Training Needs Analysis (TNA)

This TNA aims to enable you to up to 100 hours a year of training and development in transferable skills to enhance your employability. However, it is not a requirement to use all 100 hours. This is a living document and you are expected to continue to complete this throughout your time as a PGR student.

The comments below each skill are just an example of the type of question you might ask yourself when reflecting on this area of development.

Note: You do not have to undertake development in all eight competencies in each year of your programme. For instance, you could decide to prioritise two or three competencies per year. This means you may not need to complete every box on the TNA form in a single sitting. Please refer to the "TNA Tips" within the Training & Development Mapping document.

Name:	Aaron HA Fletcher
Registration Number:	
Department:	Computer Science
Primary Supervisor:	Mark Stevenson
Second Supervisor:	
Additional Supervisor(s):	
Start Date:	13/9/2023
Time Limit:	100 hours
Thesis Title:	Efficient Screening in Medical Systematic Reviews

1. Personal Skills

Time management *How do you capture and prioritise your work tasks?* **Perseverance** *Do you persevere in the face of obstacles and set-backs?* **Problem-solving** *Can you effectively analyse and interpret research results?* **Critical thinking** *How do you evaluate the quality of your work and the work of others?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Critical thinking** **Strengths in Critical Analysis:** I am proficient at applying critical thinking skills to evaluate research, particularly identifying methodological flaws and limitations. This was demonstrated during my extensive literature review for my confirmation review, where I assessed many studies in information retrieval to determine their relevance and contribution to my specific research area. **Identified Area for Development:** While I can effectively identify weaknesses in research, I sometimes struggle to equally appreciate and articulate the *positive* contributions and potential applications of that research. I focus more on the limitations than on the merits. My participation in journal clubs has highlighted this tendency. Other participants often identify practical applications or novel aspects of the presented work more readily than I do. This suggests a need to develop a more balanced approach to critical evaluation. What (if anything) will you do to further develop in these areas? When evaluating a research paper, I will use a structured approach that explicitly includes both positive and negative aspects, potentially through a structured template, which provides for the strengths/contributions of each paper. I will consciously contribute to journal club discussions by *first* highlighting the paper's positive aspects or potential applications *before* discussing any limitations. This will help me practice framing my critique in a more balanced way.	Reflection of ongoing development during your PGR studies: I am actively working to develop a more balanced and nuanced approach to critical thinking. This involves identifying weaknesses in research and consciously seeking out and appreciating the strengths, contributions, and potential applications of the work, even if it has limitations. I aim to move beyond a purely critical lens to a more appreciative and constructive one.

	I will register to attend the next "Critical Thinking and Writing" online workshop..	

2. Communication, networking and collaboration		
Communication Media and Methods *Do you use a variety of communication means including face-to-face, online and media?* **Networking** *Have you engaged individuals at conferences to make new working relationships outside of your institution?* **Collaboration** *Are you aware of your own behaviour and how it impacts on others in the team?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Networking** **Past Experience (LxMLS):** I attended the LxMLS conference in Lisbon, where my first major networking experience was at a machine learning summer school. While the conference was valuable for learning, I found networking challenging. Factors contributing to this included the physical layout of the venue (which made informal conversations difficult), my mild hearing difficulties in noisy environments, and my initial unfamiliarity with the specific research topics being discussed, which made it harder to find common ground with other attendees. **Skill Development (Diana Maynard's Session):** Based on this poor experience, I attended a session on "Getting the most out of conferences", which included some great tips on starting conversations at these events, approaching networking opportunities, and following up on connections. **Application (BCS lecture)**: I began implementing these strategies during a tutorial I presented on information retrieval. I consciously used the conversation starters and approached individuals who expressed interest in my research area. This resulted in several promising connections with researchers working on related topics, opening up possibilities for future collaboration and knowledge	Reflection of ongoing development during your PGR studies: This has been a focused area for improvement over the past 12 months. I have used available resources (such as tutorials) well. I want to become more proactive and seek out networking opportunities in the future.

	exchange (and an ever-expanding list of connections on LinkedIn!) While I've progressed in my networking abilities, it is an ongoing process. I would like to improve my confidence in approaching groups of people and initiating conversations in larger groups.	
	What (if anything) will you do to further develop in these areas? **Conference Attendance**: Over the next 12 months, I will potentially attend 2 or 3 conferences. I will identify 3 to 5 researchers at each conference whose work aligns with mine and seek them out during the conference. **Improved social media interaction:** I currently rarely interact on social media. Increasing the time spent interacting with the community could help identify other individuals in this research area. **Poster Preparation**: I will produce posters explaining some of my work for any attended conferences (i.e. SIGIR/Sheffield CDT event). Practising my "poster pitch" beforehand with my supervisor or CDT colleagues will help improve my ability to network.	

