ Understanding career landscapes and patterns of researchers' careers<br>- Foresight approach: foresee trends with respect to<br>▪ Employment<br>▪ Research topics<br>▪ Economy/society<br>▪ **Mobility**<br>- Understand and enable different forms of mobility: international, intersectoral; in and out of academia; in and out of research<br>- Awareness about knowledge circulation<br>▪ **Accountability**<br>- Inform about policy and practice<br>- Inform about outcome of career funding schemes and impact of doctoral programmes in view of their mission and objectives<br>- Identify the effect of (non) funding on future society/economy/workforce<br>- Justify public investment in doctoral training/research including:<br>▪ effect of changes in policy<br>▪ adaptation of funding instruments<br>- Produce "good" science (understanding training needs of researchers, productivity patterns and stages of careers)<br>- What is the true value of a PhD? (compared e.g. to a masters)<br>- Awareness raising/communication about benefits of research careers<br>▪ **Policy planning**<br>- Quality management: increased need for quality assurance<br>▪ Ensuring/Improving the provision of the right training/funding schemes<br>▪ Advance existing/develop new strategies/programmes to support doctoral education<br>- Prevent unemployment through effective research training |

| For Whom | Why |
|---|---|
| **The Institution**<br>- Research performing institution<br>- Funding agency<br>- Professional societies<br>- Private company<br>- Public service / administration<br>- NGOs etc. | ▪ **Creating transparency and know-how about institutional workforce, jobs and career paths**<br>- Knowledge about the staff structure (R1–R4) and its balance<br>- What is the distinction between research and non-research occupations and how to measure/indicate this [is it measurable]?<br>- Creating transparency about jobs and career paths<br>▪ Awareness of wider career options and on how to deploy skills in different settings:<br>▫ Where are our researchers coming from?<br>▫ Do they have appropriate/expected skills?<br>▫ Where do our researchers go next?<br>▫ Are we providing them with suitable skills for the next steps?<br>▫ Which sectors of the economy do we serve?<br>▪ **Career development**<br>- Provide career destination guidance to the institutional workforce:<br>▪ Raise awareness at the level of career consultants/advisors (incl. supervisors, principal investigators, families etc.) of the breadth of careers open to researchers<br>▪ Inform about employability inside/outside research<br>▪ Demonstrate programme outcomes through professional destinations: link between programme, PhD or research experience and future employment)<br>▪ Demonstrate how career transitions are organised<br>▪ Share experience of previous with current researchers<br>- Provide information to employers on understanding the researchers' labour market and what doctoral graduates can offer them<br>- Monitor career advancement<br>▪ **Institutional competitiveness/profiling the institution**<br>- Assess impact of doctoral programmes in view of their mission and objectives<br>- Assess the quality of doctoral programmes in view of their mission and objectives - benchmarking against<br>▪ other institutions<br>▪ other programmes<br>▪ other ways of organising programmes<br>- Challenge to maintain a competitive position for future funding (e.g. x% employed, y% in research, z% taxi drivers)<br>- Promoting the institution based on insight about the success of their researchers<br>- Advance existing and develop new strategies/programmes to support doctoral education<br>▪ **Inter-institutional/inter-sector collaborations and networks**<br>- Maintenance of sustainable links between academia and research/non-research (alumni networks)<br>- Awareness about benefits for the institution when encouraging mobility |

| For Whom | Why |
|---|---|
| **THE INDIVIDUAL**<br>- Current and future researchers at the various levels:<br>- Researchers R1<br>- Researchers R2<br>- Researchers R3<br>- Researchers R4 (~Professors)<br>- Non Researchers | ▪ **Provide career orientation and information on career destinations, programmes etc.** which will help doctoral candidates and prospective researchers to make well informed career choices, e.g.:<br>Information about career perspectives:<br>- Why should I study for a PhD?<br>- What are alternative choices and where do they lead?<br>- Information by peers and career development of peers<br>- Information on the difference made by e.g. institution, country, supervisor, programme<br>- Where might a certain choice lead my career to? (I want to get to x, will a PhD help me?)<br>- Return on my investments<br>▫ of time?<br>▫ of cost?<br>- Illustrate good practice examples out of career tracking (show diversity)<br>- Value of international mobility?<br>- Need to understand people making a different choice (other national system/other career)<br>▪ **Job satisfaction**<br>- Expectations/profit ratio of career (more than salary)<br>- Meaningful work/research<br>- Employment conditions, e.g. flexicurity (sectors, countries, disciplines, institutions)<br>▪ **Demonstrate attractiveness of research career/perception of quality of career**<br>▪ **Understand the motivation to engage in doctoral training**<br>- E.g. most students pursue a PhD out of love for the subject, while indicators to measure success are mainly "material": income, publications, career attainment, etc.<br>▪ **Realising the broad variety of successful careers – not just in academia.** |

## Section III.2. How to set up a Career Tracking Study?

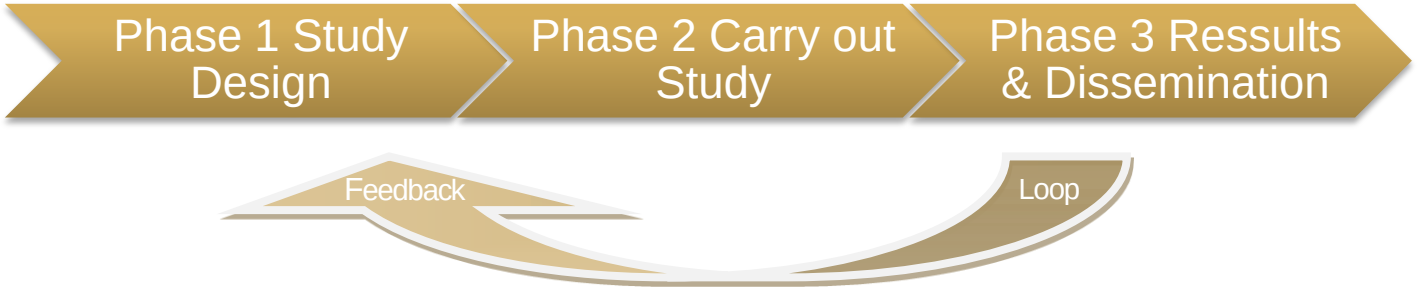
The identified purposes and stakeholders, as outlined in Section III.1. "Why and for Whom", determine the way in which the career tracking study will be conceived and implemented ("How"?).

The implementation process consists of three phases that are described in the following:

- Phase 1: Study Design
- Phase 2: Carrying out the study
- Phase 3: Results and Dissemination – to be followed by a feedback loop to phase 1 (lessons learnt – leading to adaptations and redesign)

The present section is not intended to be exhaustive, but resumes the contributions made by the members of the Working Groups and the World Café during the workshop. It can help to stimulate reflection on different aspects in the phase of considering the set-up and design of a career tracking study.

