Department	School of Computing
Supervisors	Dr Dimitrios Darzentas, Dr Iain Donald
Project Title	Designing Meaningful Mixed Reality Experiences

PROJECT DESCRIPTION

The aim of this research project is to investigate the design of Mixed Reality Experiences, with the long-term objective of investigating how they can be designed, developed and deployed in engaging, impactful, and ultimately more meaningful ways, in any given application context.

The creation of a Mixed Reality (MR) experience is by its nature a transdisciplinary challenge, and the application context influences the design significantly. The research can encompass aspects of Design, Technology, Human-Computer Interaction (HCI), User Experience Design (UxD), Service Design, and application-specific issues, among many others.

For effective implementation, designers need to apply a holistic approach, taking into consideration the stakeholders, the capabilities and limitations of the chosen technology, the human-centred design, the socio-cultural challenges, and more. Therefore, we welcome diverse perspectives and approaches to the research. Candidates with experience and knowledge of multiple and varied disciplines, and interdisciplinary ways of working, are strongly encouraged.

The intent is for the project to be application focused. Therefore, a suitable application area should be chosen, which can draw from a broad range including Digital Cultural Heritage, Creative Industries, Performance, Games & Playful Interactions, Accessibility, Wellbeing, Health, Sustainability, or a combination thereof. The application area can also include others that are of interest to the candidate, especially if they have prior work or resources in that area.

A candidate may choose to focus on the broader conceptual challenge of meaningful experience design, an ongoing transdisciplinary challenge which underpins the entire project.
Or, depending on the background and preference of the candidate, the research approach may narrow the scope to a particular challenge of MR experience design & development, beyond the wider exploration of meaningful design.

Some examples of scoping could include:

- A tighter focus on Computer Vision and MR interaction design, by looking into interaction challenges such as the use of 3D Object Recognition and Tracking to facilitate tangible interactions in Mixed Reality Experiences. This could enable more natural interactions with physical objects that can act as immersive interfaces for MR experiences.
This example would suit a candidate interested in Computer Vision and machine learning.
- Or a focus on exploring the barriers to inclusive MR experiences. This could be along the lines of accessibility, inclusivity, or socio-economic and cultural perspectives. This example could suit a candidate from a variety of backgrounds, including design, psychology or sociology.
- Or An initiative to drive a novel combination of MR and an existing experience, intended for health and wellbeing, cultural heritage or performance and art.
This example could suit a candidate with a health, creative industries or cultural heritage background and a keen interest in in utilising creative and immersive technology.

Over the course of the project, the candidate will evaluate and determine which approach and/or technology is most suitable for their focus, and ideally develop a process that can be adopted by end-

users in the chosen application area. The process should be co-designed and evaluated by practitioners of the chosen application area to drive real-world impact.

Academic qualifications
A first degree (at least a 2.1) ideally in Computer Science, Applied Informatics, a similar field, or relevant to their chosen application context, with a good fundamental knowledge of Research Methods and ideally Mixed Reality Technologies, with knowledge and skills from their chosen application area.

English language requirement
IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. Full details of the University's policy are available online.

Essential attributes:

- Experience of fundamental Design, User Exprerience Design or Applied Computer Science
- Competent in the interdisciplinary application of research methods and creative tools
- Knowledge of their chosen application area, or of the design of Mixed Reality Experiences
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

Desirable attributes:
Application-specific attributes will be considered, and a strong interest in, and experience of, designing and developing interactive experiences, or similarly aligned practice experience is very welcome. In addition, experience utilising mixed methods for research and ideally some experience in academic authoring is also welcome.

Indicative Bibliography	Benford, Steve, Adrian Hazzard, Alan Chamberlain, Kevin Glover, Chris Greenhalgh, Liming Xu, Michaela Hoare, and Dimitrios Darzentas. 2016. 'Accountable Artefacts: The Case of the Carolan Guitar'. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, 1163–75. CHI '16. New York, NY, USA: ACM. https://doi.org/10.1145/2858036.2858306. Benford, Steve, Kadja Manninen, Sarah Martindale, Adrian Hazzard, Juan Pablo Martinez Avila, Paul Tennent, Jocelyn Spence, et al. 2023. 'Infrastructures for Virtual Volunteering at Online Music Festivals'. *Proceedings of the ACM on Human-Computer Interaction* 7 (CSCW1): 65:1-65:26. https://doi.org/10.1145/3579498. Benford, Steve, Anders Sundnes Løvlie, Karin Ryding, Paulina Rajkowska, Edgar Bodiaj, Dimitrios Paris Darzentas, Harriet Cameron, Jocelyn Spence, Joy Egede, and Bogdan Spanjevic. 2022. 'Sensitive Pictures: Emotional Interpretation in the Museum'. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, 1–16. Darzentas, Dimitrios, Harriet Cameron, Hanne Wagner, Peter Craigon, Edgar Bodiaj, Jocelyn Spence, Paul Tennent, and Steve Benford. 2022. 'Data-Inspired Co-Design for Museum and Gallery Visitor Experiences'. *AI EDAM* 36: e3. https://doi.org/10.1017/S0890060421000317. Darzentas, Dimitrios, Martin Flintham, and Steve Benford. 2018. 'Object-Focused Mixed Reality Storytelling: Technology-Driven Content Creation and Dissemination for Engaging User Experiences'. In *Proceedings of the 22nd*

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Enquiries	For informal enquiries about this PhD project, please contact Dr Dimitrios Darzentas at d.darzentas@napier.ac.uk
Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process