Proceedings Catalog of the 37th Annual Conference of the Association for Computer Aided Design in Architecture

Massachusetts Institute of Technology, School of Architecture + Planning, Department of Architecture

Edited by Takehiko Nagakura, Skylar Tibbits, Mariana Ibañez and Caitlin Mueller

MIT academia
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Foreward
“Testing Ground”

Jason Kelly Johnson
President, Association for Computer Aided Design in Architecture
Associate Professor, California College of the Arts
Founding Design Principal, Future Cities Lab

Now in its 36th year of existence, the ACADIA community continues to thrive. Since its inception, Acadians have produced pioneering work and research, making key contributions to the fields of architecture, design, computation, engineering, scholarship, education, and beyond. As the most selective peer-reviewed conference of its kind in the world, it is also an open setting to discuss and debate experimental ideas no matter who you are or where you come from. I often call ACADIA a “testing ground”. It is a conference that explicitly accepts and cultivates early work-in-progress explorations, where one can share and celebrate prototypes, iterations, glitches, failures, tests and triumphs.

My own involvement with ACADIA began over a decade ago. After having just become an Assistant Professor and co-founder of Future Cities Lab, I was fortunate to have a project accepted for presentation at the conference. It was exciting to discover a peer group with overlapping research interests in fabrication and robotics, and also mentors willing to provide constructive feedback and encouragement.

At these early ACADIA conferences I fondly remember getting to know the emerging work and research of people like Andrew Kudless and Jenny Sabin. Andrew’s early explorations in form-finding and material systems, most often using inexpensive wood laminates and plaster, allowed him to iterate and produce families of experiments, rather than mere one-offs. In a similar fashion, Jenny’s early research into textile systems and weaving algorithms allowed for the production of thousands of exploratory prototypes, some fantastically monstrous, others more refined and systematic. During these years I was also struck by the support and mentorship they received from the ACADIA community. People like Philip Beesley, Mike Weinstock, Achim Menges and Branko Kolarevic, come to mind. Not only do they regularly attend the conferences and provide support, but they mixed it up later in the evening, helping emerging generations connect the dots, meet future collaborators, and openly discuss potential new avenues of research. It is exciting to see projects from Andrew and Jenny now being realized. Andrew’s concrete shell pavilions at Confluence Park in Texas, and Jenny’s recently executed project Lumen for MOMA PS1’s Young Architects Program, are both excellent examples of Acadians moving from the “testing ground” to real-world constructions of the highest quality.

Similarly, during the year the majority of Acadians work tirelessly to experiment, write, design, build, prototype, collaborate and teach. Near the end of the year they gather in one place to exchange ideas, debate, share, learn and celebrate the past year’s accomplishments. It is in this spirit that our “testing ground” exists and flourishes. This year, with the MIT School of Architecture and the MIT Media Lab in Cambridge, Massachusetts as our extraordinary backdrop, we explore the conference theme of “Disciplines and Disruptions”. In the spirit of Acadians past and present, the conference Chairs speculate that: “Distinctions between design and making, building and urban scale, architecture and engineering, real and virtual, on site and remote, physical and digital data, professionals and crowds, are diminishing as technology increases the designer’s reach far beyond the confines of the drafting board. This conference provides a platform to investigate the shifting landscape of the discipline today, and to help define and navigate the future.”

On behalf of the ACADIA Board of Directors and its membership, as President of ACADIA I want to acknowledge the 2017 MIT conference team for their extraordinary organization, energy and thoughtfulness.
Special thanks to Conference Site Chairs Skylar Tibbits and Takehiko Nagakura, the Technical Chairs, Exhibition Chairs, Session Chairs, Hackathon Chairs, and many other advisers and supporters including Dennis Sheldon, and Head of the Department of Architecture at MIT, Professor Meejin Yoon. Workshop Chair Justin Lavallee (with Brandon Clifford), assistant Maroula Bacharidou, copy editors, graphic designers, staff members Patricia Driscoll, Inala Locke and many others were also instrumental to the success of the conference. Chairing and hosting a conference requires a thankless series of meetings and tasks that require vision, energy, a sense of humor, diplomacy and above all patience. Skylar, Takehiko and the extraordinary team they assembled, have patiently and generously worked with us over two years to craft a thought-provoking conference, exhibition, workshops and hackathon events.

