Technology is accelerating profound changes throughout society, affecting everything we do—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 (GSD) leverages design research methods to understand the architecture of complex issues and develop prototypes for a more resilient, responsive, and productive future.

The LDT balances creative and imaginative design methods with a deep knowledge of science, engineering, and practice. The GSD invites leading companies to engage in transformative work by becoming members of the LDT Industry Advisors Group, a unique philanthropic network wherein experts from industry and the public sector join with design researchers to shape the future of the built environment—from new materials, to landscapes and cities.
Researchers in the Laboratory for Design Technologies have generated ideas with remarkable potential:

- The Material Processes and Systems (MaP+S) Group is advancing multi-material large-scale 3D printing, a technology widely expected to disrupt the construction industry. MaP+S has developed and tested designs for novel 3D printed construction elements that can expand the capacity for evaporative cooling of naturally ventilated buildings and supplement mechanical cooling systems.

- The Responsive Environments & Artifacts Lab (REAL) set up “PULSUS,” an experimental installation molded and folded from concrete, as a place to relax in the SoHo neighborhood of New York City. “PULSUS” collected real-time data from sensors and social media streams in the city and reinterpreted the data into interactive soundscapes that hummed and misted in response to small fluctuations in urban activity, demonstrating how a dynamically responsive place encourages urban visitors to unwind and cool off.

The LDT Industry Advisors Group will help realize 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 will be a vigorous new forum for thought leaders in construction, fabrication, material production, design and engineering, real estate, technology, government, international development, and other sectors. The Industry Advisors will support the world’s foremost design innovators.

Operating on a shared discovery platform, industry leaders and public sector experts will sharpen each other’s understanding of emerging tools and trends. Their pooled knowledge will accelerate the development of new products, processes, and systems. The real-world perspective provided by Industry Advisors will help bridge the gap between exciting discoveries and the advancements required to drive all sectors of society and business.
LABORATORY FOR DESIGN TECHNOLOGIES RESEARCH TRACKS

The Laboratory for Design Technologies has established a collaborative platform to pursue work in multiple related yet distinct, areas.

MATERIAL PROCESSES AND SYSTEMS GROUP
Director: Martin Bechthold DDes ’01

Work by the Material Processes and Systems Group expands the aesthetic and performative contributions of material systems in shaping better built environments. The Group is developing novel material technologies and applications, with a special interest in robotics and material science.

CITY FORM LAB
Director: Andres Sevtsuk

The City Form Lab is exploring a growing area of urban analytics research with potential for wide-ranging application. This Lab is developing analytic software tools for spatial analysis and studying the effects of the spatial distribution of urban infrastructure, amenities, and resources on social, economic, and environmental outcomes.

GEOMETRY LAB
Director: 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.
REAL LAB
Director: Allen Sayegh MDes ’96

The Responsive Environments & Artifacts Lab (REAL) pursues the design of digital, virtual, and physical worlds as an indivisible whole. It recognizes the all-pervasive nature of digital information and interaction in the realms of architectural, urban, and landscape design. This Lab takes an interdisciplinary look at the design of the built environment through the lens of technologically augmented experiences, with a strong focus on the sustainability and longevity of technology.

DESIGN INTERFACES
Sawako Kaijima

Professor Kaijima pursues research objectives across domain boundaries in the realms of design and technology/academia and industry, aiming to understand complex sociotechnical phenomena and creating unique, efficient, and previously unattainable designs. Kaijima creates innovative design processes and artifacts, deploying methodology including mathematical modeling, computational simulation, machine learning, scientific visualization, and digital manufacturing.
WIDER HORIZONS, EXPANDED OPPORTUNITIES

LDT Industry Advisors will convene in non-competing working groups to gain a better understanding of the opportunities emerging in response to technological progress in all sectors of industry and government. The GSD will provide a collaborative platform for thought leaders to understand and prepare for the future of the built environment. The LDT Industry Advisors will guide and access broad-based, strategic research—at a fraction of the cost that such high-risk, high-reward investigations would require if conducted at in-house corporate R&D facilitates. Advisors will have an opportunity to explore fundamental questions and open the doors to unexpected new paths. Participation in the LDT Industry Advisors Group represents a low-risk investment that could yield visionary results.

