ESRWhat is your CDP?

Career Development planning is an integral part of the FLUORr21 programme. The purpose of such planning is to ensure that your work is clearly focused on achieving your research and professional goals. This will play a major part in informing the trajectory of your research and in your training and development as a researcher. Your plan will also be a useful resource when it comes to writing up, and it will help you develop key skills which will be invaluable for both your current research and your future career prospects.

There are two main components to your Career Development plan:

A Research Plan – The purpose of your Research Plan is to provide you with a clear research focus and a coherent research work programme. A well-structured research plan will enable you to review your progress and adjust your objectives as your research evolves. Revising and keeping your Research Plan up-to-date will also make it easy for you to produce progress reports, prepare presentations and publications, draft funding applications and write up your thesis. The attached guidelines have been tailored to your area and should be used in conjunction with input and advice from your supervisor in preparing your plan.

A Professional Development Plan – On leaving FLUOR21 it will be expected that, in addition to having produced a body of original research, you will also have developed a set of skills that distinguish the professional from the novice. Employers, and others who you will interact with professionally in the future, will assume that you bring the skills of an independent professional to any work situation. It is therefore very important for you to develop, demonstrate and practice these skills during your doctoral programme. The attached guidelines are designed to enable you to identify the skills important for your research and career. Developing these skills will not only help you to be a more productive researcher, but will ensure that you are well placed to compete for employment opportunities when you complete your PhD.

Guidelines on writing your Research Plan

Every research project requires advance planning, and the better the planning the more successful the project. Preparing a research plan is one of the most important tasks you will undertake as a PhD candidate. This brief document offers some basic guidelines for preparing a research plan and for using it as a roadmap during your fourth-level experience.

What is a research plan?

At the start of your PhD you identify a research problem in your field which needs to be solved, or an issue in your field which has not hitherto been researched but which is clearly important and has scope for study. A research plan is a model or scheme which you design to help you organise your thoughts about your topic, schedule the specific jobs which you need to do, and visualise a finished product.

There is no such thing as an ideal research plan. Plans come in different shapes and sizes, but common to all is **structure** and **timeframe**: research is always planned in stages, each one linked to the next by a structure, and each designed with some idea of how long it will take.

There are two critical things to remember when you begin to design a research plan.

First, your supervisor is there to advise you. He or she will have experience of planning research, and, having agreed to supervise you in the first instance, will happily guide you as you gather your thoughts and formulate your plan. In consultation with your supervisor you should, within the first months of your PhD, be able to identify major tasks and work out the order in which they should be done.

Second, research plans change as research progresses. You will *always* find that the structure which you first envisaged needs modification, and that the timeframe you set will not work. The secrets of a successful research project are (a) the realisation

that a research plan is always a work-in-progress, and (b) the ability to adjust a project's structure and timeframe without losing sight of its goals.

At the start of your studies, your emphasis will be primarily on devising, developing and implementing your research. As you progress, your focus will also encompass the publication of your research results and the preparation of your thesis. Your plan need not encompass all of the elements indicated below at all times, rather it will develop to incorporate them as your research progresses.

Essential elements of a Research Plan

- Your research question or hypothesis.
- Background information on why your research question is important.
- A plan of how you intend to investigate your hypothesis and interpret your results.
- How you intend to write-up and publish your findings.

Keep in mind that the objectives and goals you set yourself in your plan should be specific, challenging and achievable within a defined time frame. It may be helpful to refer to the SMART framework, which is widely used as a means of describing objectives in a way that makes them more useful and easier to review. The SMART guidelines indicate that objectives should be:

Specific	Specific and clear statements about what is to be achieved.
Measurable	Quantitative and/or qualitative (if objectives are not measurable then it is difficult to determine whether they have been achieved).
Achievable	Objectives need to be realistic, challenging and motivating.
Relevant	Relevant to the achievement of your research aims
Time bound	Include a time-scale for in which to achieve your objective or goal.

