FACULTY OF ENGINEERING: TRAINING NEEDS ANALYSIS (TNA)

An individual approach to develop the skills and experience you should gain by the end of your higher degree studies.

Name of student: Jordan Pannell
Department or School: Department of Civil and Structural Engineering; Department of Automatic Control and Systems Engineering
Names of all supervisors: Dr Sam Rigby and Professor George Panoutsos
Year of study: First

Completing your TNA. Before completing your TNA in consultation with your primary and secondary supervisor, you should read the guidance notes that accompany this form. The Faculty's TNA form has been compiled with reference to the Vitae Researcher Development Framework (RDF), which was developed in consultation with a range of stakeholders including RCUK, HEFCE, The British Library and the Higher Education Academy. This development tool divides into four 'Domains' the skills, and attitudes and behaviours required to be an effective researcher. The framework is also recognised widely outside academia, and can provide you with an effective way of articulating your skills to future employers. If you are unfamiliar with the RDF, it may be useful to visit the relevant section of the Vitae website.

For many, the skills you will develop and attain as part of the DDP will aid in you attaining chartered status as Engineering and is mapped here showing the links between chartered status and your training.

Level of experience/ability. When assessing your current ability or experience in a specific area and identifying the level that you wish to attain, please use the numbers below. Note, each TNA is unique as it is a reflection of the experiences and abilities of an individual. There are no right or wrong answers.

Key	Experience	Knowledge/understanding	Skill level
1	I have no experience of this.	I have no knowledge/understanding of this.	I have no skill in this area.
2	I have some limited experience of this.	I have a little knowledge/understanding of this.	I have some basic skill in this area.
3	I have regular experience of this, but require further experience to become highly proficient	I have a good working knowledge of this area, but need to increase my knowledge to become highly proficient.	I am competent in this area, but require further development to become highly proficient.
4	I have extensive experience of this, and am able to use this experience effectively in my research.	I have extensive knowledge in/understanding of this area, which supports my research effectively.	I am highly skilled in this area, to a level that supports my research effectively.
5	I consider myself an expert in this and could train others in the area.	I consider myself an expert in this and could train others in the area.	I consider myself an expert in this and could train others in the area.

Students grading their level of knowledge and experience at 1-3 should seek further training or ensure that they undertake activities that will enhance their knowledge (where appropriate). In order to be able to grade your experience, knowledge, understanding or skill at a 4 or 5 it is likely that you will have received relevant training at Masters level or above, and received documentation confirming this. Those grading their level of knowledge and experience at 5 may, with approval from their supervisors, seek further training if they wish.

IMPORTANT NOTE FOR ALL STUDENTS AND SUPERVISORS: The TNA should be **evidence based**. Students should detail how they have obtained the skills and knowledge they have in the space provided on this form – or as attachments to this document. The evidence they provide in this section of the form may include, but is not restricted to: the successful completion of a module, course or training session; work experience; published or submitted writing or assessment; attendance at or participation in conferences, symposia and research seminars; public engagement activities and/or other forms of research dissemination.

Prioritising your training and development

Academic, professional and personal developments are all key aspects of your doctoral research experience, and the Faculty will support you to develop your skills throughout the course of your PhD. However, time is a precious resource, so it is important to ensure that you undertake the right training at the right stage of your PhD, nor should it detract from the completion of your thesis on time. When considering the priority of each aspect of each item in the following table, please decide – in consultation with your supervisor – whether the item is LOW, MEDIUM or HIGH priority for the upcoming year.

RDF Domain A: Knowledge and Intellectual Abilities *the knowledge, intellectual abilities and techniques to do research*					
	Current skill level	**How has this skill level been obtained (with evidence)?**	**Required skill level**	**Priority**	**Training plan agreed with supervisor(s), i.e. DDP modules, training courses etc.**
Knowledge of the research methods appropriate to my research field	3	Regular meetings with supervisors who have provided guidance in research methods for my research. Enrolled on ACS6427 at the beginning of the year.	5	High	Articles sent to me by supervisors which we will discuss. Extensive literature reviews to understand where the “state-of-the-art” is. Completion of ACS6427.
Knowledge of how to retrieve information effectively	3	Produced literature reviews in interim reports throughout first year.	5	High	Feedback on my work provided by supervisors.