### Phases of the Implementation Process of a career tracking study




Implementation Phase 1: Study Design

### Implementation Phase 1: Study Design

In this phase, the study will be carefully planned/designed, taking into account the purposes/objectives and study framework defined in the preliminary stage.

**Study framework – already defined (cf. section "Why and for Whom?") :**

- Purpose and objectives
- Stakeholders

**Study framework − remaining to be defined:**

- Available resources:
  - Budget & HR staff/expertise (need to hire/outsource?)
- Available timeframe
- Type of study and methodology:
  - Already available data/registers and data protection legislation may be decisive concerning the type of study and methodology to be envisaged
  - Cohort studies; longitudinal panel study; cross-sectional retrospective study; cross-sectional retrospective study composed of consecutive cohorts; register or administration data, alumni database, CV analysis, data mix, etc.
  - Longitudinal vs. early career? If longitudinal, how to keep track of the population you follow?
  - Type of survey: online, phone or print? Interviews?

  - Population (R1–R4; researchers/non researchers; sectors; disciplines; control groups); need for a robust body of data/analysis allowing aggregation by subject, sector, type of research, organisation, gender, etc.
  - Sample: recruitment basis; representativeness; for example, PhD population in country x/institution x; only structured PhD programmes, etc.
  - Approach: both quantitative and qualitative approaches needed, e.g. to understand contextual factors
  - Periodicity and timing, for example, good choice of starting point for the tracking − results may depend on the timing of the survey
  - New web-based ways to create panels of respondents (may) emerge
- Choice of methodology implies choice of tools and software for both implementation and analysis/results phase!
- If outsourcing: terms of reference, etc.
- Define key performance indicators that correspond to purpose and objectives (inclusion of baseline data)
- Define strategy for stakeholder management during the different phases of study (including sponsors)
- Define professional communication strategy right from the start to involve stakeholders, disseminate results
- Optimise procedure, preview and manage bottlenecks

**Aspects to take into account for the conceptualisation of the study:**

- Benchmarking: analyse existing tracking studies of the same nature and their questionnaire/methodology
- Try to achieve comparability where possible: consider methodology suggested by OECD CDH project using the same wording/terminology −Limitation: national/institutional terminology may be specific (e.g. the designations of positions)
- Observe good practice in survey design
- How to deal with ethics/data protection?
- How to deal with international mobility? Tracking internationally mobile population may be difficult.
- Broader definition of mobility to address intersectoral and interdisciplinary mobility
- How to measure what is a successful career?
- How to measure quality of research output?
- When conceptualising a study, the complexity and diversity of lives & career paths need to be considered
- Assess the family/relationship path in parallel with the professional career path (work-life career paths). Such a dual analysis allows understanding the influence of partners, children and the care-taking of parents on career development
- The usefulness of the doctoral qualification is assessed both in light of personal as well as career development
- To fully understand the interaction between private and professional life, career tracking needs to consider a longer timeline than just one or two years after completion of the doctorate
- The added value of PhD training should be determined in relation to masters degree achievements (input-output analysis), for example analyse completion rates of doctorates in relation to achievements at masters level
- Keep in mind the context: validity of surveys depend a lot on how people interpret the questions (disciplines, working and living conditions differ; relevance of PhD stage at time of the survey)
- Each indicator might be multi-faceted: this might be true for objective indicators such as income level; but especially concepts such as "satisfaction" or "quality"

Implementation Phase 2: Carry out Study

## Implementation Phase 2: Carrying out the study

In this phase, the questionnaire will be developed and the survey will be carried out.

**The questionnaire – general comments:**

- Conceptualise the different sections of the survey questionnaire
  - Consider the purpose of your research and pose the right questions to translate them into carefully worded questionnaire items crafted to facilitate analysis and interpretation
- Create effective survey questions: Be Brief – Be Objective – Be Simple – Be Specific – No built-in assumptions
- Ensure effective survey design:
  - Make the survey visually appealing and user-friendly
  - Try not to use small fonts or fonts that are not easy to read
  - Ask interesting questions at the beginning of the survey to raise attention
  - Built a relationship with your respondents and try to notify them of the upcoming survey
  - Indicate how long the survey takes to complete and indicate the expiration deadline
  - Personalise the invitation message, if possible
  - Avoid open ended questions for the quantitative part
  - Place demographic and/or sensitive questions at the end of the survey to avoid early drop outs
- Involve main stakeholders; allow for their feedback on questionnaire and survey design
- Pilot test the survey before going live; undertake interviews to find out if you need to revise and edit questions survey design
- Schedule reminder messages

**The questionnaire – potential content:**

- **Quality of doctoral training**
  E.g. facilities, research topic/project: who decided about PhD topic?
  Type and quality of supervision, working conditions, collaboration with experts, seminar series, guest researchers, working environment support, reputation, independence, discipline specific aspects
- **Qualification prior to the PhD degree/grades** − Tracing top grades, etc.
- **Career**
  Initial career goals vs. goals at the end of the PhD, career advice, salary, capabilities for current job and progression, job destinations/academia and other sectors, value of PhD for getting job, kind of contract/status, using networks from PhD, transitions
- **Professional skills as a researcher**
  Project management, future trends/foresight, social skills/team-working/working with others, leadership, employability/knowledge of career opportunities/interview skills/CV writing, communication skills/presentation/publications/grant proposals/writing/teaching
- **Personal information**
  Gender, family/children, ethnicity, etc.
- **Training**
  Matching needs? Flexibility? Method: on the job or courses? Transferable skills? Self perception?
- **Collaborations**
  Internships with industry; networks/mobility; interdisciplinary collaboration; value of collaborations for career?
- **Research achievements**

Scientific publications (impact factor), patents, grant history etc.

- **Satisfaction**
  Would the PhD be done again; if so, with the same/another subject/institution? What opportunities arose with the PhD? Satisfied expectations: PhD/career: What was missing? Competition?
  Recommend PhD experience to others? Work culture and environment? Career: prospects, job security, salary, type of contracts, values in the work environment/gap to expectations, work-life balance, and research environment: role models, peer culture, etc.
- **Accountability** e.g. Time to degree
- **Equality of opportunities** Gender balance/diversity

**Motivate survey population to participate:**

- Social and cognitive factors affect the willingness to contribute to the survey e.g. a sense of belonging to a site is an important predictor of contribution
- Efforts are needed to enhance the knowledge and familiarity with the survey among target groups
- Account that some kind of "symbolic reward" helps (-> Motivational Theories)

**Carry out the survey / distribute the questionnaire:**

- Professional project management is essential
- Ensure transparency by informing participants in the first mail about all relevant details of the study
- Decide about IT tools/software to be used for the data collection
- Set timing and staff realistically to allow for re-launch in view of achieving higher response rates, etc.

Implementation Phase 3: Results & dissemination

## Implementation Phase 3: Results and Dissemination

In this phase, data will be processed and cleaned and the results will be generated and communicated to the communities and stakeholders.