Members of the LDT Industry Advisors Group will be invited to GSD conferences, lectures, receptions, and events, on campus and around the globe. Industry Advisors will be exposed to novel design and analysis methods, immersive technologies, and computational and fabrication strategies as they reimagine the future.

MAKE IT HAPPEN

Using a structured philanthropic framework is a powerful way to nurture groundbreaking design research. Support from industry advisors will accelerate progress and create opportunities to transform the built environment.

Together with industry leaders, we will advance technology as an agent of change.

Please join us in this important work.

PACESETTERS

Some participants in the LDT Industry Advisors Group may opt to sponsor timely research on critical topics by entering into separate agreements at an additional cost. In 2018, the School convened experts from multiple sectors for an ambitious, 3-year study on “The Future of Air Travel.” The GSD plays a unifying role for the pacesetters as they reimagine air travel at both the human and system scale. Such creative partnerships will give us better chances of finding solutions to the complex challenges we face as a global community.
LABORATORY FOR DESIGN TECHNOLOGIES (LDT)

A collaboration of faculty-led research groups that investigate the challenges and opportunities at the intersection of design technology and the built environment. These research units work in distinct yet interrelated areas:

1. Materials: Materials Processes + Systems (MaP+S) Group
2. Urban modeling and simulation: City Form Lab
3. Computational geometry: Geometry Lab
4. Responsive systems: Responsive Environments & Artifacts Lab (REAL)
5. Design Interfaces

An internal scientific advisory board consisting of key GSD leaders (including the dean, department chairs, and director of research) will provide oversight of the LDT. Other research units and GSD faculty will be eligible to join the LDT in the future.

LDT INDUSTRY ADVISORS GROUP

A high-visibility partnership between GSD design technology researchers and industry experts, government entities, and nonprofit organizations.

The Industry Advisors Group, comprised of thought leaders from various fields, will work with GSD faculty in an advisory capacity. Gifts from Industry Advisors will be pooled in the Laboratory for Design Technologies Research Fund to advance the development of breakthrough design approaches.

Members of the LDT Industry Advisors Group will be invited to participate in a range of roles and events, and will network with industry peers, public sector specialists, and imaginative designers.

FUNDING LEVELS

• Corporate members will make a base commitment of $225K, payable over three years ($75K per year).

• Small nonprofit organizations and government agencies will make a base commitment of $30K, payable over three years ($10K per year).

• To fund focus projects, such as “The Future of Air Travel,” the commitment is $375K, payable over three years ($125K per year).

OPPORTUNITIES

• Access to a shared platform for design technology research.

• Participation in conferences and workshops, and access to world-class faculty and a broad network of thought leaders.

• Invitations to lectures, exhibitions, receptions, and tours on campus and around the globe.

• Enhanced recruitment opportunities for organizations seeking high-quality employees.
The LDT Industry Advisors Group unites industry and government sectors with academia to develop technological solutions to challenges in the built environment.
LABORATORY FOR DESIGN TECHNOLOGIES LEADERSHIP

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

SAWAKO KAIJIMA
Assistant Professor of Architecture
Director, Design Interface Lab

ALLEN SAYEGH MDes ’96
Associate Professor in Practice of Architectural Technology
Director, Responsive Environments & Artifacts Lab (REAL)

ANDRES SEVTSUK
Assistant Professor of Urban Planning
Director, City Form Lab

ANDREW WITT MArch ’07, MDes ’02
Assistant Professor in Practice of Architecture
Director, Geometry Lab

THE HARVARD GRADUATE SCHOOL OF DESIGN has a rich legacy of design leadership and innovation, pushing the frontiers of knowledge across all design disciplines for more than 80 years. Research at the GSD is grounded in the belief that responses to many of the key challenges and opportunities of our era rely on the combination of design thinking with the arts, the humanities, science, and engineering. As one of 12 degree-granting schools at Harvard University, the GSD is committed to collaborating across disciplines within the larger Harvard ecosystem. Our graduates and faculty are world leaders. As the largest and most comprehensive design school in the world, with programs in architecture, landscape architecture, urban planning and design, and design engineering, the GSD is uniquely positioned to lead multifaceted efforts to convert brilliant discoveries into new practices.

gsd.harvard.edu/
laboratory-for-design-technologies

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