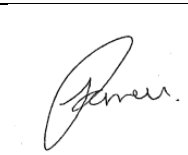
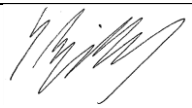
Knowledge of how to undertake an advanced literature review in my research field	3	Literature reviews have been produced in interim reports.	5	High	Feedback and guidance from supervisors allows me to address gaps in my literature review.
Knowledge of writing styles appropriate to graduate research in my field	3	Reading of theses in my field, and general reading of relevant literature.	4	Medium	Continue to read journal articles and relevant literature.
Knowledge of relevant IT packages to my studies and field in general	4	Extensive use of LaTex, Matlab during undergraduate years.	5	High	Python is a more widely used skill than Matlab (outside of academia) – teaching myself throughout the year.
Ability to keep up to date with new research developments	3	Have a researchGate and Twitter account and follow some leading academics in the field.	5	Medium	More engagement with the online academic community to build a feed of relevant research.
Knowledge of how to create materials suitable for presentation on-line	2	Have a researchGate account. Not yet published any work online.	4	Medium	Once conference publication is released I will sit down with Dr. Rigby and post on ResearchGate and myPublication.
Broader understanding of research in other fields applicable to my field	3	Have read relevant literature and reviewed this in interim reports.	5	High	Attend conference, read journal articles and network.
Anything else identified and agreed by the supervisor and the student [please specify]:	-	-	-	-	-
RDF Domain B: Personal Effectiveness *the personal qualities and approach to be an effective researcher*					
	Current skill level	**How has this skill level been obtained (with evidence)?**	**Required skill level**	**Priority**	**Training plan agreed with supervisor(s), i.e. DDP modules, training courses etc.**
An ability to manage my time effectively	4	Extensive use of calendar. Produced work in a timely manner.	4	Low	Work produced in timely manner. Engage in teaching work and balance this alongside research.

Knowledge of how to make the most of conferences	3	Attendance at one conference.	4	Medium	Attend and present work at a conference.
Networking skills	3	Meetings with DSTL organised by Dr Rigby, building an online presence to do with my research.	4	Medium	Attend and present work at a conference and engage with other academics there.
Understanding of how to prepare for the viva	2	Experience of this from undergraduate.	5	Low	Not a pressing issue until closer to the end of my PhD.
Experience of preparing a CV	3	Have produced CVs in the past.	5	Low	Not a pressing issue until closer to the end of my PhD.
Understanding of the range of career destinations PhDs both within and outside academia	3	Online research of career destinations for PhDs in Engineering/ML. Informal discussions with supervisors.	5	Medium	Online research. Meetings with supervisors towards the latter half of PhD to discuss potential career paths relevant to my research and options to promote the path chosen.
Anything else identified and agreed by the supervisor and the student [please specify]:	-	-	-	-	-
RDF Domain C: Research Governance and Organisation *the knowledge of the standards, requirements and professionalism to do research*					
	Current skill level	**How has this skill level been obtained (with evidence)?**	**Required skill level**	**Priority**	**Training plan agreed with supervisor(s), i.e. DDP modules, training courses etc.**
Understanding of plagiarism and how to avoid it	5	Undergraduate experience with Turnitin.	5	High	-

Understanding of copyright issues relevant to doctoral research	5	Completed the compulsory FCE6100 – Ethics and integrity in Engineering module.	5	Low	-
Knowledge of how to plan and manage a research project	4	Produced a Gantt chart of my project timeline	5	High	Feedback given on the Gantt chart by supervisors.
Knowledge of appropriate Health and Safety requirements for conducting research	5	Completed the compulsory training online.	5	Low	-
Understanding of research ethics and good research practice relevant to their research field	5	Completed the compulsory FCE6100 – Ethics and integrity in Engineering module.	5	Low	-
Anything else identified and agreed by the supervisor and the student [please specify]:	-	-	-	-	-
RDF Domain D: Engagement, Influence and Impact *the knowledge and skills to work with others and ensure the wider impact of research*					
	Current skill level	**How has this skill level been obtained (with evidence)?**	**Required skill level**	**Priority**	**Training plan agreed with supervisor(s), i.e. DDP modules, training courses etc.**
An ability to communicate orally in an effective manner	3		5	Medium	
Understanding of how to get the best from the student-supervisor relationship	3	Good relationship with supervisors. Productive meetings where I record minutes	5	Medium	Continue to have meetings with supervisors and discuss work, and future opportunities. Listen and act on feedback received. Contribute work in a timely manner.

		and review them to discuss at next meeting.			
Experience of presenting research at conferences/workshops	3	Some experience with meetings organised by Dr Rigby with DSTL where I have presented research.	5	Medium	Attendance at a conference in the coming year or so to present research.
Knowledge of how to prepare research for publication	3	Produced one conference paper.	5	Medium	Discussion of targeting publications to domains relevant to Machine Learning and targeting some Journals (Engineering Informatics, Computers & Structures, Advances in Engineering Software).
Ability to write for different audiences	3	Work produced in different styles: informal presentations, conference papers, internal reports.	5	High	Continue to produce work to supervisors and receive feedback and guidance on how to improve.
Experience of teaching and demonstrating	5	Good experience in CIV1900, MAS252. Experience doing outreach activities at ICAIR for y12 students and as a STEM ambassador for getting more girls into STEM careers. Also helped organise a section of the first year rother valley trip.	5	Low	Continue to teach and demonstrate in modules as this cements personal knowledge and improves leadership/communication skills.
Understanding of how to make my research count (i.e. impact, outreach and knowledge exchange)	3	Have achieved a conference publication within my first year. Meetings with DSTL organised by Dr Rigby have allowed me to understand what tools	5	High	Target journal publications.

		would be useful from my research.			
Anything else identified and agreed by the supervisor and the student [please specify]:	-	-	-	-	-

Student signature: 	**Date: 17.09.2019**
Signatures of all supervisors:  **(Dr. Rigby),**	**Date: 17.09.2019**
Signature of departmental PGR Director:	**Date:**