I would like to acknowledge ACADIA’s many sponsors this year. Year-after-year the support of sponsors allows us to host a world-class event with an unsurpassed roster of keynote speakers, awardees, exhibits, publications, workshops, special round-tables, events and celebrations. Additional sponsorship from Autodesk allowed us to support more ACADIA Conference Student Travel Scholarships than ever before, and the ACADIA Autodesk Awards Program will honor and financially support emerging paper and project research again this year. I would like to personally thank Matt Jezyk from Autodesk for working with us over several years to make this an annual feature of the conference. Shane Burger, in his role as ACADIA’s Development Officer, took the lead with sponsorship again this year. Adam Marcus, in his role as ACADIA’s Communications Officer, also maintained key partnerships with Architect’s Newspaper and Archinect. Under their leadership our development and communications efforts have never been stronger.

I would also like to thank the ACADIA Board of Directors and Officers. Through the leadership of this dedicated group of people, ACADIA’s organization, finances, sponsorships, marketing and other outreach efforts have never been stronger. In addition to Shane and Adam, board members Mike Christenson, Kory Bieg, Dana Cupkova, Philip Anzalone, Kathy Velikov and others, have taken key leadership roles this year. We look forward to continuing to build-upon and evolve these efforts in the coming year as ACADIA prepares to host its follow-up conference in Mexico City in October 2018.

Finally, this year the ACADIA community mourned the tragic loss of pioneering architect Zaha Hadid. She was previously awarded ACADIA’s highest honor - the ACADIA Lifetime Achievement Award for Design in 2014. Zaha, along with her partner Patrik Schumacher and legions of extremely dedicated employees and collaborators, produced a trail-blazing body of cutting-edge work. Together they pushed design, computation, fabrication and construction into radical new territories. For many years her employees, collaborators and students have also made critical contributions to the ACADIA community. While we mourn Zaha’s loss, we also celebrate and take inspiration from her spirit of inventiveness and risk-taking. At this year’s Conference and Annual Meeting, we will honor Zaha for having the courage, patience and fortitude to devote her life to translating spectacular visions, paintings and models, into buildings and public spaces with the highest degree of conceptual thinking, craft and computational rigor.

Jason Kelly Johnson
ACADIA President
Introduction

Takehiko Nagakura  
Associate Professor, MIT  
Director, Computation Group, MIT

Skylar Tibbits  
Assistant Professor, MIT  
Co-director and Founder, Self-Assembly Lab, MIT

What is the state of computation in architecture today, and where are the predominant disruptions beginning to take shape for designers and the built environment?

Half a century ago, pioneers of computational design laid out a road map for the future of architectural design with incredible imagination and the backbone of computational theory. They predicted that architects would make drawings with input devices, electronic storage, design renditions would be made by computer software, computer-controlled machines would be making models of architectural components, and information about building design would be integrated in software. The roots of computational techniques such as stereographic viewing, immersive environments, photogrammetry, and parametric design dates back even further in history.

Today, many of these technological predictions have been fully realized and the tools to execute them have become ubiquitous in an architect’s daily life, from computational design software to digital fabrication and AR/VR. Technological advances have already delivered unprecedented possibilities for architects and enabled new expression, performance, material, fabrication and construction processes. Simultaneously, digital technology has permeated the fabric of architecture with broad influences ranging from digital preservation to design with social impact.

In this way, the first revolutionary period in design computation, led by the original pioneers of the field, seems largely complete. We are now moving into a second phase that is to be imagined and created by all of us. Disciplines & Disruption initiates a dialog about the state of the discipline of architecture and the impact of technology in shaping or disrupting design, methods and cultural trajectories. This conference will explore some of the following questions:

What are the new possibilities beyond the initial predictions by the pioneers?  
Are there still emerging technological fronts yet to be explored?  
Are there new opportunities to synthesize and recombine existing technologies?  
Where do we go from here?

Driven by technological, data and material advances, architecture now witnesses a moment whereby previously distinct areas of operation become increasingly connected and accessible to architecture in ways never before possible. Distinctions between design and making, building and urban scale, architecture and engineering, real and virtual, on site and remote, physical and digital data, individuals and crowds, are diminishing as technology increases the designer’s reach far beyond the confines of the drafting board.