3. Professional Skills		
Argument construction *Are you clear about your research question?* **Publication** *Do you know how to prepare research for publication?* **Project planning and delivery** *Do you make the decision on what to do next in your research?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Publication** **Prior Experience (Medical Publication):** I have previously published in a medical journal and have two pieces of research undergoing peer review. This (hopefully)	Reflection of ongoing development during your PGR studies: I am actively working to adapt to the publication norms of computer science. This includes understanding the role of conferences,, and refining my writing style to align more with the field's expectations. The feedback received on submitted works is used as a roadmap for improvements.

Teaching *Can you effectively teach/supervise undergraduate students?*	demonstrates some understanding of the academic publishing process. **Transitioning to Computer Science:** Transitioning to computer science research has highlighted key differences in publication norms and expectations, which I aim to address. **Venue:** In medicine, journal publications are the primary and often only accepted venue for disseminating research. Conference publications are typically not considered significant. In contrast, computer science heavily emphasises conference proceedings as the primary means of disseminating research. Preprint servers like arXiv are also commonly used to share work before or during peer review, which is a practice I'm unfamiliar with. **Writing Style and Structure:** Medical publications typically adhere to a strict, standardised format (IMRaD: Introduction, Methods, Results, and Discussion) with a strong emphasis on detailed statistical analysis. While still rigorous, computer science publications often adopt a more narrative structure, emphasising the "story" of the research and its contribution to the state-of-the-art. This includes justifying the novelty and significance of the approach, often in comparison to existing methods. I have struggled to adapt my writing to this style (as evidenced by feedback on submitted works).	Some of my generic feedback includes: **Precision at the expense of clarity** - for example, hyperparameters of experiments can be provided in the submitted code. Tangential additions to the main text can cause unclarity in the main point of the work. **Conciseness:** Journal submissions have the luxury of much greater word counts, whereas conferences are strict, one-shot approaches.
	What (if anything) will you do to further develop in these areas? **Contrastive Papers:** One of my submissions needs rewriting from a computer science target venue to a biomedical one. I will compare both submissions (as they detail the same research) and see the major differences. **Peer review:** If opportunities are available, I will participate in the peer review process by volunteering to review	

	conference or journal papers. This will give me more insight into the publication process and publishers' expectations.	

4. Leadership		
Influence and leadership *Can you recognise the implications of your own research for real life contexts?* **Reputation and esteem/profile** *How might you develop your online research profile?* **Research Funding** *Are you aware of how your research aligns with the focus of your department, institution or funding body?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Reputation and esteem/profile** **Current online presence:** This is minimal. I have accounts on • ORCID • LinkedIn • BlueSky My posting activity on LinkedIn and Bluesky is infrequent and deliberately limited to announcements related to research publications or presentations I am involved in. I do not actively engage in broader discussions or share content with others. What (if anything) will you do to further develop in these areas? If I present papers or posters at conferences, I will continue to utilise the CDT's social media postings to promote those presentations.	Reflection of ongoing development during your PGR studies: I recognise the importance of developing a stronger and more active online research profile to enhance my visibility, build my network, and contribute to the broader research community. Developments in this area, however, will not be done at the expense of active involvement with social media.

5. Ownership and understanding of the scope for career development options		
Career Management *Are you aware of career pathways within and outside of academia?* *Can you communicate convincingly about your research specific and transferable skills?* *How can you improve your employability?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Career Management**	Reflection of ongoing development during your PGR studies: I am consciously transitioning my career focus from medical practice to academic research in computer science. This involves understanding the specific

	Prior Professional Experience: Before starting the PhD, I accumulated ten years of professional experience in the medical field. This included pursuing and obtaining additional qualifications, including the master's level qualification of Certificate of Advanced Practice and MSc in Artificial Intelligence and documenting my proactive approach to career development. I also successfully managed a medical practice and progressed to a senior management level. **Career Goal:** My primary career goal is to pursue a research and academic career path within computer science, specifically information retrieval and natural language processing. Undertaking this PhD is a deliberate step towards achieving this goal. My PhD training and skills are transferable to various non-academic sectors, such as technology consulting, software engineering, etc. However, I do not aim to work in those areas. **Prior Teaching Experience:** I have experience teaching and training, specifically in providing practical instruction to medical students. This experience, while valuable, differs from the pedagogical approaches and expectations within a computer science academic setting.	career pathways within academia, developing the necessary skills (particularly teaching in this new context), and networking within the field. I am actively researching the requirements for academic positions and seeking opportunities to gain relevant experience.
	What (if anything) will you do to further develop in these areas? ● Look at career pathways for academia (such as post-doctoral research assistant). ● Continue working as a Graduate Teaching Assistant on relevant modules. ● I will investigate the requirements and benefits of obtaining a Higher Education Academy Fellowship (or equivalent qualification).	