**Pre-consider:**

- Decide about appropriate IT and statistical tools/software
- Ethical issues/data protection: practical issues concerning data storage, data access, etc.
- Potential distribution of data to outside world (for social science research): how to cover additional effort and costs? -> Important to define in initial dissemination strategy and include budget needed

**Survey results:**

- Control groups are important for analysis, e.g. compare fellows funded by a given programme to non-funded population or compare PhD to masters holders
- Response rates: minimum level of response to ensure representativeness
- Typical analysis of careers in relation to quality of research outputs/publications/citations, research funding after PhD, career progress, salary progress, etc.
- Be careful in aggregating results as the disciplinary differences are significant. Ideally, present the findings by major fields of study
- Specific analysis of career transition stages, such as first employment after PhD, family related career changes, intersectoral mobility "events"
- Is the linear career model the prevalent one?
- Do non-linear careers disadvantage professional advancement?
- Detect career patterns? Discipline-specific careers? Cohort-/age specific careers?
- Are there success predictors for a career? For example do mobile researchers perform better or not?
- Gender-/minority-related issues?

-

- Analyse the differences in the same field between men and women and consider their family status and the career of the partners
- Can we see future trends from the available studies?
- Comparative aspects of results? Differences between countries? Gender-specific? Cohort-/age-specific? Discipline-specific? Sector-specific? Etc.
- Innovation-related results?
- Survey results can influence the change of attitude of the stakeholders (for example, professionalisation of supervision)
- Survey results impact on design and focus of funding instruments or programmes including the improvement of the quality of PhD training
- Differentiate between international or domestic researchers and cultural background
- Based on survey results, recommendations for future political action should be made
- Identify possible unintended effects of the study
- Possibly think about additional surveys to complement career tracking study, e.g. supervisor survey
- Survey results may reflect wrong preconceptions, so that new methodologies need to be developed in view of future survey (feedback loop to phase 1)
- Network analysis

**Dissemination:**

- Develop a communication and dissemination strategy and plan to release data obtained from a statistical activity to users through various media, ideally right from the beginning of the survey.
- Involve communication specialists for professionalism.
- Most common dissemination channels include publication on (specifically developed) websites, publications of scientific articles in peer review journals, distribution vial well-established associations, organisation/participation in scientific conferences etc., publication of newsletters, leaflets, videos for presenting the results etc.
- Present statistics comprehensively, with personalised examples
- Suggest solutions (concrete!) rather than scientific findings.
- Simplified language but accurate and credible messages are essential for success.
- Face-to-face meetings, including demonstrations, have been proven to work. Use of mediators such as associations or consultants is recommended.
- Policy makers follow their own agenda and so it is important to understand their interests. For research results to be fully exploited, they must match the interests of policy makers. It is important to understand the policy process. Arrange face-to-face meetings with the right people/individuals to explain your research results and the implication of your research.
- Show benefits to target groups
- Focus on few issues (Figures and images, e.g. scissors diagram)
- Show positive and negative consequences
- Give researchers a voice (in a structured way)
- Use open source material

## Section IV. Mirroring Workshop Findings from an External Perspective – Closing Comments at the Workshop

*Prof. Michael Samuel, University of KwaZulu-Natal, School of Education, Durban, South Africa*

The opportunity to provide reflections from afar offers the possibility to question our sometimes taken-for-granted methodologies, epistemologies and research discourses. In this instance looking at research about tracking doctoral graduates, I choose to ask whether our dominant discourses are perhaps too tightly circumscribing our understandings of doctoral studies as a form of "productivity" rather than more broadly as part of a learning process which include matters of social justice and transformation, freedoms and significances. To this end I offer a set of reflections, which could elaborate the researching of doctoral education offering possibilities for new methodologies and new agencies in this pursuit. I support a possible Charter for enabling studies of doctoral careers and conclude with suggestions for new definitions of development that implicates the design and quality of doctoral education.

**Our metaphors matter**

Our metaphors matter since they indicate our positionality in relation to what, how and why we study and comment on our "objects" of research. The metaphor of "career tracking" dominant in the title of this workshop reinforces a notion that there constitutes a fixed trajectory from which doctoral education should not be allowed to stray. This constrains the notion that the end goal of doctoral education is already well established a priori and that we should merely aspire to reach this end point. Alternatives explored in the conference/workshop were "career mobility", "career transitions", "career flexibilities", "career stages" each which suggests that attention needs to be paid to the fluidity of the "paths/journeys" that doctoral education and supervision entails. Oftentimes the doctoral student is embarked on a journey that defines a target destination but she deviates according to the pushes and pulls of a variety of forces that redirect her attention. Does this detraction constitute a loss of focus, detraction from the "track" she should pursue? The dominant metaphors suggest a linear trajectory for pursuing knowledge production that may not necessarily be resonant with the kinds of personal, social and epistemological shifts required in the pursuit of doctoral education.

Alternative metaphors might assist analogous thinking: what if we considered the doctoral career not as a track or journey, but as a tree, a natural force of energies aspiring in relation to the (natural and artificial) nurturing provided, ever widening as it extends its branches for others to roost within. Could we consider doctoral careers as a process of developing garden – a never-ending task responsive to the vagaries of seasonal powers? What then constitutes these "seasons": politically, socially, and economically? The intention here is to ask whether our metaphors constrain us to design methodologies that simplify rather than complexify the understandings of promoting doctoral education and career making.

If we mean by "doctoral productivity" the opening up of the potential of the doctoral candidates towards making a significant contribution to the society, then we need to find methodologies, which go beyond reductionist survey methodologies alone. Our paradigmatic choices are varied: to know definitely absolute variables and factors which predict the doctoral success; or to understand interpretively the meanings that doctoral students and supervisors attach to their experiences; or more provocatively to understand how doctoral education and supervision are implicated in the hierarchies of power that exist within the academia, within the industrial/business world, between different parts of our globalised world. And then to work towards realising a change of these patterns.

We must pay attention to the inequities that characterise social systems of race, gender, nationality and culture within doctoral education and career development. We live in a world constantly having to address matters of inclusion and exclusion and doctoral education is not sanitised from such conceptions. If through the research designs we choose to ignore particular patterns of privilege and power, then we may end up being implicated in these marginalisation agendas. This is often translated not only to how we research, but also whom we research. The workshop was clear in suggesting that we need to understand more closely when we do our research into doctoral careers: for example, immediately after graduation, after the graduate selects not to return to their country of origin, after the graduate has perhaps returned to her country of origin. Each of these "stages" might yield significantly different conceptions of the "use value" of doctoral education.

I am also suggesting that our research methodologies need to reflect critically on who does the research and why. Why is it that the dominant researchers of doctoral education are not doctoral students themselves, but funding agencies, or curriculum designers of their doctoral programmes? What agenda drives the particular groups of researchers to pursue doctoral career studies, and what do they hope to achieve from making public their findings? Who is the target audience of the research agendas of the different doctoral career histories? What will different audiences listen to and why?