We have also witnessed the rise of a new reality with high speed internet connecting people around the world instantly, big data piling up in servers and communication platforms, enormous computing power packed in tiny mobile devices, 3D worlds in AR and VR, drones operated by kids to record wedding scenes, and cars driven autonomously by software.
This conference provides a platform to investigate the shifting landscape of the discipline to help define and navigate this future. This conference is organized into three broad themes:

**Disruptions in Material/Construction**
Over the past decade we have witnessed new material capabilities, an explosion of materials research from new possibilities in materials science to synthetic biology, multi-material printing and programmable materials. Similarly, with an increase in automation, industrial robotics and all sorts of digital fabrication, industry and academia have been rethinking construction processes from both top-down and bottom-up approaches. This year, we will have many papers that cover the cutting edge of materials, fabrication and construction paradigms, demonstrating how these new capabilities are shifting and enhancing our discipline. Beyond academia, how these new technologies infiltrate and augment real-world construction scenarios is likely the next major question for our discipline.

**Disruptions in Design Tools/Information Processing**
As artificial intelligence, AR/VR and data visualization expand in interest, capabilities and application, our discipline is witnessing an influx beyond computational design and form generation towards information processing and machine learning. This conference will explore how these computational capabilities will influence design through questions on authorship, data, automation and visualization. With every new tool from CAD to CAM and now AI, our discipline questions the agency of the designer versus the agency of the tool and the role of computation in design. Is it about optimization, idea generation, implementation, analytics or collaboration? Is ever-more powerful computation beyond human capabilities or in collaboration with human creativity?

**Disruptions in Society & Cultures**
Fast wireless connection between people, accumulation and application of information in Big Data, interactive and immersive visualization tools are infiltrating our social lives in the form of, for instance, E-education, car and bike sharing, VR social network, and the Pokemon Go phenomenon. This conference includes presentations addressing social and cultural transformations related to the process and delivery of architectural design. In education, new technology is deployed to help students in remote sites. Digital heritage enhances study and distribution of important architectural designs through virtual and augmented means. And democratization of design is sought through technology-assisted connections and collaborations among stakeholders. These attempts challenge the constraints inherent in architectural projects that deal with physical existence on site, something not easily moved and remotely experienced.

An interesting perspective on the field can be extrapolated from the wide array of submissions this year. As a snapshot, recording the contemporary interests, challenges and new directions, the list of keywords submitted by all 343 authors who submitted long and short papers to the 2017 conference spans physics, fabrication, representation and education. Each author was requested to select up to three keywords. There are certainly the obvious topics for ACADIA, like Fabrication (91 submissions) and Generative Systems (49 submissions), but we also find topics less familiar to this conference, like AR/VR (21 submissions), HCI (17 submissions), AI & Machine Learning (32 submissions) and Digital Heritage (9 submissions), which emphasize the cross-pollination with other disciplines. For instance, further cross analysis shows that AR/VR papers include 3 that co-list Game Engine as expected, but also 4 that co-list Education, 3 that do BIM, and 2 that do Manual/Digital Craft. In addition, Fabrication papers include 18 that co-list Construction/Robotics and Form Finding as expected, 9 list Smart Materials, but also 6 that co-list Education and Collaboration. After the double-blind peer-review process by 138 reviewers, unfortunately, not all of these emerging voices were able to be included in the final presentation session floor. For instance, there were 32 papers with AI/ML tag, but only a small number survived the reviewing to make it to the presentation. The shift in authors’ ethos and paper/quality and reviewer perspectives are not moving together, but they represent the new wave of technologies that are attracting the attention of a broad public and may shift our own perspective on the architectural discipline.
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**TOTAL (343 papers)** 809
Boston, Cambridge & MIT

MIT is a unique environment to host ACADIA and explore new possibilities for architecture in a technologically connected, convergent, and disruptive context. MIT’s program in architecture was established as an experiment in formal architectural education in the United States in 1865; the department will celebrate the sesquicentennial of its first course in Fall 2018.

MIT has been involved in inventing the future for the past 150 years, quite literally. From Chaos Theory to Cybernetics; from the Human Genome to Dark Matter; and from the fax machine to the World Wide Web, MIT has helped invent the future we live in today. There are few departments of architecture in the world that exist within a context so deeply committed to the advancement of knowledge through scholarship, research, and innovation. There are even fewer operating in a place with as pressing a sense of responsibility to “bring this knowledge to bear on the world’s great challenges.” The Department of Architecture at MIT is truly unique among architecture programs in its commitment to creating a culture of experimentation to expand the discipline and change the world.

At MIT, processes and acts of design, research, testing, and experimentation are intertwined and grounded in critical contemporary questions that require deep knowledge of the past and present as well as insights into the future. We enable and open up our students’ understanding of the built environment as a cultural, technological, social, and ecological condition, and one in which design is as critically focused on answering questions as it is about solving problems through intervening in the world.

Today, the School of Architecture and Planning comprises a number of departments and programs that represent a broad perspective on the role of technology in design: the Department of Architecture, the Department of Urban Studies and Planning, the Program in Media Arts and Sciences/Media Lab, the Center for Real Estate, the Program in Art, Culture and Technology, and Norman B. Leventhal Center for Advanced Urbanism.

There are seven programs within the Department of Architecture, including Architecture and Urbanism; Art, Culture and Technology; Building Technology; Computation; History, Theory and Criticism of Architecture and Art and the Aga Khan Program in Islamic Architecture. The department’s graduate programs include both professional (Master of Architecture, MArch) and post-professional degrees (Master of Science in Architecture Studies, SMArchS) as well as doctoral programs in three disciplinary areas: Building Technology, Computation, and History, Theory and Criticism. Undergraduate programs in the department include a four-year Bachelor of Science in Architecture (BSA) and Design Minor, a new program for undergraduates from across the Institute to be exposed to design through hands-on studio courses. Courses in the Design Minor encompass work ranging from design objects to information design.

The Department of Urban Studies and Planning (DUSP) was founded in 1933 and offers undergraduate and graduate degrees in city planning with focuses on City Design and Development; Environmental Policy and Planning; Housing, Community and Economic Development; and International Development. Cross-cutting areas of study include Transportation Systems, Urban Information Systems, and Multi-Regional Systems Planning.

The Media Lab, or the Program in Media Arts and Sciences, launched in 1980 through the efforts of Nicholas Negroponte and former MIT President Jerome Wiesner. It grew out of the Architecture Machine Group founded by Negroponte a decade earlier. The Media Lab brings together a number of wide-ranging and contemporary research areas from nanotechnology to visualization; viral communications to machine learning. Its new building, designed by Fumihiko Maki, is the beautiful venue for this year’s conference.

The Program in Art, Culture and Technology formed in 2009 as a merger of the Center for Advanced Visual Studies, founded by Gyorgy Kepes and formed by MIT President Jerome Wiesner in 1967, and the Visual Arts Program, formed in the department in 1989 by Professor Ed Levine. ACT’s mission is to “promote leadership in critical artistic practice and deployment, developing art...
as a vital means of experimenting with new registers of knowledge and new modes of valuation and expression; and to continually question what an artistic research and learning environment can be and do.’ ACT celebrates the 50th anniversary of CAVS in the 2017-2018 academic year.

SA+P also has deep ties to many other departments like computer science, mathematics, materials science, as well as civil and mechanical engineering. Across these departments, many inventions have emerged that have directly influenced and enabled computation, fabrication, AI and new materials. As some of the fundamental technologies that grave rise to ACADIA, MIT was the birthplace of the first CAD tool from Ivan Sutherland’s Sketchpad in 1963, the first CNC Machine from the Servomechanisms Lab in 1952, Claude Shannon’s famous masters thesis on Information Theory, Seymour Papert and Marvin Minsky’s pioneering work in Artificial Intelligence, Norbert Wiener’s introduction of Cybernetics, the first house to be built from composite materials, the Monsanto House of the Future in 1957, as well as the founding of one of the original (Zcorp) and newest (Formlabs) 3D Printing companies.

Beyond the borders of the Institute, Cambridge and the greater Boston area is host to a number of prestigious universities with different perspectives on the future directions of architecture, including Harvard’s Graduate School of Design, the Boston Architectural College and the Rhode Island School of Design in Providence. Also, the greater Boston area provides a rich and dense environment for exploring the history of architecture, with works from H. H. Richardson, McKim, Mead & White, Eero Saarinen, Alvar Aalto, Le Corbusier, Walter Gropius, Renzo Piano, Frank Gehry, Steven Holl and many more.