6. Understanding the importance of impact and translation (if you are not engaged in this area, reflect on its importance instead)		
Impact *Do you have an awareness of the impact of your research on wider society (culture, environment policy)?* **Public engagement /Outreach** *Do you have experience in communicating your research to a non-specialist audience?* **Policy** *How could your research impact on policy?* **Enterprise and IP** *Are you aware of the value to academia of establishing relationships in business/commercial context?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Public Engagement/Outreach** In November, I presented a tutorial at the British Computing Society on my area of research (screening prioritisation in systematic reviews). Specialists and non-specialists attended this. Preparation for this and my ability to communicate was harder than I expected. In particular, dealing with questions from non-specialists was difficult, trying to understand exactly what was being asked. One strategy I adopted was to get them to rephrase their question or repeat my interpretation of their question before answering. This event made it clear that, while I am knowledgeable in my specific research area, I need to improve at translating it for a wider audience. What (if anything) will you do to further develop in these areas? I will practice presenting my poster to a diverse audience, including colleagues outside my immediate research area (e.g., other PhD students in different departments, friends or family members with non-technical backgrounds). I will specifically ask for feedback on clarity and accessibility. I will develop a "lay summary" of my research that explains the core concepts and potential impact in plain language, avoiding technical jargon. I will test this summary with non-specialists and refine it based on their feedback.	Reflection of ongoing development during your PGR studies: I recognise the importance of public engagement and outreach for disseminating research findings and fostering broader understanding and support for scientific endeavours. I am working to improve my ability to communicate complex research concepts clearly and effectively to non-specialist audiences. This skill is crucial for demonstrating my research's impact and engaging with people beyond academia.

7. Responsible research and innovation

Ethics *Are you aware of ethical issues and/or good research practices relevant to your field?* **Data Management** *Do you have a data management plan that you have shared with your supervisor?* **Sustainability** *Do you ensure your research does not have a negative effect on the environment and society?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Data Management Plan (DMP)** I have experience developing and implementing DMPs. I have created two DMPs for this PhD: one for my initial CDT Mini Project and a more comprehensive one for my confirmation review. These plans were made using the DMPonline tool and the University of Sheffield template, as well as detailed data collection, storage, organisation, long-term preservation, and sharing. While the mini-project DMP was not fully followed due to early project challenges (such as the large group it was intended to cover), the current DMP is actively being used and reviewed regularly. What (if anything) will you do to further develop in these areas? I will adhere to my current DMP, reviewing and updating it frequently every three months or more if significant changes occur in my research project. These reviews will be documented.	Reflection of ongoing development during your PGR studies: I am committed to maintaining the highest standards of responsible research throughout my PhD. I will actively monitor and update my DMP,

8. Qualitative skills and/or quantitative and digital skills, depending on discipline

Do you know what research approaches/ techniques are generally used in your field and which are relevant to you? *Can you use relevant IT packages for effective analysis?*	Reflect on your current ability/experience in these areas (using examples if you wish): **Relevant Research Approaches** As part of the preparation for my confirmation review, I conducted an extensive literature review covering key areas relevant to my research: systematic reviews, active learning,	Reflection of ongoing development during your PGR studies: I am moving from a foundational understanding of the field, gained through my initial literature review, to a continuous learning approach. This involves actively monitoring new publications, adapting my research

	and stopping methods in the context of continuous active learning for systematic review screening. I have practical experience in implementing research methods from the literature. Specifically, I have reimplemented code used by previous researchers in this field and augmented them with different models and custom loss functions. Continuous active learning for systematic reviews is rapidly evolving, with new research published annually. Continually monitoring journals for related research output is needed to maintain this knowledge.	methods as needed, and developing my skills in implementing and evaluating cutting-edge techniques.
	What (if anything) will you do to further develop in these areas? I will set up alerts (e.g., using Google Scholar, Semantic Scholar, or journal/conference email notifications) for relevant keywords and key researchers in my field. I will review these alerts weekly.	

Personal Development Plan

These are to be decided ***after*** consultation with your supervisor.

You should aim to use SMART objectives when completing this document

What (is the development activity)	**Who** (will support you/organise the activity)	**When** (will you focus on it / which year)	**Hours involved** (where relevant for formal training)	**Completed** (tick when the action is completed

Add more rows if needed

Required Approvals

A member of your supervisory team should approve the current development plan below.

COMPLETED BY: SUPERVISOR

Approval - comments:

Date approved: