

Andrew Witt

Design x Technology x Culture

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Biography

Andrew Witt is an Associate Professor in Practice in Architecture at the Harvard Graduate School of Design, teaching and researching on the relationship of geometry, data, and machines to perception, design, construction, and culture. Trained in both architecture and mathematics, he has a particular interest in a technically synthetic and logically rigorous approach to form. He is also co-founder, with Tobias Nolte, of Certain Measures, a Boston/Berlin-based design and technology studio that combines imagination and evidence for systemic and scalable approaches to spatial problems. Their clients include large manufacturers, material fabricators, government agencies, infrastructure companies, investment funds, medical startups, and cultural institutions. The work of Certain Measures is in the permanent collection of the Centre Pompidou, and has been exhibited at the Pompidou, the Barbican Centre, Futurium, the Canadian Centre for Architecture, the Museum of the Future, and Haus der Kulturen der Welt, among others. Witt's personal work has been featured at the Storefront for Art and Architecture. In 2017 Certain Measures were finalists for the Zumtobel Award in both the Young Professionals and Applied Innovation Categories.

Witt has a longstanding research interest in the disciplinary exchanges between design and science, particularly through the media and visualizations of mathematics. He is the author of *Formulations: Architecture, Mathematics, Culture* (MIT Press, 2022), an expansive examination of the visual, methodological, and epistemic connections between design, mathematics, and the broader sciences. He is also author of *Light Harmonies: The Rhythmic Photographs of Heinrich Heidersberger* (Hatje Cantz, 2014), the first English treatment of German proto-computational photographic hacker Heinrich Heidersberger's light-drawing machines. For the Canadian Centre for Architecture he has authored *Studies in the Design Laboratory*, a trilogy of case studies that examine how and why architects who developed laboratories in the 1960s and 1970s and what these laboratories reveal about the cultural research practices of design.

He is a fellow of the Canadian Centre for Architecture and Macdowell, a Graham Foundation grantee, a World Frontiers Forum Pioneer (2018) and Young Pioneer (2017), and a 2015 nominee for the Chernikov Prize. Witt has lectured widely, including at the Venice Biennale, Library of Congress, Yale, Princeton, MIT, The Bartlett, The Berlage, Stanford, UCLA, Berkeley, ETH, and EPFL, and his research has been published in venues such as AD, Log, Project, Detail, Harvard Design Magazine, e-Flux, Surface, Space, Linear Algebra and its Applications, and Linear and Multilinear Algebra, and Issues in Science and Technology. He has been awarded patents for geometric rationalizations of complex geometry and large-scale collaborative software systems.

Witt was previously Director of Research at Gehry Technologies and a director at GT's Paris, France office, where he solved complex geometric challenges for clients including Gehry Partners, Ateliers Jean Nouvel, UN Studio, and Coop Himmelb(l)au, and projects such as Fondation Louis Vuitton and Louvre Abu Dhabi. He also developed prototypes for new software design tools such as GTeam (now Trimble Connect, acquired by Trimble in 2014).

Witt received an M.Arch (with distinction, AIA medal, John E. Thayer Scholarship, Frederick Shelden Travelling Fellowship) and an M.Des (History and Theory, with distinction) from Harvard GSD. He has an Erdős number of 3.

Education

- 2007** **Master of Architecture with Distinction**
Harvard University Graduate School of Design
- 2002** **Master of Design Studies with Distinction (History and Theory)**
Letter of Commendation for: "Demonstrated Commitment to Scholarship and Research, and Generosity of Spirit"
Harvard University Graduate School of Design
- 2001** **B.S. Mathematics, B.A. Philosophy (double major) Summa Cum Laude**
GPA: 4.00 / 4.00
Brigham Young University
- Erdős number: 3**

Academic Appointments

- 2019-Current** **Associate Professor in Practice, Harvard University.**
I teach and research topics on the relationship between design, science, and technology. Courses include:
- STU-1231 Masters in Design Engineering - Collaborative Design Studio
2017 (Health), 2018 (Mobility), 2019 (Waste), 2020 (Telepresence),
2021 (Energy), 2022 (Textiles)
 - STU-1602 Neuralisms Shenzhen (Option Studio)
2020
 - VIS-2224 Digital Media: Neural Bodies
2022
 - SCI-6373 Domestic Logistics
2020, 2022
 - VIS-2224 Digital Media II
2010, 2011, 2012, 2013, 2014, 2015, 2016, 2018
 - SCI-06459 Mechatronic Optics
2016, 2017, 2019
 - SCI-06436 Expanded Mechanisms/Empirical Materialisms
2012, 2013, 2014
 - DES-3350 Narratives of Design Science
2016, 2017
 - SCI-06455 Structural Surfaces
2015, 2016

Co-Founder and Director, Geometry Lab, Harvard University.