**Questioning the questions**

I re-interpret a set of questions which Taylor, Rizvi, Lingard and Henry (1997) asks of the policy making process which has many parallels for doctoral education research. What is the design of doctoral curriculum or policy around doctoral education responding to? Who are the major stakeholders involved in defining what constitutes the notions of "doctoral productivity", quality doctoral education or career development postdoctorate? What are the suggested intentions behind the introduction of any legislation, or innovation with respect to doctoral education and career development? Who are the likely beneficiaries of the legislation/innovation? How is implementation of the legislation to be achieved? How does one develop "ownership" of the legislation or innovation amongst potential users? I add further why should ownership matter? What constitutes significant doctoral research? Unfortunately many of the research reports circulated in this workshop did not pay sufficient attention to these kinds of questions.

**Complexifying forces**

A doctoral student becoming a doctoral researcher and developing a career after completion of a doctorate is caught at the intersection between several forces like an electron in a force field. I chose to label three main forces that characterise identity development of teachers (Samuel, 2008) and these could potentially be useful for questioning how forces push and pull doctoral students, their supervisors and their employers (inside and outside academia).

- Biographical forces:
  Who are we as doctoral candidates; when (at which point in their research development) are we are labelled as such? Does our country of origin, our nationality, our race, sexual orientation and gender play any feature in the quality of the force we are able to exert within the particular doctoral education curriculum design? To what extent does the biography of the researcher supervisor influence the nature of what comes to be studied in the doctoral education process? Who defines the research question? When? What biographical force drives (pushes or pulls) these considerations? For example, does it matter that one is a Chinese student studying in English in a German university? How does one's "gayness" affect what is being studied: for example, the study of inequity in the schooling system? (What and how we study (is) who we are (or wish to be).

- Institutional forces:
  How does the reputation of the institution influence how students position themselves as researchers in doctoral education? How does the institution market their paradigmatic, theoretical and practical agendas and what choices are available to doctoral students in relation to these agendas? How does the institutional force constrain or enable the pursuit of independent thinking, knowledge production?

- Programmatic forces:
  These forces are those that emanate from the explicit or official curriculum design of a particular institution or department within the institution. These programmatic forces of course, are also influenced by the different traditions within particular disciplines. Major differences constitute the models of curricular design of doctoral studies in the Humanities compared with the (natural) sciences for example[10]. Additionally, the distinction between the taught curriculum, the learnt curriculum and the caught curriculum has been the study of many educational researchers. How different is the declared, espoused, enacted and experienced curriculum of doctoral students as they pursue their doctoral studies? What hidden learning do particular students in particular programmes experience as a consequence of their doctoral curriculum of teaching and learning (formal and informal)? Many of these nuances of curriculum analysis escaped many of the studies in this workshop.

**Understanding power**

The Workshop World Café supported the view that research into career development includes the interaction between the personal (individual), the institutional (programmatic) and the societal (social). I choose to emphasise the need for understanding doctoral studies and career development within the historical, political and national context. This is especially true for contexts such as developing countries where the promotion of doctoral education is implicated in the exclusion of novice and young researchers to exercise influence over the tradition of subservience and successor regime mentality especially within the academia. The scarce resource of the senior professor is often threatened by the power that novice researchers (usually who have studied abroad) can exercise within the social systems. The newly graduated doctoral student is often interpreted as a threat rather than as resource to the context. This seems counterproductive within a social analysis that already believes that producing doctoral graduates contributes to "development".

The macro forces of a social system as it tries to reconstruct identities in an increasingly globalised society also have relevance. How does doctoral education contribute to the changing patterns of privilege between the wealthier and less wealthy nations? How and why do doctoral students choose to return or remain within their international host countries during their doctoral studies? The macro-systemic forces often mitigate against doctoral education rather than promote it. However, the more affluent world is increasingly having to find targeted enrolment of students from international contexts, in order to satisfy (partially) the agenda of international collaboration, or to increase rankings of an institution, or to better establish new markets abroad. The agenda of increasing international students within doctoral education is infused with a multiplicity of agendas all of which do not necessarily benefit the individual student per se, but foreground social, political and economic considerations.

**Developing a Charter for researching doctoral education and career making**

The influences of the above forces could be guided by a framework of possibilities for conducting research into doctoral education which this workshop referred to as a Charter for Researching Doctoral Education and Career Making. This is akin to a protocol, such as the Commonwealth Teacher Recruitment Protocol (CTRP), which serves as benchmark for teachers who cross national borders, about their rights and responsibilities in relation to teacher employment agencies and potential employers across different

[10] However, much innovation may be claimed to have arisen when these boundaries of research traditions are blurred, as researchers chose to work across disciplinary and departmental boundaries, challenging their habits, rituals and routines.

international borders (Commonwealth Secretariat, 2004; Ochs and Jackson, 2009). The CTRP is a morally binding set of principles signed by 54 Commonwealth ministers of education to promote a dialogue of rights and responsibilities that constitute an ethical and morally binding force underpinning the exchange of teachers. This protects not only individual teachers but also national states in their supply and demand management of teacher production. The CTRP is designed to serve as a guide for all participants to ask relevant questions about the quality of teacher exchange.

A Charter for Research on Doctoral Education and Career Making could serve as a protocol, guide or framework to deepen our understanding of the kinds of research possibilities to guide our activity as researchers, serving as a bank of ethical and theoretical considerations yet underpinned ethically by social, political and economic ideals and values, cognisant of the individual doctoral student and potential employee within a complex terrain of competing forces.

**Development as freedom: a question of significance**

The Nobel Laureate on Economics from India, Amartya Sen cautions us that we should not narrowly understand development as the pursuit of individual material wealth alone, nor the growth of the gross national product, nor the rise of industrialisation, nor technological advancement, nor social modernisation in isolation of each other. He suggests that when we think of our development we need to think of the quality of expanding freedoms that it has engendered. What quality of society has our development yielded? Our freedom is however not singular, but a plural concept.

In his book "Development as Freedom" (Sen, 1999), he suggests:

> *"Freedoms are not only the primary ends of development, they are also among its principal means. In addition to acknowledging, foundationally, the evaluative importance of freedom, we also have to understand the remarkable empirical connection that links freedoms of different kinds with one another. Political freedoms (in the form of free speech and elections) help to promote economic security. Social opportunities (in the form of education and health facilities) facilitate economic participation. Economic facilities (in the form of opportunities for participation in trade and production) can help generate personal abundance as well as public resources for social facilities. Freedoms of different kinds can strengthen one another." (Sen, 1999:10)*

This quotation suggests that we need to look critically at how our doctoral research studies, our doctoral education and our doctoral career making processes are implicated in introducing the quality of freedoms in our society. Are our doctoral education students embracing the responsibilities for the local and global force field of ideas towards realising greater freedoms? How do we develop significance in doctoral research? How do we assure that our doctoral research is contributing to a "worthwhileness of scholarship" including practical, personal, emotional, clinical and theoretical significance? (Jansen, 2011: 139)? In large measure our dominant discourse of the "worthwhileness" of doctoral education is couched in econometric terms (return-on-investment discourses), promoted either by individuals, institutions or nation states.