ACADIA 2017 will blend these worlds through various disciplines and computational, material and social disruptions. This conference will include paper and project presentations from over 80 speakers, a projects exhibition, five distinguished keynote speakers, special events and a curated exhibition of faculty work, entitled “Optimism, In Three Acts.” Seeking alternatives to pure techno-optimism, the ACADIA 2017 exhibition explores how criticality and responsibility of architecture is articulated today though the use and development of new technologies in various contexts, addressing the topics agency, memory and empathy.

Our peer review process testifies that the large number of quality papers submitted were more than the three day conference can adequately accommodate this year. We would like to sincerely thank all those who submitted papers to this conference, selected or not, as valuable contribution to the progress of the field and community of computation and design in architecture.

Welcome to ACADIA 2017 at MIT.

2017 ACADIA Conference Chairs
DISCIPLINES + DISRUPTION
CREDITS

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CONFERENCE CHAIR
Associate Professor, MIT
Director, Computation Group, MIT

Skylar Tibbits
CONFERENCE CHAIR, COORDINATION TECHNICAL CHAIR
Assistant Professor, MIT
Co-director and Founder, Self-Assembly Lab, MIT

Takehiko Nagakura is an architect from Tokyo. He received undergraduate education in the University of Tokyo, and finished Master of Architecture and PhD at Harvard University under Prof. William Mitchell. Currently, he is an Associate Professor of Design and Computation, and Director of Computation Group at the Department of Architecture, Massachusetts Institute of Technology. Nagakura's research focuses on the computational representation of architectural space and formal design knowledge. He heads the project UNBUILT in which his team has developed computer graphics walk-through visualization of significant early modern unbuilt projects such as Tatlin's Monument to the Third International, and invented a series of patented interactive visualization device, DIGITARAMA, Deskrama, and Multirama as well as AR Mail. Nagakura serves as the strategic adviser for Archbazar.com, an online competition platform, and is the recipient of the Japan Information Culture Society Grand Prize in 1999.

Skylar Tibbits is the founder and co-director of the Self-Assembly Lab housed at MIT’s International Design Center. The Self-Assembly Lab focuses on self-assembly and programmable material technologies for novel manufacturing, products and construction processes. Skylar is an Assistant Professor of Design Research in the Department of Architecture at MIT where he teaches graduate and undergraduate design studios. Skylar is also the Editor-In-Chief of the 3D Printing and Additive Manufacturing Journal and the founder of SJET LLC, a small multi-disciplinary design practice. Skylar has a Professional Degree in Architecture and minor in experimental computation from Philadelphia University. Continuing his education at MIT, he received a Masters of Science in Design Computation and a Masters of Science in Computer Science under the guidance of; Patrick Winston, Terry Knight, Erik Demaine and Neil Gershenfeld.
Azra Aksamija
EXHIBITION CO-CHAIR

Associate Professor, Art, Culture and Technology Program, MIT

Azra Aksamija is an artist and architectural historian, she is the director of the MIT Future Heritage Lab and an Associate Professor in the MIT Program in Art, Culture and Technology. Aksamija’s artistic work investigates transcultural aesthetics, cultural mobility, and ways in which art and architecture can form a bridge between cultures. Her recent academic research focuses on the role of culture in conflict, with the focus on the 1990s war in the Balkans. Her recent book, Mosque Manifesto, published 2015 by Revolver Publishing, offers a repertoire of ways in which representation of Islamic culture may foster cross-cultural dialogue and provide a critical response to xenophobia and nationalism. Aksamija holds master degrees from the Technical University Graz and Princeton University, and a Ph.D. from MIT. Her work has been shown in leading international venues including the Generali Foundation Vienna, Valencia Biennial, Liverpool Biennial, Museums of Contemporary Art Zagreb, Ljubljana and Belgrade, Secession Vienna, Manifesta 7, the Royal Academy of Arts London, Sculpture Center and Queens Museum in New York, and the Fondazione Giorgio Cini as a part of the 54th Art Biennale in Venice. She received the Aga Khan Award for Architecture in 2013 for her design of the prayer space interior in the Islamic Cemetery Altach, Austria.

www.futureheritagelab.com
Federico Casalegno, Associate Professor of the Practice, is the Founder and Director of the MIT Mobile Experience Lab at the Massachusetts Institute of Technology, SHASS, program in Comparative Media Studies.

He has been awarded honorary professorships by the Glasgow School of Art, University of Glasgow and the Jiangnan University School of Design in Wuxi, China.