Co-founded this research group to develop automated systems for building design and construction. Partners with industry companies and groups to accelerate innovation in geometry and fabrication.

Research projects include:

Sensory Isolation and Experimental Design Computation

Hyperdimensional Cartography and Latent Space Visualization

Neuroclassification of Architectural Imagery

A Normalized Vocabulary for Visual Description

3D Generative Adversarial Networks

Future of Air Travel

Topological Discrete Shells

Robotic Spaceframe Assembly

Procedural Optimization of Urban Form

Machine Vision for Adaptive Assembly

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|---------------------|---|
| 2019-Current | External Examiner, Bartlett UCL, BPro Masters Program |
| 2018 | Studio instructor, UCLA xLab summer program on Mobility, Tokyo. |
| 2017-2020 | Area Head, Masters in Design Studies, Technology concentration Harvard University. Cambridge, MA. |
| 2017-2020 | GSD Masters in Design Studies Program Council Harvard University. Cambridge, MA. |
| 2016-Current | GSD Masters in Design Engineering Steering Committee Harvard University. Cambridge, MA. GSD Masters in Design Engineering Program Council Harvard University. Cambridge, MA. |
| 2015-Current | GSD Technology Platform Committee Harvard University. Cambridge, MA. |
| 2014-Current | MArch Admissions Committee |

- 2013** **Co-Organizer, Dean's Design Challenge**
Harvard University. Cambridge, MA.
- 2014-2019** **Assistant Professor in Practice, Harvard University.**
- 2010-2014** **Lecturer, Harvard University Graduate School of Design.**
Taught research-oriented courses on geometry, computation, technology development, and automated fabrication and assembly in design.
Awarded Faculty of the Year (Architecture) in first year of teaching.
- 2008** **Visiting Faculty, Ecole Speciale D'Architecture. Paris, France.**
Course: Conception Parametrique (Parametric Design).
Co-taught with Valerie Chatelet.
Topic: Critical discourse surrounding digital approaches to the built environment.
- 2006** **Teaching Assistant, Harvard University.**
Descriptive Geometry, Preston Scott Cohen
Teaching Assistant, Harvard University.
Offset Ceilings (Studio), Preston Scott Cohen
- 2005** **Visiting Faculty, Southern California Institute of Architecture.**
Los Angeles, CA.
Course: Digital Tectonics. Co-taught with Sameer Kashyup.
Topic: Parametric prototyping of building details for emergent architectural effects.

Professional Work

- 2014-Current** **Co-Founder, Certain Measures.**
certainmeasures.com
Certain Measures is a design and technology studio that works at the intersection of architecture, strategy, and science. Using quantitative methods, we solve exceptional problems and build bespoke software tools to simplify, accelerate, and expand the possibilities of design.

Sample Clients: Audi, BMW, SBB (Swiss Federal Rail), Centre Pompidou, Dubai Futures Foundation.
- 2013-2014** **Research Advisor, Gehry Technologies.**
I provided strategic guidance on research directions and go-to-market for GT's emerging technology products, including cloud BIM collaboration and data integration solutions.
- 2010-2013** **Director of Research, Gehry Technologies.**
Responsible for company-wide strategic leadership on development of new practices and technologies for design and construction. Research areas including advanced geometry optimization for fabrication, cloud computation for environmental simulation.

Led research team of in-house and outsourced researchers addressing complex design and construction problems, including prototyping of new software and technology solutions. Executive-level experience with pitching to investors/VCs, strategic planning, M&A assist and selection, market assesment, talent search.

Developed and initially product-managed the 3D BIM collaboration platform GTeam (Acquired by Trimble, now Trimble Connect).

Coordinator, Gehry Technologies Advisory Board.

Acted as personal liason to select group of world - design leaders including Ben Van Berkel, Wolf Prix, Greg Lynn, Moshe Safdie, and David Childs.

2009-2010

Director, Design Innovation. Gehry Technologies.

