



Harvard University
Graduate School of Design

Laboratory for Design Technologies

Improving the Human Condition



Harvard University's Graduate School of Design

The Harvard University Graduate School of Design (GSD) has a rich legacy of design leadership and innovation, pushing the frontiers of knowledge and research across all design disciplines for more than 80 years. As a leading global design school, the GSD offers programs in architecture, landscape architecture, urban planning and design, design studies, and design engineering. And as a global leader in each of these fields, the GSD is redefining design as a critical response to increasingly complex issues faced by people, cities, and ecologies, across the United States and around the world.

The GSD's method of design education involves transdisciplinary collaboration across all of the School's departments and programs, as well as with other schools and units at Harvard. It is through this cross-practice that the GSD fosters a deep connection between design and other academic fields, which is reflected in the joint degree programs with the Harvard John A. Paulson School of Engineering and Applied Sciences, the Harvard T.H. Chan School of Public Health, the John F. Kennedy School of Government, and the Harvard Law School.

The GSD educates leaders in design, research, and scholarship who will directly impact and improve the built environment to create a resilient, just, and beautiful world, now and in the future.

Laboratory for Design Technologies

Technology is accelerating profound changes throughout society, affecting how we live, work, produce, build, and think. The ubiquity of data and computational power impacts all systems—from mobility and health to government and construction. The Laboratory for Design Technologies (LDT) at the Harvard Graduate School of Design is a collaborative platform that investigates the challenges and opportunities at the intersection of design technology and the built environment. It advances design as a catalyst of change and leverages innovative research methods to understand the architecture of complex issues.

LDT Research Tracks

The Laboratory for Design Technologies has established a collaborative platform to pursue work by faculty in multiple research units.

Material Processes and Systems Group Martin Bechthold DDes '01

The Material Processes and Systems Group (MaP+S) is a research lab that takes materials as a starting point for a broad set of research investigations that involve computation, robotics, and material science. MaP+S advances the aesthetic and functional agenda of materials in the built environment. The group, which evolved from the previously established Design Robotics Group, looks at materiality as a starting point for design research, with a special interest in robotic and computer numerically controlled (CNC) fabrication processes, as well as small-scale work on nano materials.

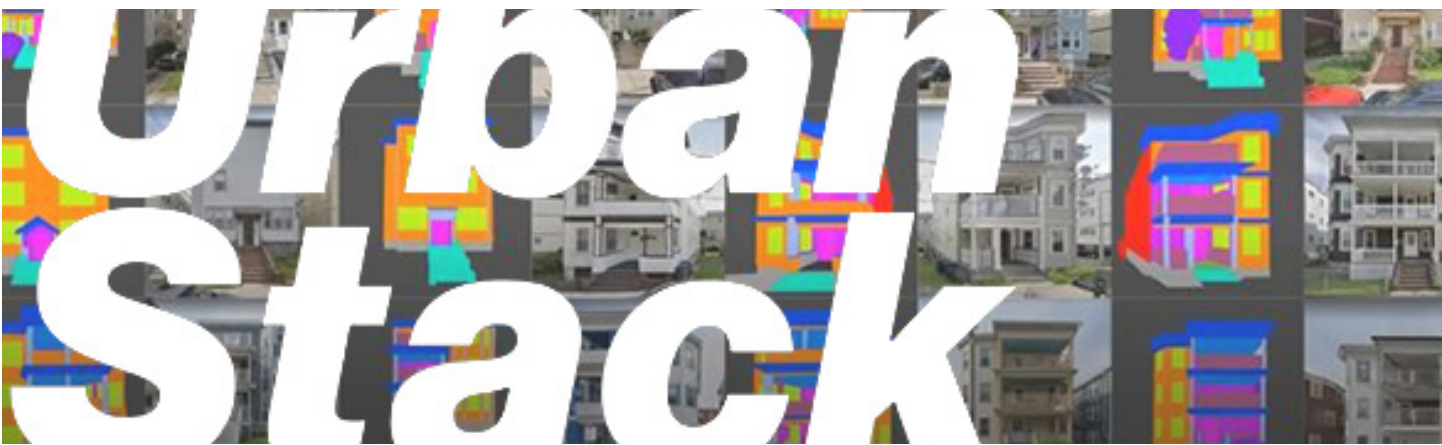
Geometry Lab Andrew Witt MArch '07, MDes '02

The Geometry Lab researches the intersection of design and the science of shape and form, aided by computational tools and design intuition. This Lab combines computational, formal, architectural, and historical research in a heterogeneous yet synthetic agenda. The objectives of the Lab are to produce and disseminate new knowledge, to generate broad, scalable solutions to big problems, and explore the associated cultural and human implications.



Computational Geometry Lab

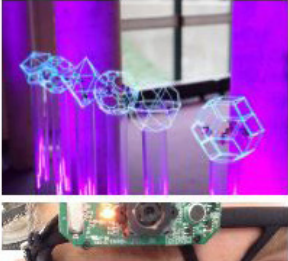
Andrew Witt // Associate Professor in Practice, GSD
Hyojin Kwon // Lecturer, GSD



RESPONSIVE ENVIRONMENTS & ARTIFACTS LAB
HARVARD UNIVERSITY GSD



All Works ARTIFACTS BUILDINGS CITIES LANDSCAPES



The Responsive Environments and Artifacts Lab (REAL Lab) **Allen Sayegh MDes '96**

The Responsive Environments and Artifacts Lab (REAL) is a research lab that pursues the design of digital, virtual, and physical worlds as an indivisible whole. It recognizes the all-pervasive nature of digital information and interaction at scales ranging from our bodies to the larger urban contexts we occupy and the infrastructures that support them. REAL takes an interdisciplinary look at the design of the built environment from the lens of technologically augmented experiences, with a strong focus on the sustainability and longevity of technology. Putting the human being at the center and forefront, from the micro (bodily sensors, smart product design, augmented interfaces) to the macro (interactive buildings, information infrastructures, communication frameworks), researchers at REAL examine the emerging ways in which technology fuses into the ways we live, work, and play.