When developing your Research Plan, it may be helpful to consider the following:

Formulating your Research Question and Hypothesis	- What hypothesis (es) are you testing? - What question(s) are you asking? - Why is this important?
Reviewing the Literature	- Are you familiar with the relevant literature in your area? - Can you clearly explain how your research question builds on what is currently known?
To test your research question or hypothesis, do you need to define more specific objectives?	- If so, what are these objectives?
Devising your investigative plan to test your hypothesis/meet your objectives	- What methodological/technological approaches will you use and why are they most appropriate? - How will you collect your data (sources, documents, surveys, experiments, etc)? - How will you organise and analyse your data? - How will you interpret your data?
Reviewing your findings	- How do your findings inform your original objective(s)? - Do they prove or disprove your hypothesis? - What new information do they provide you and/or your area of research?
Drawing conclusions	- What conclusions can you draw from your work to date?
What is your next step?	- Given your results and conclusions to date, what further work needs to be done to address your original hypothesis? Or do you want to change or adjust the direction of your research?
Presenting and publishing your research	- Where do you intend to present the results of your work?

	- Where do you intend to publish the results of your work?
	- In each instance, are you familiar with what is required for presenting and/or publishing in the manner you plan?
Writing up your thesis	- Have you prepared a thesis plan (you should do this as early as possible in your research programme)?
	- Are you familiar with how best to present your work in thesis form and what the requirements are?
	- What progress have you made in writing chapters of your thesis?
	- When do you hope to have your first draft completed?
	- When do you hope to submit?

You will also need to set a time frame to each of the aspects outlined above. Devising a realistic schedule for each step on the way is extremely important if you want to complete your PhD within the timeframe required.

Guidelines for Professional Development

During the course of FLUOR21, you will have opportunities to acquire new skills and to hone your existing skills. As a PhD graduate, your skill-set will need to include the advanced research and analytical techniques necessary for high-level research in your field and for the application of these skills in a broader context.

In general, 20% of PhD graduates pursue careers in academia and 80% develop careers in business, industry, the public and voluntary sectors. It is important to realise that a doctorate offers far more than a passport to a potential career in a particular field of scientific investigation. It greatly enlarges the menu of career tracks open to you. To possess a PhD in a Sciences discipline is to say to the world that you are a professional scientist who is an expert in your field of research and who can apply your professional skills to addressing scientific investigation and development in the broader context. It also says that you are intelligent, well-read, self-motivated and adaptable. As a PhD student, therefore, you should be aware of the 'transfer value' of the various skills that you will and can acquire. 'Transferable skills' both enhance the experience of learning and equip you to avail of a wide range of career and employment opportunities, including those in areas other than the specific field in which you received your PhD.

What skills do I need, and how skilled do I need to be?

The first step is to identify the relevant skills you require for effective research and for your proposed career path. Every discipline in the Science area has its own particular suite of skills, many of these you will have acquired as a prerequisite to enrolling for the FLUOR21 programme in the first instance. However, it is useful to discuss with your supervisor what additional skills you will need (technical skills, statistical skills, analytical skills) for your research and professional development and to identify where you can acquire them.

As well as identifying the actual skills you need, you should also consider the level of competence you need to achieve in each skill. For example, your research may require an expert level of skill in one technology or methodology, but it may be sufficient to merely be familiar with others. It might be helpful for you to think of your skill development as going through a series of different levels of competence, as outlined below, and to identify which level you need to target:
- ***You are a basic-level learner***, gaining an initial understanding of a new methodology, technique, area of knowledge or expertise;
- ***You are an advanced learner,*** still relying on expert advice for the appropriate application of a new methodology, technique, area of knowledge or expertise;
- ***You are an independent user***, capable of applying a new methodology, technique, knowledge or expertise to your research independently;
- ***You are an expert***, capable of further development of the methodology, technique, knowledge or expertise that was once new to you.

The chart below, which is mapped to the skill set identified by the IUA, may be useful in identifying the research and professional skills you need to develop. It is recommended that use this to devise your plan to attain the competencies you

require in consultation with your supervisor and/or other individuals who have an expertise in the skill in question. Several routes to addressing any gaps in your skill-set are open to you: applying the skill in your research, attending workshops and taking taught modules. Remember that you can attend modules and workshops outside your College.

Research skills and awareness
• Have I good knowledge of advances and developments in my field?
• Can I demonstrate knowledge of research in related fields and disciplines?
• Do I comprehend and can I effectively employ appropriate research methodologies?
• Can I critically analyse and synthesise new and complex information from diverse sources?
• Can I formulate and apply solutions to research problems and effectively interpret research results?
• Can I exercise critical judgment and apply critical thinking to create new ways of understanding?
• Can I formulate and apply solutions to research problems and effectively interpret research results?
• Do I need to know health and safety procedures and their application in my research environment?
• Have I a broad awareness and knowledge of key relevant funding sources and grant application procedures?
• Do I appreciate basic principles of project and time management?