How do we as designers of curriculum, as funders of doctoral education enable our doctoral graduates, their course designers and their funders to exercise their freedoms to execute significant research in all its multiplicity?

# APPENDICES

I. Workshop Programme

II. List of Participants

III. Speakers' Biographies

IV. References

# Appendix I – Workshop Programme

## Thursday 9 February 2012

| | | Rooms |
|---|---|---|
| 09:30 | **Registration** | |
| 10:00 - 10:30 | **Plenary Session**<br>**Workshop Introduction**<br>Dr Iain Cameron, ESF MO Forum Chair and Research Councils UK<br>**Welcome Address**<br>Mr François Biltgen, Minister of Higher Education and Research, Luxembourg<br>**Researchers' Career Tracks from a Funder's Perspective**<br>Yves Elsen, President, National Research Fund Luxembourg (FNR) | C2 |
| 10:30 - 12:30 | **Presentations of five existing Career Tracking Studies**<br>**Lessons Learned from three U.S. PhD Career Paths' Studies**<br>Dr Maresi Nerad, University of Washington, Seattle, USA<br>**Careers of Doctorate Holders Project: Challenges for the Future**<br>Dr Toshiyuki Misu, OECD<br>**Revealing the Landscape and Impact of Researchers' Careers**<br>Dr Janet Metcalfe, VITAE, Cambridge, UK<br>**Wellcome Trust Career Tracker**<br>Joanna Scott, The Wellcome Trust, London, UK<br>**CIFRE Grants and Careers of former Grant Holders**<br>Dr Clarisse Angelier, ANRT, Paris, France<br>**Questions and Answers** | C2 |
| 12:30 - 14:00 | **Buffet Lunch**<br>Supporting Programme: Career Tracking Clinic & Poster Exhibition | F36 |

## Thursday 9 February 2012

| Working Groups | **Working Group 1**<br>Tracking the Quality of Doctoral Training and Researchers' Skills | **Working Group 2**<br>Tracking to find out where researchers move in their careers | **Working Group 3**<br>Tracking for Accountability and Efficiency | Rooms |
|---|---|---|---|---|
| 14:00 - 17:30 | **Chair:** Dr Janet Metcalfe, VITAE UK<br>Rapporteur: Anke Reinhardt, DFG Germany | **Chair:** Dr Iain Cameron, RCUK<br>Rapporteur: Dr Toshiyuki Misu, OECD | **Chairs:** Dr Beate Scholz, Scholz CTC and Dr Maresi Nerad, CIRGE, USA<br>Rapporteur: Marta Lazarowicz, Foundation for Polish Science | |
| 14:00 - 15:30 | **Ensuring that Skills' Training supports Researchers' Careers**<br>Speaker: Dr Karen Vandevelde, ECOOM, Belgium | **PhD Holders' Careers in and out of Science**<br>Speaker: Marc Kaulisch, iFQ Germany | **Marie Curie Impact Assessment**<br>Speaker: Kamila Partyka, EU Commission | F 33 - F34 |
| 15:30 - 16:00 | **Coffee Break**<br>Supporting Programme: Career Tracking Clinic & Poster Exhibition | | | F36 |
| 16:00 - 17:30 | **Quality of Doctoral Training and Assessment Methods**<br>Speaker: Kalle Hauss, iFQ, Germany | **Careers in the Private Sector and Intersectoral Mobility**<br>Speaker: Dr Clarisse Angelier, ANRT, France | **Sharing a Funding Agency's Experience**<br>Speaker: Dr Annette Schmidtmann, DFG, Germany | F 33 - F34 |
| 17:30 - 18:15 | Presentation of Working Group Results in the Plenary | | | C2 |
| 19:30 | Reception and Dinner at Restaurant Mansfeld - Departure by Bus | | | |

## Friday 10 February 2012

| | | Rooms |
|---|---|---|
| 09:00 - 09:30 | **Introduction to the World Café** | F33 - F35 |
| 09:30 - 12:30 | **World Café**<br>Set up in a format of multiple roundtables, facilitated by experts and dealing with specific issues around Researchers' Career Tracking | F33 - F35 |
| 12:30 - 13:00 | **Mirroring Workshop Findings from an External Perspective**<br>Prof. Michael Samuel, Dean, Faculty of Education, University of Kwazula Natal, South Africa | F33 - F35 |
| 13:00 - 13:30 | **Best Poster Award**<br>**Conclusions and Closure by the Organisers**<br>Laura Marin, ESF Science Officer and Ulrike Kohl, FNR Senior Programme Manager | F33 - F35 |
| 13:30 | **End of Workshop / Walking Lunch** | F36 |
| 14:30 - 16:30 | **Guided Tour (Bus & Walking) of Luxembourg City** | |