Urban Stack **Elizabeth Christoforetti MArch '09** **Carole Voulgaris**

The Urban Stack Lab (USL) explores the impact and opportunities presented by the emergence of scalable systems in the built environment and is building and testing productive overlaps between the digital, social, and design processes that shape urban form and civic futures in 21st century urban places. Faculty are developing technologies that embrace the complexity of social infrastructures and market dynamics to produce new modes of design practice. The persistent and growing challenge of housing supply and quality is a primary focus of current USL research.

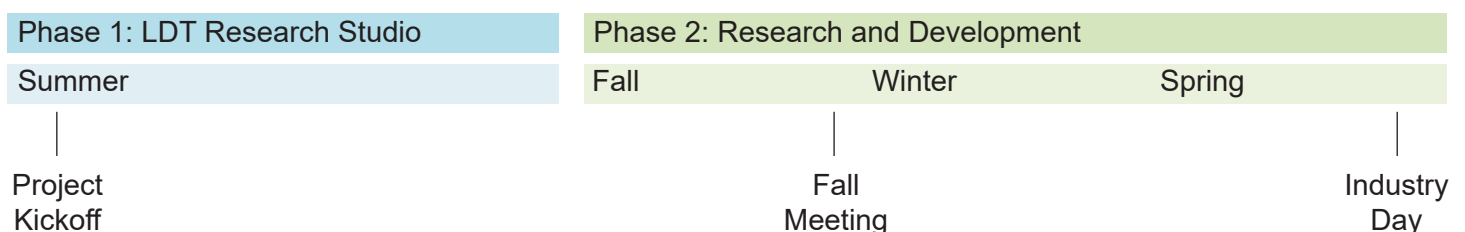
A High Visibility Partnership

The GSD invites leading companies to engage in LDT by becoming members of the Industry Advisors Group, a unique philanthropic network where experts from industry and the public sector join with faculty and researchers from the GSD and the greater Harvard community to shape the future of the built environment through innovative design research.

The real-world perspective of the Industry Advisors helps to bridge the gap between discovery and the advancement of ideas and transforms inspiration to activation. Operating from a platform of shared knowledge, industry leaders work with a committed group of internal and external stakeholders to accelerate the development of new products, processes, and systems.

The Industry Advisors Group members help to guide forward-looking projects in areas such as artificial intelligence and machine learning, adaptive material systems, multidimensional computational simulations and spatial analysis, and multimedia design interfaces. It is a vigorous forum for thought leaders in fields including construction, fabrication, material production, design and engineering, real estate, technology, government, and international development. Alongside faculty, members focus on broad-based, strategic research questions—at a fraction of the cost that such high-risk, high-reward investigations would require if conducted at in-house corporate R&D facilities. Participation represents a low-risk investment that could yield visionary results.

Through a 12-month partnership, the Industry Advisors Group will engage in two phases of research:



Phase 1: LDT Research Studio

The framework of LDT begins with a two-month design ideation and research phase that involves faculty, student researchers, and industry advisors in a collaborative setting. The studio launches during the summer and serves as an exploratory dive into the research topic.

Phase 2: Research and Development

Upon completion of the summer studio, an academic year of research and development is led by Harvard faculty and researchers, and in collaboration with students focused on the topic of investigation, including those in the Master in Design Engineering (MDE) program.

Industry engagement shifts from the intensive studio phase to periodic project reviews and LDT meetings where industry members, faculty, and researchers discuss ongoing research, findings, and outputs. The year culminates in a final spring meeting and Industry Day, during which industry members engage with students and student projects for intellectual exchange and recruitment opportunities.

Make It Happen

The funding level for participation in the Laboratory for Design Technologies and membership in the Industry Advisors Group is \$125,000 per year: \$25,000 for the summer studio and \$100,000 for the year of research and development (commitments can be split into more than one payment).

Members are also invited to make an optional philanthropic contribution to the Master in Design Engineering (MDE) Fund, which directly supports student aid. MDE students are a critical part of this program and supporting students is a top priority for the School.

Joining the Industry Advisors Group offers a range of benefits including:

- Joint discussion and analysis of desired learning outputs and deliverables, as part of the exploratory summer studio.
- Creative co-development of design visions/fictions and applied-research ideas within the research project's scope, accompanied by access to background research materials.
- Participation in the learning that produces final publications and public output.
- Engagement and networking with master's students on the cusp of launching new careers, including ideation exercises that bring together stakeholders of different generations and backgrounds in an open, exploratory environment.
- Invitation to in-person meetings and opportunities to engage with faculty, students, and fellow AIG members.
- Members can engage various leaders across their organization to promote innovation and discovery among their team.
- LDT newsletters that highlight research activities in participating labs.
- Access to and association with public content output tied to the LDT research project.

Laboratory for Design Technologies Faculty

JOANNA AIZENBERG

Amy Smith Berylson Professor of Material Sciences at Harvard John A. Paulson School of Engineering and Applied Sciences
Professor of Chemistry and Chemical Biology in the Department of Chemistry and Chemical Biology

MARTIN BECHTHOLD DDes '01

Kumagai Professor of Architectural Technology
Director, Doctor of Design Program
Co-Director of Master in Design Engineering Program
Associate Faculty, Wyss Institute for Biologically Inspired Engineering
Director, Material Processes and Systems (MaP+S) Group

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CHUCK HOBERMAN

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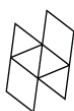
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Director, Geometry Lab

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