Funded PhD position in digital & physical media

The [Cheriton School of Computer Science at the University of Waterloo](#) invites applications for a fully funded, 4 year PhD position in human-computer interaction (HCI). **The general topic is integration of digital and physical media in interdisciplinary design processes grounded in physical computing, tangible media, installation art, and ambient media.**

This opportunity is part of a specialized research creation program connected to the [EU-Horizon EXPLORA initiative](#), in association with the [Living Architecture Systems Group](#) (LASG) and partner [Philip Beesley Studio Inc](#). The EXPLORA program focuses in areas related to human perception, and supports science communication. **A distinctive aspect of this position is that the candidate will be based in Toronto at the LASG design lab and studio facility.** The LASG brings together a multi-disciplinary team of researchers, designers, and technicians in a richly equipped environment combining advanced fabrication, physical computing, and generative design. It supports experimental projects that explore the boundaries of art, architecture, science, and interaction.

Over the past two decades, the LASG has developed and installed internationally a series of architectural-scale interactive sculptural testbeds (e.g., [Aria](#), [Ar Frout Reef](#), [Grove](#), [Meander](#)) that enable creative exploration and expression. Underlying these developments is a series of physical and virtual behaviour, design, and fabrication tools and pattern libraries (e.g., [Living Shadows](#), [Spatialized Digital Milieu](#)) and modular [kits](#) of interchangeable physical components. These have been workshopped with users from grade school to professional designers (e.g., [Dream Worlds](#), [Shadows and Whispers](#)). **A primary focus of the candidate's thesis research will be the design and implementation of "digital twin" systems that integrate with and augment emerging LASG-authored distributed physical immersive environments and interactive physical toolkits.** To inform the effective development of digital twins, the candidate would also participate in physical design and fabrication, supported by the LASG studio team. The specific details of the project will be refined with the successful candidate based on their interests and expertise.

Candidates should have *experience* in augmented reality development (e.g Unreal or Unity) as well as *interest* in microcontroller programming, sensors and electronics, physical component design and fabrication (such as 3D printing), and mechanical systems. HCI research methods may include research-through-design, co-design, participatory design, controlled experiments, technical design probes, and qualitative methods (e.g., observation,

interviews, coding). Outcomes may be disseminated at HCI venues such as ACM CHI, UIST, TEI, DIS, or Creativity & Cognition, as well as art and design venues like Leonardo, Ars Electronica, and SIGGRAPH Art Gallery.

The successful candidate will join the PhD program in Computer Science at the Cheriton School of Computer Science, University of Waterloo. This is one of the world's premier computing programs, consistently ranked among the top two in Canada and within the top 25 globally in QS and U.S. rankings.

In addition to their work at Waterloo and the LASG Studio, the successful candidate will be embedded in an international network of doctoral students and research labs as part of the [EXPLORA Consortium](#). This will include potential for several international travel opportunities to [EXPLORA training workshops/meetings](#), interaction and collaboration with other Consortium doctoral candidates and researchers, as well as several months spent on two secondments to EXPLORA partner labs.

The successful candidate will be co-supervised by Philip Beesley (Professor of Architecture and multidisciplinary artist), Rob Gorbet (Professor in Knowledge Integration and mechatronics specialist), and Daniel Vogel (Professor in Computer Science and HCI researcher with an art and design background).

Eligibility Criteria:
You should have a background in computer science, either through an undergraduate degree, or equivalent coursework in algorithms (e.g. design paradigms and analysis techniques) and operating systems (e.g. concurrency, memory management, scheduling, and related topics).

The terms of the HORIZON EU MSCA-DN program specify two additional criteria:

1. You must not already have successfully defended your doctoral thesis, or be in possession of a doctoral degree, at the date of the recruitment.
2. You must not have resided or carried out your main activity (work, studies, etc.) in Canada for more than 12 months in the 36 months immediately before the date of recruitment.

Recruitment Process:

We anticipate finalizing an offer in fall 2025 with the candidate starting the program May 1, 2026. To apply, please send the following to rob.gorbet@uwaterloo.ca:

- An extended statement (2-3 pages) that describes how the expertise and experience of the LASG might support your research interests, and how your own interests and

experience might contribute to ongoing LASG research. It is easy to see when these letters are generic, so please put your best effort forward.

- Documentation of related projects and writing you have done; we recognize this may be a lot of material, but please don't hesitate to send:
  - Project-based evidence of coding and software creation. This is especially important if you do not have a formal Computer Science background. Provide a short write-up describing the purpose of the project, your technical contributions, and the languages/frameworks used.
  - Any documentation/portfolio evidence of past projects in HCI and/or VR/Game Engine (e.g. Unity) software. We are particularly interested in projects where you were applying these in research with humans: designing experiments, configuring sensors/hardware, gathering data, analyzing and publishing results.
  - Any documentation/portfolio evidence of past projects in interactive systems, in which you designed embedded hardware and sensors to enable user experiences.
  - Any documentation/portfolio evidence of industrial design, spatial design, and hands-on making. This could be with laser cutters, 3D printers, craft approaches, graphic design…anything that demonstrates your ability to think and create in physical space.
  - Any documentation/portfolio evidence of your own creative and speculative work relating to the Art-Science orientation of the EXPLORA LASG project, even if it was outside the context of your formal training.
- a CV; and
- a statement confirming eligibility with respect to the Horizon EU criteria.

If you wish to request a pre-screening to evaluate the investment required in a full application, please send your CV and brief written background (relevant to the project needs) to rob.gorbet@uwaterloo.ca.

Applicants can expect a first response following preliminary review within two weeks. Interviews will be scheduled virtually in groups. Interview rounds will continue until the position is filled.

Remuneration:
The MSCA Doctoral Network fellowship covers the first three years of your four-year degree. In the first three years, the fellowship provides generous remuneration in line with the EC rules for MSCA researchers. Effective funding amounts vary based on host country and local institution regulations, but would be approximately CAD$70k gross per annum. This amount is after tuition, which could be covered through a combination of teaching/grading duties and scholarships assigned by Waterloo. In addition, the EU funding provides a travel and accommodation allowance of approximately CAD$20k, paid in

instalments over the first three years. For the fourth year, the University of Waterloo guarantees a minimum funding level of approximately CAD$45k made up of a combination of teaching/grading duties and scholarships, resulting in after-tuition net income of approximately CAD$26k.