# Appendix II – List of Participants

| Title | First Name | Name | Organisation | Country |
|---|---|---|---|---|
| Dr | Jean-Pierre | Alix | CNRS | France |
| Mr | Jesper | Allerup | Ministry of Science, Innovation and Higher Education | Denmark |
| Dr | Clarisse | Angelier | L'Association nationale de la recherche et de la technologie | France |
| Mr | Iñigo | Atxutegi | IKERBASQUE - Basque Foundation for Science | Spain |
| Mr | Gilles | Aumont | INRA | France |
| Mr | Aitor | Ayesta | IKERBASQUE - Basque Foundation for Science | Spain |
| Mrs | Natacha | Beicht | CRP Santé | Luxembourg |
| Mrs | Stefania | Bettini | European Commission/EURAXESS | Belgium |
| Mr | François | Biltgen | Minister of Higher Education and Research | Luxembourg |
| Pr | Lucienne | Blessing | University of Luxembourg | Luxembourg |
| Mr | Joel | Boeglin | | Luxembourg |
| Dr | Olivier | Boehme | Research Foundation - Flanders (FWO) | Belgium |
| Mr | Hans M | Borchgrevink | The Research Council of Norway (RCN) | Norway |
| Mrs | Rachel | Bowden | Macmillan Publishers Ltd | United Kingdom |
| Mrs | Anjana | Buckow | German Research Foundation (DFG) | Germany |
| Dr | Helena | Burg | Fonds National de la Recherche (FNR) | Luxembourg |
| Dr | Iain | Cameron | Research Councils UK | United Kingdom |
| Mrs | Anne | Christophe | University of Luxembourg | Luxembourg |
| Dr | Shewly | Choudhury | Wellcome Trust | United Kingdom |
| Mrs | Dominika | Czerniawska | Interdiscypl. Centre for Mathemat.&Computational Modeling | Poland |
| Mrs | Barbara | Daniel | University of Luxembourg | Luxembourg |
| Mrs | Marije | de Goede | Rathenau Instituut | Netherlands |
| Mrs | Muriel | Delepierre | Institut Pasteur | France |
| Mr | Alejandro | Delgado-Rangel | CRP Henri Tudor | Luxembourg |
| Dr | Leon | Diederich | Ministry of Higher Education and Research | Luxembourg |
| Dr | Peter | Dukes | Medical Research Council | United Kingdom |
| Dr | Carlo | Duprel | Fonds National de la Recherche (FNR) | Luxembourg |
| Mr | Yves | Elsen | Fonds National de la Recherche & HITEC Luxembourg S.A. | Luxembourg |
| Dr | Liz | Elvidge | Imperial College | United Kingdom |
| Mrs | Josiane | Entringer | Ministry of Higher Education and Research | Luxembourg |
| Ms | Rebecca | Fairbairn | UK Economic and Social Research Council | United Kingdom |
| Mrs | Angelina | Frank | Fonds National de la Recherche (FNR) | Luxembourg |
| Mrs | Katharina | Fuß | German Research Foundation (DFG) | Germany |
| Mr | Eoin | Gahan | Forfás | Ireland |
| Dr | Frank | Glod | Fonds National de la Recherche (FNR) | Luxembourg |
| Mrs | Angelique | Gobin | CRP Gabriel Lippmann | Luxembourg |
| Mr | Hans | Groenvynck | Ghent University (ECOOM) | Belgium |
| Dr | Joachim | Haas | CEREQ | France |
| Mrs | Karen | Haegemans | Flemish government Vlaamse overheid | Belgium |
| Mr | Kalle | Hauss | Institute for Research Information and Quality Assurance | Germany |
| Mr | Seong-Min | Hong | Science and Technology Policy Institute | Korea |
| Dr | Andrea | Hutterer | EMBO | Germany |
| Dr | Kim | Huyge | Antwerp Doctoral School | Belgium |
| Mr | Tom | Jakobs | Fonds National de la Recherche (FNR) | Luxembourg |
| Mr | Steffen | Jaksztat | Hochschul-Informations-System GmbH ( HIS) | Germany |
| Mrs | Michèle | Jentges | Fonds National de la Recherche (FNR) | Luxembourg |
| Mrs | Elisabeth | John | University of Luxembourg | Luxembourg |
| Mrs | Claire | Jolibois | UniverSud Paris | France |
| Mrs | Christiane | Kaell | Fonds National de la Recherche (FNR) | Luxembourg |
| Dr | Vivien | Kappel | University of Zurich | Switzerland |
| Mr | Marc | Kaulisch | Institute for Research Information and Quality Assurance | Germany |
| Dr | Robert | Kerger | Ministry of Higher Education and Research | Luxembourg |

| Title | First Name | Name | Organisation | Country |
|---|---|---|---|---|
| Mrs | Bérénice | Kimpe | French-German University - Association Bernard Gregory | Germany |
| Mrs | Eneli | Kindsiko | University of Tartu | Estonia |
| Mr | Michael | Klimke | Technische Universität München | Germany |
| Mrs | Ulrike | Kohl | Fonds National de la Recherche (FNR) | Luxembourg |
| Dr | Christian | Kolowrat | University of Vienna | Austria |
| Dr | Frank | Kuhn | European Research Council Executive Agency | Belgium |
| Mrs | Marta | Lazarowicz-Kowalik | The Foundation for Polish Science | Poland |
| Mrs | Marijke | Lein | VIB [VZW] | Belgium |
| Mrs | Ute | Leuschner | University of Freiburg | Germany |
| Mrs | Katia | Levecque | Research Council Flanders/Ghent University | Belgium |
| Mrs | Tiina | Loit | Eesti Teadusfond / Estonian Science Foundation | Estonia |
| Dr | Katrien | Maes | League of European Research Universities | Belgium |
| Mrs | Laura | Marin | European Science Foundation (ESF) | France |
| Dr | Marie-Claude | Marx | Fonds National de la Recherche (FNR) | Luxembourg |
| Mrs | Luise | Menzi | Graduate Campus, University of Zurich | Switzerland |
| Dr | Janet | Metcalfe | VITAE UK | United Kingdom |
| Dr | Dian | Michel | FU Berlin Dahlem Research School | Germany |
| Dr | Toshiyuki 'Max' | Misu | OECD Directorate for Science, Technology and Industry | France |
| Mr | Nils | Moeller | Nature Publishing Group | United Kingdom |
| Mrs | Emke | Molnar | University Utrecht | Netherlands |
| Dr | Maresi | Nerad | University of Washington | United States |
| Mrs | Helen | O'Connor | Science Foundation Ireland | Ireland |
| Mr | Hideo | Ohara | Japan Science and Technology Agency | Japan |
| Mrs | Susana | Pinto | Fonds National de la Recherche (FNR) | Luxembourg |
| Mr | Fredrik Niclas | Piro | NIFU | Norway |
| Dr | Anna | Price | King's College London | United Kingdom |
| Mrs | Judith | Przyrowski | European University Institute | Italy |
| Mrs | Kate | Reading | RCUK | UK |
| Mrs | Anke | Reinhardt | German Research Foundation (DFG) | Germany |
| Mrs | Susanne | Rick | Fonds National de la Recherche (FNR) | Luxembourg |
| Mr | Asael | Rouby | Fonds National de la Recherche (FNR) | Luxembourg |
| Mr | Keiji | Saito | National Institute of Science and Technology Policy | Japan |
| Pr. | Michael | Samuel | University of KwaZulu-Natal | South-Africa |
| Mr | Bo | Sarpebakken | NIFU | Norway |
| Mrs | Lisette | Schermer | European Commission, DG EAC (Education and Culture) | Belgium |
| Dr | Annette | Schmidtman | German Research Foundation (DFG) | Germany |
| Mr | Jens Christian | Schneider | Gerda Henkel Stiftung | Germany |
| Dr | Baeate | Scholz | Scholz – Consulting Training Coaching | Germny |
| Dr | Anita | Schlögl | Humboldt Foundation | Germany |
| Mrs | Joanna | Scott | The Wellcome Trust | United Kingdom |
| Mrs | Izabela | Stelmaszewska - Patyk | Adam Mickiewicz University Foundation | Poland |
| Mr | Justin | Synnott | IRCSET | Ireland |
| Dr | Hiroshi | Takahashi | Japan Science and Technology Agency | Japan |
| Dr | Gudrun | Tegeder | Volkswagen Foundation | Germany |
| Mr | Christophe | Trefois | University of Luxembourg | Luxembourg |
| Dr | Martina | van de Sand | FU Berlin Dahlem Research School | Germany |
| Mr | Frank | van der Most | DANS Institute, Royal Netherlands Academy of Arts and Sciences | Netherlands |
| Dr | Karen | Vandervelde | Ghent University (DOZA-ECOOM) | Belgium |
| Mrs | Odile | Vilotte | Agreenium - Inra | France |
| Mrs | Ning | Wang | CRP Santé | Luxembourg |
| Mrs | Corina | Wirth | State Secretariat for Education and Research (SER) | Switzerland |
| Dr | Paul | Zahlen | STATEC | Luxembourg |
| Mrs | Ingrid | Zantis | Zantis Management/Communication Consulting | Luxembourg |

# Appendix III – Speakers Biographies

### Dr Clarisse Angelier

*Head of CIFRE, ANRT, France*

Dr Clarisse Angelier holds a PhD and graduated as engineer of material sciences.