Responsible for the development and implementation of new design technology practices and applications in Europe and across GT's global services team.

Work included directing project engagements of consultant teams, leading new business development with designers, engineers, fabricators and builders, proto typing development for advanced architectural geometry tools, Web 2.0 concurrent design systems, fabrication automation, generative detailing, and optimization.

Instrumental from growing team from zero to \$2M revenue and 15 professional consultants.

2007-2009

Lead Consultant, Europe. Gehry Technologies.

Responsible for setting market and consulting strategy for Europe-wide operations: business development and execution of digital consulting services on large (\$200M+) design and construction projects, totalling over \$1 Billion value.

Sample Gehry Technologies Consulting Projects:

| Date | Client | Project |
|-------------|----------------------|--|
| 2011 | LVMH, Gehry Partners | Fondation Louis Vuitton |
| 2010 | Snohetta | KACARE |
| 2010 | UN Studio | Raffles Hotel |
| 2009 | Ateliers Jean Nouvel | Qatar National Museum |
| 2009 | Ateliers Jean Nouvel | Louvre Abu Dhabi |
| 2008 | Morphosis | Phare Tower |
| 2008 | Coop Himmelb(l)au | Museum of Contemporary Architecture and Urban Planning |
| 2005 | Gehry Partners | Novartis Headquarters |
| 2005 | Gehry Partners | Princeton Science Library |

2004-2007

Senior Project Consultant and Project Consultant, Gehry Technologies.

Consulted on major projects for Gehry Partners and for clients in UK, China, France, Switzerland, Austria and across the US. Helped to design and develop software, comprehensively involved in the planning, management, implementation, and bid preparation for digital process for projects of value of exceeding \$1B US.

- 2003** **Designer. Preston Scott Cohen Architects.**
Design Team member on competition-winning entry for Tel Aviv Art Museum.
Project awarded PA Citation.
- 2003** **Design Researcher, IBM Research, Thomas J. Watson Research Lab.**
Developed systems for transparency in online collaboration systems, with an
emphasis on design collaboration.
- Work patented as US 7,356,772
"Multi-column user interface for managing on-line threaded conversations."
- 2002-2003** **Design Informatics Researcher, Center for Design Informatics**
Harvard University.
- Developed distributed Web 2.0 database-driven systems for design collaboration.
Included extensive development of 3D virtual environments, data-mining, and
visualization processes.

Awards

- 2021** Dean's Junior Faculty Research Grant, Harvard GSD.
"Sensory Isolation and Experimental Design Computation"
- 2020** Harvard Center for Green Buildings and Cities Grant
"Laminate Topologies for Radiant Cooling ", with Jonathan Grinham
- 2019** Harvard Data Science Initiative Grant
"A normalized corpus of linguistic terms for the computational evaluation
of formal relationships in design"
- Dean's Junior Faculty Research Grant, Harvard GSD.
"A Neural Net-based Approach to Neoclassical Syntax."
- Winner, Beyond Bauhaus Ideas Competition
- 2018** Project "Mine the Scrap" added to permanent collection of the Centre Pompidou

MacDowell Fellowship

World Frontiers Forum Pioneer, Architecture and Design

Faculty of the Year. Design Engineering Harvard University, as voted by students.
- 2017** Zumtobel Award, Finalist. Young Professionals Category.

Zumtobel Award, Finalist. Applied Innovation Category.

World Frontiers Forum Young Pioneer. Architecture.

2016

Dean's Junior Faculty Research Grant, Harvard GSD.
"Inversive Techniques for Hinge and Curvature Design."

2015

Canadian Center for Architecture Fellowship (Visiting Scholar).
"The Formal Genealogies of Twentieth-Century Design Mathematics"

Winner, Forcast Forum.

An international competition for ideas with participants from design, architecture, photography, curation, and more.
Mentor: Jurgen Meyer H.

Chernikov Prize Nominee.

The Iakov Chernikhov Prize is awarded every two years to young masters of contemporary architecture for the best architectural concept (designs, buildings, experimental works, architectural fantasies, sketches).

2014

Building Design and Construction 40 under 40.

2012

Graham Foundation Research Grant.
"A Mathematical History of Design, 1800-2000."

AIA Technology in Architectural Practice Award.
For project Fondation Louis Vuitton

2011

Faculty of the Year.
Architecture Department, Harvard University, voted by students.

