
→ A wide-angle photograph of the design space at the iStudio research lab at Queen's University.

# iStudio: The Interioraction Design Lab

Sara Nabil, Queen's University

IMAGE COURTESY OF THE AUTHOR

Our human-computer interaction lab is a *studio-style* design space focusing on wearables and *interactive interiors* [1], so we call it *iStudio*. Located within the School of Computing at the research-intensive Queen's University in Kingston, Ontario, iStudio is a one-of-a-kind lab in Canada, combining computational power and a comprehensive suite of digital fabrication equipment that few HCI labs can match. We're not just developing new interfaces; we're pushing boundaries in how materials and technology can interact with us in everyday life.

We do everything from designing interactive stained glass [2] and smell-interactive Covidware [3] to digital weaving and machine embroidery of e-textile sensors within wearable garments, soft furnishing, and car leather sensors [4]. One of our most recent adventures was playing with a digital serger (overlocker) to sew garments and non-wearables that, through their stitching, seamlessly perform activity recognition of users' physical gestures [5].

Our lab space is split into three key areas: a design space that houses a highly specialized collection of machinery, a makerspace for hands-on construction, and a collaborative space with interactive displays and tools for participant-based research.

The design space is where the digital fabrication takes place and where researchers' desks are—this is where most of the magic happens. In addition to two laser cutters and three 3D printers, we have a computational weaving loom, an industrial digital embroidery machine, a glass grinder, a vacuum maker, and a 3D knitting machine. Other labs may have some of these, but we're confident that we're the only HCI lab with all five. The makerspace is where we do woodwork with drills and hand tools and soldering on our workstation. It's also where we store our materials, craft supplies, and safety gear.

The collaborative space includes a hybrid conference room with smart TVs and AI speakers, a kitchen,


→ The design space houses a unique suite of equipment, from laser cutters and 3D printers to sewing, weaving, and 3D knitting machines.

→ The makerspace is not only used for soldering electronics and organizing materials but also for fun and messy creation, including woodworking and glass grinding.

**At iStudio, we approach HCI through design-driven and material-driven approaches—we work with and are inspired by the materials of our design research—and use artistic methods to generate knowledge.**

and a living room–like lounge. It's where we host speakers and guests like artists in residence, meet and brainstorm, run some user studies, and conduct participatory design workshops. Recently, we used the space to wash and spin sheep wool and make a new weaving warp while watching movies. This setup allows us to dive deep into every aspect of HCI, from developing innovative fabrication methods and prototyping deployable home interfaces to codesigning and evaluating user experience. One fun fact about the space: The comfy sofa zone doubles as a resting spot for our adorable lab pet, Lily the (robot) cat!

At iStudio, we approach HCI through design-driven and material-driven approaches—we work with and are inspired by the materials of our design research—and use artistic methods to generate knowledge. Our work is interdisciplinary, often combining electrical engineering with design and art to explore how digital materials can better integrate into our lives for more-seamless interactivity, new materiality, and innovative applications. Each project leverages our advanced equipment, enabling us to prototype smart textile interfaces that are not just functional but also push aesthetic boundaries.

IMAGES BY LUIS GARCIA



→ **The collaborative space includes a hybrid conference room for codesign and making workshops. Recently, it was used for cleaning raw sheep wool in preparation for washing and spinning it into weaving yarn.**



→ **iStudio members Salma Ibrahim and Pouya Khorsandi at the design lounge making a warp for the digital jacquard weaving loom while watching the entire *Star Wars* movie series.**


## ACKNOWLEDGMENTS

We would like to acknowledge the funding of the Canadian Foundation for Innovation, the Ontario Research Fund, the NSERC RTI Award, and the Queen's University Research Initiation Grant for the infrastructure that helped build our lab.


### ENDNOTES


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**Sara Nabil** is an assistant professor of HCI in the School of Computing at Queen's University and director of the iStudio research laboratory. Her work focuses on interactive interior and everyday things, smart textiles, and wearables for self-reflection and self-expression, community-based research, and designing for digital living.

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DOI: 10.1145/3715930 