A social scientist with an interest in the impact of networked digital technologies on human behavior and society, Prof. Casalegno both teaches and leads advanced research at MIT, and designs interactive media to foster connections between people, information and physical places using cutting-edge information technology.

Between 2004 and 2011, he had a position as Lecturer at the MIT Media Lab Smart Cities group and from 2006 until 2011 co-directed the MIT Design Lab with Prof. William J. Mitchell. From 2004 to 2007, he worked at Motorola, Inc. as a Technology and Product Innovation Analyst, designing pioneering products, experiences and services for mobile devices. Previously, from 1994 to 2000, he worked at Philips Design on connected communities and new media environments to inform design and product experience planning.

Dr. Casalegno holds a Ph.D. in Sociology of Culture and Communication from the Sorbonne University, Paris V, with a focus on mediated communication and social interaction in networked communities and wired cities.

He has published several scientific papers in peer-reviewed journals, books and articles. For the Living Memory connected community project he was awarded the Best Concept prize by the American Leading Industrial Designers I.D. Magazine, and the Silver Prize Design Concept by the Industrial Designers Society of America (IDSA).

Brandon Clifford is an Assistant Professor at the Massachusetts Institute of Technology and Principal at Matter Design. Brandon received his Master of Architecture from Princeton University in 2011 and Bachelor of Science in Architecture from Georgia Tech in 2006. He worked as project manager at Office dA from 2006–09, LeFevre Fellow at OSU from 2011–12, and Belluschi Lecturer at MIT from 2012–16. Brandon has been awarded the Design Biennial Boston Award, the Architectural League Prize, the SOM Prize, and the Founders Rome Prize in Architecture. His recent authored work includes ‘Volume: Bringing Surface into Question’, ‘Range: Matter Design’, ‘Volumetric Robotics: MIT Architectural Design Workshop’, and The Cannibal’s Cookbook: Mining Myths of Cyclopean Constructions. Brandon’s translation of past knowledge into contemporary practice continues to provoke new directions for digital design.
Mariana Ibáñez
PAPERS CO-CHAIR
Assistant Professor, Department of Architecture, MIT
Principal & co-founder, Ibáñez Kim Studio

Mariana Ibáñez is an Argentinian architect involved in practice, academia, and research. She is an Assistant Professor of Architecture at the MIT School of Architecture and Planning and the co-founder of Ibáñez Kim.

Before joining the faculty at MIT, Mariana taught for ten years at the Harvard University Graduate School of Design. She is an external examiner for the Architectural Association, and is on the awards jury of the Boston Society of Architects, the MacDowell Colony, and the Rotch foundation.

As an academic and editor, Mariana’s research is in the disciplinary core of architecture and its growing periphery, with a focus on the relationship between technology, culture, and the environment.

Mariana has a Bachelor of Architecture from the University of Buenos Aires and a Master of Architecture and Urbanism from the Architectural Association in London where she received thesis honours. After completing her graduate studies, she joined the Advanced Geometry Unit at ARUP before going to the office of Zaha Hadid where she was the project architect for the London Olympic Aquatic Center among other projects.

In 2006, Ibanez relocated to Cambridge and in 2012 co-founded Ibáñez Kim with Simon Kim, a research and design practice. Her work has been exhibited at the Museum of Modern Art in New York, the MAXXI museum in Rome, and The National Art Museum in Beijing with current projects including work for the Smithsonian Museum in Washington DC, the Philadelphia Museum of Art, and the Biennale in Seoul.
Joel Lamere is an Assistant Professor of Architectural Design and Homer A. Burnell Chair at MIT, where he has been teaching courses in architectural geometry, design and representation since 2007. His work critically explores the forms and other outcomes facilitated by an expanding palette of materials available to architecture, proliferating digital fabrication techniques, and evolving simulative design environments. Prior to launching his design career, Joel was the recipient of the Machette Prize for Excellence in Philosophy from Boston University. He received his MArch from Harvard GSD, where he graduated with distinction and was awarded the AIA Henry Adams Medal. His thesis, “Figured Catastrophes,” marked the beginning of his focus on material geometry and the formal opportunities intrinsic to developable surfaces. Through GLD, a collaborative design office established in 2010 with Cynthia Gunadi, Joel has sought to confront the middle ground between full-scale buildings and isolated research. GLD has been recognized and exhibited internationally for their many installations and research projects. Joel has also been active in architectural practice in the Boston area, including key roles in the design and realization of the Community Rowing Boathouse while with Anmahian Winton Architects, and the Boston Harbor Islands Pavilion for Utile Inc.