2007

American Institute of Architects Medal.
"Awarded to the graduate of the professional degree program in architecture who has shown the highest average of excellence throughout the course of study."
(Highest GPA MArch graduate)

John E. Thayer Scholarship.

Awarded to the single most meritorious scholar graduating in each of the ten graduate schools of Harvard University.

Frederick Sheldon Travelling Fellowship (Declined).

Harvard University wide competition. Project on Urbanism in New Belgrade, Serbia.

Grand Prize, Storefront/Control Group Student Design Award.

Selected as best thesis from 18 schools of architecture in the northeast US.
Work in group exhibit at the Storefront for Art and Architecture, New York, NY.

Shortlist, Royal Institute of British Architects Presidents Medal.
Shortlisted for globally competitive prize for thesis "An Urban Hospital in Istanbul."

2006

Boston Society of Architects Research Grant.
One of 10 selected projects from a national competition to be funded, and the only student selected.
Proposal: CNC Adaptable Molds for Thin Shell Structures

Penny White Travelling Prize.
Proposal: Territory and Tension between Hospital, City, and Landscape in Istanbul. A series of case studies on urban medical infrastructure in the city of Istanbul, Turkey.

Grants / Fundraising

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|------------|--|
| ~\$100,000 | Future of Air Travel Fund |
| ~\$80,000 | Laboratory for Design Technologies Fund |
| \$50,000 | ESRI Fund - for development of next-generation geographic design systems |
| \$40,000 | Geometrica Fund - for development of automated assembly processes for complex geometry |
| \$40,000 | Computational Geometry Lab Fund |
| \$20,000 | Center for Green Buildings and Cities (with Jonathan Grinham) |
| \$10,000 | Dean's Junior Faculty Research Grant, Harvard Graduate School of Design |
| \$10,000 | GSD Design Innovation Fund Grant, Harvard Graduate School of Design |
| \$8,000 | Graham Foundation Grant |
| \$7,500 | Dean's Junior Faculty Research Grant, Harvard Graduate School of Design |
| \$6,000 | Dean's Junior Faculty Research Grant, Harvard Graduate School of Design |
| \$5000 | Harvard Data Science Initiative Grant |
| \$5000 | Canadian Centre for Architecture (Fellowship Value) |

Publications: Books

2022 Witt, Andrew, **Formulations: Architecture, Mathematics, Culture**
(Cambridge: MIT Press, 2021, 432pp).

This monograph investigates mathematics as it was drawn, encoded, imagined, and interpreted by architects on the eve of digitization in the mid-twentieth century.

Reviews:

“A brilliant and thought-provoking navigation through complex mathematical notions, models and machines, spatial patterns, and construction techniques. A must-read for anyone interested in the relationships between architecture, mathematics, and digital techniques.”

- Antoine Picon, Harvard University Graduate School of Design

“Since the rise of modern science, some designers have prized verifiable calculations above intuition. Andrew Witt’s *Formulations* offers a superb, scholarly, and most enjoyable overview of maths-driven design from its early modern rise to its postmodern fall.”

- Mario Carpo, Bartlett School of Architecture

“Witt’s keen exploration of architecture’s intertwining with mathematics is outstanding and timely, a long-ranging history from graphs and grids to crystals and lattices—and far beyond. ”

- Molly Wright Steenson, Carnegie Mellon University

“This history allows for a broader grounding and legitimization of the ongoing project of computation within architecture as not a fascination within the last 50 to 75 years after modernism, but as an intrinsic and perpetually relevant subject of architectural attention An impressive body of research and theory, a must-have in the library for anyone with an interest in any aspect of computational design, geometry, math, science, [or] technology.”

- Architect’s Newspaper

“A fascinating exploration of the influence of mathematics and the sciences in general on architecture and design..It would be good if every university library contained a copy of this book.”

- Mathematical Association of America Reviews

2014 Witt, Andrew, **Light Harmonies: The Rhythmic Photographs of Heinrich Heidersberger**
(Berlin: Hatje Cantz, 2014).

The rhythmograms of Heinrich Heidersberger (1906-2006) are intricately curved compositions of pure light created not with a camera, but rather with an ingenious, room-sized, deconstructed photographic machine of his own design. This is the first critical study of these rhythmograms in all their delicate detail.

