



Harvard University
Graduate School of Design

Laboratory for Design Technologies

To Improve 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 the largest and most comprehensive design school worldwide, 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 is educating 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.

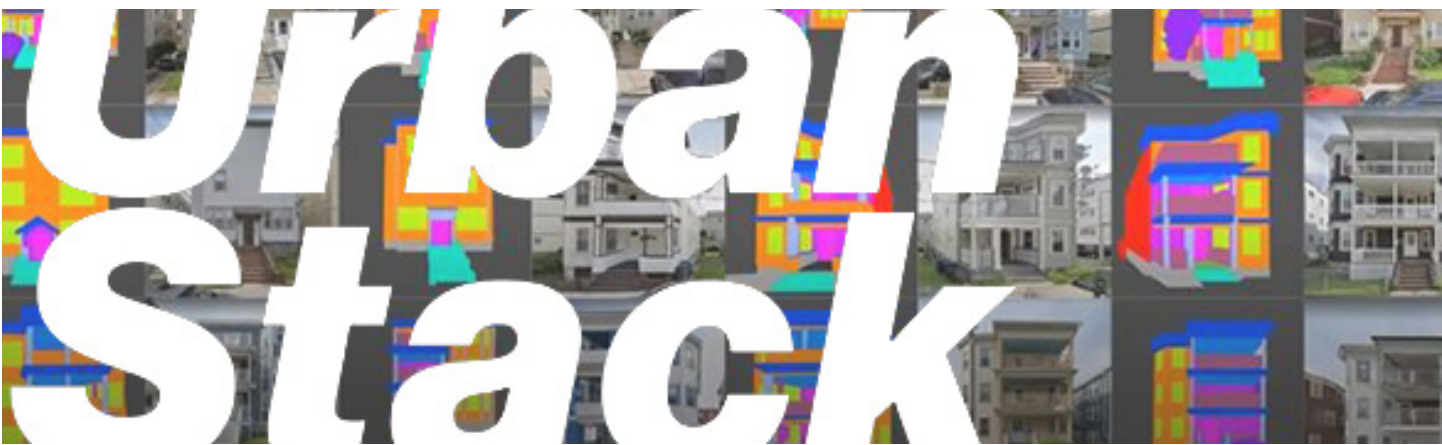
Geometry Lab **Andrew Witt MArch '07, MDes '02**

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 to explore the associated cultural and human implications.



Computational Geometry Lab

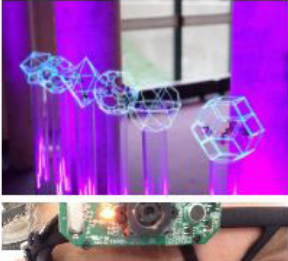
Andrew Witt // Associate Professor in Practice, GSD
Hyojin Kwon // Lecturer, GSD



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.

Designing Change

Since its inception in 2018, the Laboratory for Design Technologies has generated ideas with remarkable potential:

The Future of Air Travel focus project, which encompasses faculty and researchers from three LDT research units (REAL, MaP+S, and the Geometry Lab) is currently in year two of its three-year research project. Faculty are examining the relationships between technology, mobility, the environment, and human experience. Project output includes ON FLYING: A Toolkit, a catalog of tactics deployed by airports and airlines to guide passengers and rethink the human experience of air travel, and the Atlas of Urban Air Mobility, a body of research that will inform the development of an interactive tool for assessing multimodal scenarios.

Faculty and researchers from MaP+S and Urban Stack Lab are teaming up to launch a new focus project, Work 4.0, which will investigate the concept of hybrid work – a combination of the digital and the physical – as the “quintessential condition of contemporary life.” By incorporating architectural, scientific, and engineering research methods, the LDT team will focus on a set of research questions within two specific domains: the Urban Dimension, and the Workspace.

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.

Some participants in the Industry Advisors Group may opt to fund timely research on critical topics by entering into separate agreements at an additional cost. In 2019, the School convened experts from multiple sectors for an ambitious, three-year study on “The Future of Air Travel.” The group is working collaboratively to reimagine air travel at both the human and system scale. These creative partnerships around a series of “focus projects” will give us a better chance of finding solutions to the complex challenges we face as a global community – issues that no single academic discipline, business sector, or organization can address alone. Please join us in this important work.

Make It Happen

Funding Levels

- Corporate membership begins at \$225K, payable over three years, at \$75K per year. To fund a focus projects, such as “The Future of Air Travel,” the commitment level is \$375K, payable over three years, at \$125K per year.
- Design Firm membership begins at \$150K, payable over three years, at \$50K per year.

Opportunities

- Access to a shared platform for design technology research.
- Access to LDT newsletters and publications.
- Participation in bi-annual LDT meetings and workshops, and a series of virtual sessions.
- Facilitated access to world-class faculty, students, and a broad network of internal and external stakeholders.
- Invitations to lectures, exhibitions, receptions, and tours on campus and around the globe.
- Enhanced opportunities for student recruitment.

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

ELIZABETH CHRISTOFORETTI MArch '09

Assistant Professor in Practice of Architecture

JOSE LUIS GARCÍA DEL CASTILLO Y LÓPEZ MDes '13, DDes '19

Lecturer in Architectural Technology

JONATHAN GRINHAM DDes '18

Lecturer in Architecture and Research Associate

CHUCK HOBERMAN

Pierce Anderson Lecturer in Design Engineering

ALLEN SAYEGH MDes '96

Associate Professor in Practice of Architectural Technology
Director, Responsive Environments & Artifacts Lab (REAL)

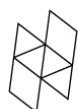
CAROLE VOULGARIS

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Associate Professor in Practice of Architecture
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