

# Advancing Human-Centred AI: PhD Research Opportunities in the Haii Lab

## Contact

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## Research Projects

The integration of AI into society is rapidly evolving, presenting challenges such as fairness, reliability, safety, privacy, security, inclusiveness, transparency, accountability, and bias. In Haii (Human-AI Interaction) Lab, our research focuses on leveraging data science, design science, and behavioural science to develop a deep understanding of human-centred, responsible AI. This knowledge guides the creation of resilient, equitable AI systems that align with societal good, applicable in education, well-being, cybersecurity, and more. Below are available projects, but we welcome your own proposals.

- **Revolutionising Intelligent Tutoring Systems (ITS):** ITS are vital for personalised learning but are often inefficient to create. This project aims to streamline ITS authoring by integrating simulated students and Large Language Models (LLM). We will explore how simulated student based ITS, enhanced by LLM, can empower educators and optimise user experience through innovative HAI techniques.
- **Enhancing AI Safety & Trustworthiness with Symbolic AI:** As AI use increases, so do concerns about reliability and trust. Symbolic AI, involving knowledge representation and reasoning, provides a clear method for representing and analysing system behaviour, enabling model verification and offering human-understandable explanations for decisions. This research will explore symbolic AI techniques to improve AI system safety and trustworthiness.
- **Exploring Artificial Social Intelligence (ASI):** AI is reshaping work, interactions, and self-perception. ASI aims to make machines socially intelligent and human-like. This project examines the psychological and societal impacts of interacting with chatbots, virtual assistants, and AI avatars, offering insights for responsible AI development and ethical frameworks.
- **Promoting Responsible AI Development and Implementation:** As AI penetrates sectors like healthcare, transportation, and education, it is crucial to align AI development with ethical principles. This study will investigate human-AI interaction dynamics and develop strategies for responsible AI implementation, ensuring systems align with human values.
- **Understanding Human-AI Interaction (HAI) in Complex Social Environments:** Integrating AI into complex social settings requires a thorough understanding of HAI. This research will explore the sociocultural dimensions of HAI using an "AI-in-the-human-loop" approach, uncovering ethical considerations and developing a framework for designing socially responsible AI systems.

**Applicant skills/background:** Eligible candidates should be completing or have completed a postgraduate (MSc) degree in fields such as Artificial Intelligence, Data Science, Applied Statistics, Human-Computer Interaction, Cognitive Sciences, Experimental Psychology, Learning Science/Engineering, Applied Linguistics, Instructional Design, Innovation Sciences, or related disciplines. As a PhD student, you will benefit from the guidance of a diverse academic team, with Dr Lei Shi as your primary supervisor. You will also join the vibrant community at the Open Lab, School of Computing, Newcastle University, engaging with scholars passionate about computing and innovation.