Justin Lavallee is a Technical Instructor and the Director of the Architecture Shops at the MIT School of Architecture and Planning. He teaches material and process driven design courses which have focused on foundry work, fiber-reinforced composites, timber, thermoplastics and robotics, among others, and collaborates on courses such as How to Make (almost) Anything and How to Design (almost) Anything. He is a member of the Urban Risk Lab and Digital Structures group at MIT, and is a regular contributor to other research projects ranging from automated manufacturing to habitation on Mars. He also plans the ongoing growth and development of the fabrication facilities within the Department of Architecture.

Before joining MIT Justin was a Research Associate with the Design Robotics Group at the Harvard Graduate School of Design, where he received a Master of Architecture in 2010.
Carl Lostritto
REGIONAL EVENT CO-CHAIR & EDUCATION ROUND TABLE SESSION MODERATOR
Assistant Professor, Department of Architecture, RISD

Carl Lostritto lives and works in Providence, RI. He is Assistant Professor of Architecture and Graduate Program Director at Rhode Island School of Design, where he teaches at all levels of the curriculum with respect to computation and drawing. In practice, he has written hundreds of programs and scripts that control vintage pen plotters. He exhibits, indexes, catalogs and writes about the resulting drawings with the goal of generating architecture and addressing architectural questions such as: What are the aesthetic implications of a geometric algorithm that gives mass to line? What is the difference between turning a corner and being in a corner? What is the simplest algorithm that produces the most complex spatial condition? How many types of ambiguity are there? And, why do architects draw?

Before joining the RISD faculty, Lostritto taught architecture and design at The Boston Architectural College, The Catholic University of America, The University of Maryland and MIT.
Caitlin Mueller is a researcher, designer, and educator working at the interface of architecture and structural engineering. She is currently an Assistant Professor in the Building Technology Program at MIT with a joint appointment in the departments of Architecture and Civil and Environmental Engineering. She is the founder and director of Digital Structures, an interdisciplinary research team at MIT. Together with Digital Structures, Mueller focuses on developing new computational methods and tools for synthesizing architectural and structural intentions in early-stage design. She also works in the field of digital fabrication, with a focus on linking high structural performance with new methods of architectural making. In addition to her digital work, she conducts research on the nature of collaboration between architects and engineers from a historical perspective.

William O’Brien Jr., principal of WOJR, is an Associate Professor in the MIT Department of Architecture and one of the founding members of Collective–LOK.

In 2013 Architectural Record awarded him with the Design Vanguard Award, a prize given to ten practitioners internationally. The same year, Wallpaper* named him one of the top twenty emerging architects in the world, and included him in the 2013 Architects Directory. He is the recipient of the 2012 - 2013 Rome Prize Fellowship in Architecture awarded by the American Academy in Rome. He was awarded the 2011 Architectural League Prize for Young Architects and Designers. In 2010 he was a finalist for the MoMA PS1 Young Architects Program and was recognized as a winner of the Design Biennial Boston Award. His parallel collaborative practice, Collective–LOK won the Van Alen Institute international competition to redesign the institute’s headquarters in 2013, and was a finalist for the MoMA PS1 Young Architects Program in 2014.

O’Brien has taught previously at The University of California Berkeley as the Bernard Maybeck Fellow and was the LeFevre Emerging Practitioner Fellow at The Ohio State University. Before joining MIT, for two years he was Assistant Professor at The University of Texas at Austin, where he taught advanced theory seminars and design studios in the graduate curriculum. O’Brien pursued his graduate studies at Harvard University where he was the recipient of the Master of Architecture Faculty Design Award. Prior to graduate school he attended Hobart College in New York where he studied architecture and music theory and was the winner of the Nicholas Cusimano Prize in Music. After completion of his graduate work he studied in Austria as the recipient of the Hayward Prize for Fine Arts Traveling Fellowship in Architecture under the sponsorship of The American Austrian Foundation. He has been named a MacDowell Fellow by the MacDowell Colony in Peterborough, New Hampshire, and a Socrates Fellow by the Aspen Institute.
Dimitris Papanikolaou  
REGIONAL EVENT CO-CHAIR & EDUCATION ROUND TABLE SESSION MODERATOR  
Assistant Professor, School of Architecture and Department of Software & Information Systems, UNCC