Publications: Book-Length Research and Studio Reports

- 2022** Witt, Andrew and Carole Voulgaris, **NLP and the Built Environment** (Cambridge: Harvard GSD, 2022).
- 2021** Witt, Andrew, Hyojin Kwon, and Eunu Kim. **An Atlas of Aerial Mobility** (Cambridge: Harvard GSD, 2021).
- 2020** Witt, Andrew and Robert Pietrusko. **Neuralisms Shenzhen** (Cambridge: Harvard GSD, 2020).

Publications: Book Chapters

Forthcoming

- Witt, Andrew, "On Legibility: Machine Readable Architecture," in Philippe Morel, Henriette Bier, David Gerber, *Disruptive Technologies in Architecture* (Cham, CO: Springer, 2022).
- Witt, Andrew, "Defabricating Architecture: AI, Disassembly, and Radical Reuse," in Wendy Fok, *digitalSTRUCTURES: Data and Urban Strategies of the Civic Future* (Novato, CA: ORO Editions, 2022)
- Witt, Andrew, "Crosscoding Cultures: Design and Data Across Disciplines," in Julie Kim, *Interdisciplinary Design Thinking in Architecture Education* (New York: Routledge, 2023).
- 2022** Witt, Andrew, "Distant Readings of Architecture: A Machine View of the City," in *Machine Learning and the City: Applications in Architecture and Urban Design*, ed. Silvio Carta (London: Wiley, 2022).
- Witt, Andrew, "Shadowplays: Models, Drawings, Cognitions," in *Artificial Intelligence and Architecture: From Research to Practice*, ed. Stanislas Chaillou (New York: Birkhäuser, 2022).
- 2021** Witt, Andrew, "Grayboxing." in *L'Intelligence Artificielle au Service de L'Architecture*, Stanislas Chaillou ed. (Paris: Le Moniteur 2021).
- 2020** Witt, Andrew, "Recursive Interiors and Cylindrical Self-Portraits: The Mereologist's Scrapbook." in *Iheartblob : Augmented Architectural Objects: A New Visual Language* (Vienna: Edition Angewandte, 2020).
- 2017** Witt, Andrew, "The Machinic Animal 1970" in *When is the Digital in Architecture?* Andrew Goodhouse, Ed. (New York: Sternberg Press, 2017).
- Witt, Andrew, "Landscapes, Spaces, Meshes: A Cultural Narrative of Design Technics," in *Architecture is All Over*. Esther Choi, Marrikka Trotter, Eds.

(New York: Columbia Books on Architecture and the City, 2017).

Witt, Andrew, "Expanded Mechanisms: The Signalization of Material" in *Lineament: Material, Representation and the Physical Figure in Architectural Production*, Gail Peter Borden and Michael Meredith, Eds. (New York: Routledge, 2017).

2015 Witt, Andrew, "Form-building" in *Frank Gehry*, ed. Aurélien Lemonier, Frédéric Migayrou (London: Prestel, 2015).

2013 Witt, Andrew, "Ideology and Encapsulation: The Counterculture of Design Computation" in *ADD Metaphysics*, Jenna Sutela, ed. (Helsinki: Aalto University Digital Design Laboratory, 2013).

Publications: Peer-Reviewed Articles

2022 Witt, Andrew, "Witt, Andrew and Hyojin Kwon, "The Past Futures of the Aerotropolis," *Thresholds* 50 (2022).

Witt, Andrew and Eunu Kim, "Neural Image Classifiers for Historical Building Elements and Typologies" *Technology: Architecture and Design* 6:1 (2022).

Witt, Andrew, "Through a Machine Lens: Case Studies of Computer Vision and Machine Learning in Design Methodology," *Loci Communes* 1 no. 2 (2022)

2021 Witt, Andrew. "Domestic Logistics: Worldbuilding the Home," *Journal of Architectural Education* 75, no. 2 (2021).

Witt, Andrew and Iman Fayyad. "On the Topology of the Double Staircase," *Nexus Network Journal: Architecture and Mathematics* (2021), <https://doi.org/10.1007/s00004-021-00575-8>.

2012 Witt, Andrew and Peter Boyer. "Euclid: A Cross-Platform Geometry Optimizer" in *Advances in Architectural Geometry* 2012.

Vaudeville, Bernard Vaudeville, Matt King, Simon Aubry, Jacques Raynaud, Marc Chalaux, Andrew Witt. "How Irregular Geometry and Industrial, Process Come Together: A Case Study of the Fondation pour la Creation, Paris." in *Advances in Architectural Geometry* 2012.