At the beginning of her career, she taught material sciences. Some years later, she was general secretary of the lifelong learning centre for material sciences. In 2000, she worked towards setting up the first pooling of economic interests that gathers companies and universities. Until 2007, she was deputy manager of Research Management at CNAM University (25 research teams).

Since 2007, Dr Angelier has managed the CIFRE process, funded by the French research ministry, at the National Association for Research and Technology. This programme funds 3700 PhDs, 1300 each year.

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### François Biltgen

*Minister for Higher Education and Research, Luxembourg*

Since 1999, François Biltgen has been a member of the Luxembourg Government − as Minister for Higher Education and Research (since 2004), Minister of Justice, Minister for the Civil Service and Administrative Reform, Minister for Communications and Media as well as Minister for Religious Affairs.

Born on 28 September 1958 in Esch-sur-Alzette, he studied law at the University of Paris and holds a masters degree in law, a DEA (higher post-graduate diploma) in community law and a diploma in political sciences from the Institut d'études politiques in Paris. After a career as a lawyer, François Biltgen was elected to the municipal council of Esch-sur-Alzette, and as Member of Parliament from 1994 on. At the European level, he is well known for the "Gago-Biltgen" initiative signed following the Competitiveness Council of 4 May 2009, entitled "A European partnership to improve the attractiveness of RTD careers and the conditions for mobility of researchers in Europe". As member of the Luxembourg Government, he substantially contributed to the most important reforms in higher education and research in Luxembourg, i.e. the set-up of the National Research Fund in 1999, the implementation of the University of Luxembourg in 2003, as well as the reform of the national PhD and postdoc grant support scheme in 2008, the "Aides à la Formation-Recherche".

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### Dr Iain Cameron

*Workshop Chair, Head of Research Careers and Diversity, Research Councils UK, Swindon, UK*

Dr Iain Cameron is Head of Research Careers and Diversity at Research Councils UK, responsible for co-coordinating research careers and related diversity issues across the UK Research Councils.

He has responsibility for implementing the RCUK Researcher Development programme including the Vitae programme which supports the development of transferable and career skills for researchers. Dr Cameron's team is also responsible for major longitudinal cohort study of UK PhD graduates. He and his team work closely with the UK Government Department for Business Innovation and Skills and liaise with the UK Higher Education Funding Councils and other funders.

Dr Cameron represents the UK on the EC Steering Group on Human Resources – Mobility and in other international networks on research careers. He chaired the HE sector group which developed the 2008 Concordat for Research Careers.

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### Yves Elsen

*President, Fonds National de Recherche (FNR) and CEO of HITEC Luxembourg*

After a Master of Science in Civil Engineering at the Swiss Federal Institute of Technology in Zurich in 1982, and an MBA from INSEAD Fontainebleau, France in 1984, Yves Elsen worked for more than 25 years in satellite, media and telecommunications engineering, covering sales, marketing, business development, general management and entrepreneurship.

Since 2004, he has been CEO of HITEC Luxembourg S.A., a Luxembourg company that offers high level technology solutions to a large base of national and international customers. Yves Elsen was nominated President of the National Research Fund Luxembourg in 2010.

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### Kalle Hauss

*Researcher, Institute for Research Information and Quality Assurance (iFQ), Berlin, Germany*

Kalle Hauss studied social sciences at the Humboldt University of Berlin, specialising in social justice research and empirical social research. Following his studies, among other he studied the impact on changing conditions of employment on labour market outcomes, he worked as a lecturer in the field of methods in social research.

Since 2006 he has been a member of the iFQ-team. His work focuses the research training conditions and the careers of young researchers.

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### Marc Kaulisch

*Researcher, Institute for Research Information and Quality Assurance (iFQ), Berlin, Germany*

Marc Kaulisch studied political science at Westfälische Wilhelms−Universität Münster and at Freie Universität in Berlin. Following his studies, he worked as "Assistent in Opleiding" at the Centre of Higher Education Policy Studies (CHEPS) at University of Twente, NL, focusing on the analyses of career systems in international comparative perspective and the career mobility of PhD holders in Germany analysis. Since 2007, Marc Kaulisch has worked for the iFQ, Berlin.

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### Dr Janet Metcalfe

*Chair and Head of Vitae, United Kingdom*

Dr Janet Metcalfe is Chair and Head of Vitae, which is committed to enhancing the quality and output of the UK research base through supporting the training and development of world-class researchers. She leads on the implementation of the UK Concordat to Support the Career Development of Researchers, the UK equivalent to the European Charter and Code.

Her publications include the "What Do PhDs Do?" and "What do researchers do?" series of publications exploring the landscape of researchers' careers and impact, including "Doctoral graduate destinations and impact three years on". She is co-author of the Universities UK research report "Promoting UK doctorate: opportunities and challenges", 2009 and the HE Impact and Evaluation Group report "Impact of researcher training and development: 2 years on", 2010.

She is a member of the CROS/PIRLS Steering Group and responsible for developing and managing the "Careers in Research Online Survey" (CROS) and the "Principal Investigator and Research Leaders Survey" (PIRLS), which explore the experiences and views of researchers and principal investigators. She also sits on the Impact and Evaluation Group, exploring the impact of researchers and researcher development.

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### Dr Toshiyuki "Max" Misu

*Senior Analyst, Directorate for Science, Technology and Industry, OECD*

Dr Toshiyuki "Max" Misu received his PhD degree in physics from the University of Tennessee in 1997. As an R&D professional with over 20 years of experience in a wide variety of R&D activities ranging from industrial telecommunication technology, academic theoretical/computational physics, applied physics for cancer therapy, and S&T human resource policy, he is currently working as a senior analyst at OECD to carry out comparative studies on careers of doctorate holders (CDH) using micro data.

Before joining OECD in October 2010, he worked at the National Institute of Science and Technology Policy, the Ministry of Education, Culture, Sports, Science and Technology, Japan, and developed the survey methodology and implemented the full-scale surveys for the first time in Japan to fill out some of the missing fundamental HRST indicators, including employment conditions and career paths of postdoctoral fellows, career path diversity and international mobility of recent doctoral graduates.