Ethics and social understanding
• Do I understand, and apply in my research, principles of ethical conduct, including avoidance of plagiarism, allocation of credit and authorship, and definitions of research misconduct?
• Do I understand the relevance of research in society and the potential impact of research on individuals, groups or society?
• Are the guidelines for the ethical conduct of research involving people, human tissue and animals relevant to me?

Communication skills
• Have I effective writing and publishing skills?
• Do I effectively use and decide on appropriate forms and levels of communication?
• Can I communicate and explain research to diverse audiences, including both specialist and non-specialist?
• Do I teach, and do I support the learning of undergraduate students when involved in teaching and demonstrating?

Personal effectiveness/development
• Do I operate in an independent and self-directed manner, showing initiative to accomplish clearly defined goals?
• Do I appreciate key rhetorical skills, including how to persuade others of a viewpoint's merits, demonstrating and communicating credible suggestions to achieve my aims?
• Do I appreciate the importance of initiating new projects, proactively reacting to identified needs or aiming to resolve problems?
• Have I the ability to handle difficulties in research or other professional activities in an appropriate way?
• Do I critically reflect on experiences and act on such in a cycle of self-improvement?

Team-working and leadership
• Can I develop and maintain effective relationships with colleagues?
• Do I work well in a collaborative environment? Do I understand how to acknowledge others' views and critically appraise them?
• What awareness have I of my own working style, that of others, and how we (or they) they interact?
• Do I understand leadership in team environments, recognising the strengths of team members and working effectively to achieve mutual goals?

Career Management
• Can I demonstrate an awareness of transferable skills and their applicability to both academic and non-academic positions and how they are applied in different circumstances?
• Have I taken ownership of my own career management, forming a credible career plan?
• Can I initiate and sustain networks and relationships that may encourage opportunities for employment?
• Do I present myself and my skills, attributes, experiences and qualifications, through effective job applications, CVs and interviews?
• Do I understand the broadest possible range of their employment opportunities?

Entrepreneurship & innovation
• Is it necessary for me to understand the role of innovation and creativity in research?
• Can I demonstrate an awareness and understanding of intellectual property issues, appreciate and contribute to knowledge exchange?
• Is it necessary for me to appreciate skills required for the development of entrepreneurial enterprises in the public and private sectors?
• Do I need to understand different cultural environments, including the business world, and the contribution that knowledge transfer can make to society?

ESR / Supervisor Meeting Record report

Candidate name:_____

Date of meeting: _____

Stage of Study: _____

<u>YOUR RESEARCH</u>

Please provide an update of your research progress (*no more than 500 words*). If this is your first meeting with your supervisor, please provide a brief synopsis of your research plan.

Since your last ESR / Supervisor meeting, have you encountered any significant difficulties?
If yes, briefly outline these difficulties and indicate what proposals have been agreed at this current meeting to address them

Have there been any substantive changes in the direction of your research since (a) you started your doctoral research or (b) your last ESR / Supervisor meeting? If yes, briefly outline the reasons for this

What is your plan of action between now and the next meeting to achieve your research objectives?

Career Development Plan (CDP)
FLUOR21

YOUR PROFESSIONAL DEVELOPMENT

Research skills

Indicate progress in the development of specific skills that you need for your research (e.g. technical skills, laboratory skills, statistical skills, analytical skills etc.)

Specific Skill	Your progress since the last meeting	Your plans for future development.

Transferable skills *Indicate progress in the development of skills in the areas indicated below.*

Transferable Skill	Your progress since the last meeting	Your plans for future development.
Ethics & Social Understanding		
Communications Skills		
Development towards professional independence		
Career-orientated skills		
Personal effectiveness/development		
Team-working & leadership		
Entrepreneurship and Innovation		

Modules Undertaken with your home institute

Module Name & Code	Semester Taken/Year	Results (or state taken by audit)

Progress Report (to be completed by your supervisor)

Progress to date

Improvements to be made
Further Comments

Declaration

We agree that this report is an accurate account of the meeting.

Signature of PhD student   Date:

Signature of principal supervisor   Date:

Next meeting   Date:

Please submit a signed copy of this report to the FLUOR21 coordinator for auditing purposes.