Dimitris Papanikolaou is an Assistant Professor at UNCC, jointly between the School of Architecture and the Department of Software and Information Systems. His research investigates how urban form and social behavior affect urban dynamics and how in turn the study of dynamics and data can inform new design strategies for intelligent urban, building, and mobility systems. His interests include urban modeling, ubiquitous computing, data visualization, urban operations research, human-building interaction, and design research. He has worked at Microsoft Research on applications of the internet of things and at the MIT Media Lab co-developing Mobility on Demand, an intelligent sharing system of electric foldable cars named by TIME magazine as the best automotive invention of 2007. His research has received distinctions including the Buckminster Fuller Challenge; the Harvard Deans’ Design Challenge; the MIT Transportation showcase award in Economics, Finance, Policy and Land Use; the Harvard Fellowship on Energy and Environment; the Harvard Meyer Transportation Research award; and a Fulbright Fellowship. He has taught at NYU ITP, MIT, and Harvard and has been an invited speaker in universities, research labs, and design studios, such as University of Michigan, Dartmouth College, CMU, Microsoft Research, PennState, NOKIA Research, UC Berkeley, UN Studio, and OMA. Dr. Papanikolaou holds a Doctor of Design (DDes) from Harvard GSD, an MSc from MIT Media Lab, an SM ArchS in Design Computation from MIT Architecture, and a Diploma in Architectural Engineering from NTUA.
Cristina Parreño Alonso is a licensed architect in Spain and UK. She holds a Masters and Bachelor degree in Architecture and Civil Engineering from the University of Madrid, Escuela Técnica Superior de Arquitectura (ETSAM) where she graduated with honors.

Prior to founding her own architectural firm, she worked for Foreign Office Architects in London and in Madrid.

Her firm Cristina Parreño Architecture has won several architectural competitions, among others, the 1st prize for the Urban Rehabilitation of the Business complex AZCA in Madrid, 1st prize for the VIP Lounge at ARCO Madrid; 3rd prize for the Housing Competition for Young Architects J5 in Spain and Mention in the National Library of Slovenia. Her work has been published in newspapers like El País and El Mundo and in several architectural magazines.

She has taught design studio at the University of Western Australia, at the State University of New York at Buffalo, at Harvard GSD and she currently teaches graduate and undergraduate design studios as a Belluschi Lecturer at MIT School of Architecture and Planning.

At MIT, Cristina conducts a research on the use of glass as a building material. Her investigation searches for ways in which glass can lose its fragility, gaining mass and volume and thus becoming a material that uses its structural properties to reinforce its visual qualities: transparency, appearance of fragility, light filtering and translucency.

She received the “Europe 40 under 40 Design Awards 2014”. She was selected one of the four emerging firms for the “Design Boston Biennial 2015” where she exhibited one of the pieces of her current research “Tectonics of Transparency”. And she has won the 1st price in a public contest by the City of Boston to design a Public Art Intervention in Hyde square 2017 where she will build her project “Glow”.

Dennis Shelden is director of the Digital Building Lab and an associate professor in the School of Architecture at Georgia Tech. An expert in applications of digital technology to building design, construction and operations, his experience spans across research, technology development, professional practice and entrepreneurship including multiple architecture, building engineering and computing disciplines. Prior to joining Georgia Tech he co-founded and was CTO of Gehry Technologies - a technology software development and professional consulting company focused on digital practice advancement. He previously served as Director of R&D and Director of Computing for Gehry Partners, and was Associate Professor of Practice in the Design & Computation program at MIT. He is a licensed Architect and holds a BS in Architectural Design, an MS in Civil & Environmental Engineering, and a PhD in Design & Computation from MIT.
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The Association for Computer Aided Design in Architecture (ACADIA) is an international network of digital design researchers and professionals that facilitates critical investigations into the role of computation in architecture, planning, and building science, encouraging innovation in design creativity, sustainability and education.

ACADIA was founded in 1981 by some of the pioneers in the field of design computation including Bill Mitchell, Chuck Eastman, and Chris Yessios. Since then, ACADIA has hosted over 30 conferences across North America and has grown into a strong network of academics and professionals in the design computation field.

Incorporated in the state of Delaware as a not-for-profit corporation, ACADIA is an all-volunteer organization governed by elected officers, an elected Board of Directors, and appointed ex-officio officers.

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