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### Dr Maresi Nerad

*Founding Director, Center for Innovation and Research in Graduate Education (CIRGE)*

*Associate Professor, College of Education at the University of Washington, Seattle, US*

Dr Maresi Nerad received her doctorate in higher education from the University of California, Berkeley in 1988. From 1988 until 2000, she directed research in the Graduate Division at the University of California, Berkeley and spent 2000–01 as Dean in Residence at the Council of Graduate Schools, in Washington, D.C.,US. In 2001 she joined the University of Washington in Seattle and opened CIRGE in 2002. She served as Associate Dean of the Graduate School at the University of Washington from 2003–2009. In 2005 she received the Miegunyah Fellowship and spent three months at the University of Melbourne, Australia. She was appointed Professor Extraordinary by the University of the Free State in 2011, and was a Fulbright Specialist during Fall 2011 in South Africa.

Having worked for over two decades in the field of doctoral education, she has undertaken national PhD career path surveys, research on factors that influence time to doctoral degree and attrition. Since 2005 she convened biannually an international network of experts in doctoral education worldwide. This group studies the forces and forms that promote and impede improvement and change in doctoral education around the globe. Her current research interests cover the assessment of innovative doctoral programmes, comparison of international doctoral programmes, integrating international students and preparing domestic students with the skills needed for the globalised PhD labour market.

She has written and edited four books and published numerous articles on doctoral education. She has been an invited speaker at many national and international conferences on doctoral education and has served and serves on several US national advisory committees and consults with German and South African universities and their doctoral schools.

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### Professor Michael Samuel

*Dean, Faculty of Education, University of KwaZulu-Natal, Durban, South-Africa*

Prof. Michael Samuel is presently the Dean at the Faculty of Education, University of KwaZulu-Natal. His international research projects include the Department for International Development (UK) multi-site teacher education research (MUSTER) project involving Ghana, Malawi, Lesotho, Trinidad and Tobago, and South Africa (1998–2003) and a project focusing on who sits at the margins of schooling in India and South Africa (2002).

He was part of the Ministerial Committee on Teacher Education responsible for the development of a National Policy Framework for Teacher Education 2006. His recent book "Life History Research: Epistemology, Methodology and Representation, documents his own writings and the work of postgraduate students involved in life history research as a methodology for exploring how teachers and other developing professionals understand and experience their curriculum at school level and within the higher education system.

He serves on numerous national educational advisory bodies and editorial boards. He is also the present Chair of the Higher Education South Africa Education Deans Forum.

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### LisetteSchermer

*Policy Officer, Marie Curie Actions, EuropeanCommission, Belgium*

LisetteSchermer has a background in health sciences, University of Maastricht, the Netherlands. During her career of almost twenty years in the European Commission she has occupied various positions within the Directorate General Research and Innovation and the Directorate-General for Education and Culture (EAC); furthermore, she was seconded to the Dutch Ministry responsible for EU research and was on secondment to a Brussels-based international association looking after science funding for the former Soviet Union. Since joining the Marie Curie Actions seven years ago, she has held the position of head of sector for finance and administration and recently joined the Marie Curie Policy Unit in DG EAC where she is the Liaison Officer for the Research Executive Agency.

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### Dr Annette Schmidtmann

*Head of Division Research Careers, DFG German Research Foundation, Germany*

Dr Annette Schmidtmann studied biology at the University of Cologne with a PhD at the Institute for Molecular Biology at the University of Essen (1989). After working as postdoc at the same institute until 1991, she continued working as Programme Manager for Life Sciences at DFG German Research Foundation before joining the University of Hildesheim as Research Manager in 1996, followed by a position as Coordinator at the Bureau of Ethics Commission, Medical Faculty of the University of Göttingen from 1997 to 1999. Returning to the DFG in 2000, she took over the Coordination of Clinical Research Programmes as Programme Director.
Since 2006, she has been head of the division for Research Careers, amongst others in charge of around 200 Research Training Groups and 30 Graduate Schools under the Excellence Initiative, offering structured PhD training.

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### Beate Scholz

*Director, Scholz – consulting training coaching, Bonn, Germany*

Dr Beate Scholz, director of Scholz CTC, has worked as strategy consultant, project facilitator and coach since 2003 (until April 2008 in addition to her position at the German DFG). Her company focuses on supporting universities, research organisations and governments in designing, implementing and evaluating concepts and strategies for research career development. International research collaboration, training and coaching of individual investigators or researchers' teams in view of research career development issues and strategic acquisition of research funds completes Beate Scholz's professional portfolio.

From 1997 to 2008 Beate Scholz worked for Germany's central research funding organisation, the DFG, where she headed the Research Career Strategy division, beginning in 2001. Her scientific background is in history, political sciences and international economics. She holds a PhD in Modern Italian History.

During her professional career, Beate Scholz has conducted a number of surveys and evaluations, e.g. on behalf of the European Alliance on Research Career Development, on the AFR Programme of the Research Fund Luxembourg (2010) and on "Cross-border research collaboration in Europe" (on behalf of the European Heads of Research Councils and the European Science Foundation) in 2009. In addition, she has gained considerable experience as reviewer in selection panels for doctoral programmes and junior research groups on behalf of the German Helmholtz Association, two Irish Research Councils and in chairing the international management committee of the European Young Investigator Award. Moreover, she is member of the global network of experts "Forces and Forms of Change in Doctoral Education Worldwide".

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**Joanne Scott**

*Evaluation Officer, Wellcome Trust, London, United Kingdom*

Jo Scott joined the Wellcome Trust in September 2009 as part of the Strategic Planning and Policy Unit. Jo works within the Evaluation team as an Evaluation Officer and is involved in the management of career tracking studies of Wellcome Trust-funded basic scientists and clinicians, scheme-based reviews, questionnaire design, data analysis and research.

Jo has an undergraduate degree in Medical Science (Cell and Molecular Biology) from the University of Birmingham.

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**Dr Karen Vandevelde**

*Policy Advisor, Ghent University, Belgium*

A graduate of Ghent University (Belgium), Karen Vandevelde moved to Ireland to obtain an MA Degree and a PhD Degree in Arts (2001).

She taught literature and drama and obtained a Postdoctoral Research Fellowship at the National University of Ireland, Galway, and another one, which brought her back to Ghent University.

After a short but exciting teaching experience at a teacher training college in Belgium, Karen became involved in research policy and management as an advisor in Ghent University's Department of Research Affairs in 2006. She was involved in setting up the Doctoral Schools at the university, in Quality Assurance in Research and in various other exciting projects at Ghent University. One such project is the policy-relevant research centre ECOOM for R&D Monitoring, funded by the Flemish Government and devoted to mapping PhD success rates, doctoral careers and researchers' mobility.

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## Section IV. Mirroring Workshop Findings: Closing Comments at the Workshop

Professor Michael Samuel, University of KwaZulu-Natal, School of Education, Durban, South Africa

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