Imbert, Frédéric, Kathryn Stutts Frost, Al Fisher, Andrew Witt, Vincent Tourre, Benjamin Koren. "Concurrent Geometric, Structural, and Environmental Design: Louvre Abu Dhabi" *Advances in Architectural Geometry* 2012.

2009 Witt, Andrew, Dennis Sheldon and Tobias Nolte. "Large-scale Concurrent Design: The Case of Fondation Louis Vuitton" in *Proceedings of the Design Modeling Conference*. Berlin: 2009.

Johnson, Charles, Brian Sutton, and Andrew Witt.
"Implicit Construction of Multiple Eigenvalues for Trees"
in *Linear and Multilinear Algebra*. 01 June 2009, Vol.57(4), p.409-420.

2004 Witt, Andrew, Werner Geyer et al. "Chat Spaces," *Proceedings of the 5th conference on Designing Interactive systems*.

2003 Johnson, Charles R., António Leal Duarte, Carlos M. Saiago, Brian D. Sutton, Andrew J. Witt. "On the relative position of multiple eigenvalues in the spectrum of an Hermitian matrix with a given graph," *Linear Algebra and Its Applications*, 2003, Vol.363, pp.147-159

Publications: Academic Articles

Forthcoming

Witt, Andrew, "AI and the More-Than-Human Metropolis," in *Testing-Ground 4*

Witt, Andrew, "Data, Digital Media, and a Different Design Office,"
in *Harvard Design Magazine* 51

2022 Witt, Andrew, "World Pictures and Room-Worlds," in *Bartlett Prospectives Journal* 3 (2022).

2021 Witt, Andrew, Kira Horie, Ayami Akagawa. "Tange Lab: The Quantified Economy and Urban Futurism" Canadian Centre for Architecture ePublications (2021).

2020 Witt, Andrew. "Shadowplays: Models, Drawings, Cognitions" in *Log* no. 50 (2020).

Witt, Andrew. "Feral Autonomies" in *E-flux Architecture*, August 16, 2020.

2019 Witt, Andrew and Eliza Pertigkiozoglou. "Computation as Design: Ron Resch and the New Media of Geometry" Canadian Centre for Architecture ePublications (2019).

Witt, Andrew, Chris Reznich. "Ralph Knowles and the Natural Forces Laboratory." Canadian Centre for Architecture ePublications (2019).

2018 Witt, Andrew. "Grayboxing." in *Log* no. 43 (2018).

Witt, Andrew. "Cold Colony" in *Project Journal*. no. 7 (2018).

Witt, Andrew. "Woodland Quilting" in *Harvard Design Magazine* no. 45, S/S 2018.

2017 Witt, Andrew. "Vision with New Lenses: On Designing with Machine Vision,"
Archinect.com, June 01, 2017

2016 Witt, Andrew. "Cartogrammic Metamorphologies; or, Enter the Rowebot"
in *Log* no. 36, Winter 2016.

Witt, Andrew. "Edge Cases" in *All that is Solid* (Cambridge: Harvard GSD, 2016).

- 2015** Witt, Andrew. "Archeology of the Digital" (Exhibition Review)
- 2014** Witt, Andrew and Tobias Nolte. "Gehry Partners' Fondation Louis Vuitton: Crowdsourcing Embedded Intelligence" in *AD: Architectural Design*. Special Issue: High Definition. January/February 2014
- 2013** Witt, Andrew. "Form Logics" in 306090 vol 15: (Non-) Essential knowledge for (new) architecture. David Hays, Ed. New York: 306090 (2013).
- Interview: "Translating Design" in *Mark Magazine*.
- 2011** Witt, Andrew. "Script and Proof: The Design of Fact and Objectivity." in *Scripting the Future*, Neil Leach and Philip F. Yuan, eds. (Shanghai: Tongji University Press, 2011).
- Witt, Andrew. "Design Hacking: The Machinery of Visual Combinatorics." in *Log* no. 23 (2011).
- Witt, Andrew and Dennis Shelden. "Continuity and Rupture." in *AD: Architectural Design*. 81, no. 4, Special Issue: Mathematics of Space.
- 2010** Witt, Andrew. "A Machine Epistemology in Architecture" in *Candide: Journal of Architectural Knowledge* 3 (2010).
- 2008** Witt, Andrew. "An Urban Hospital in Istanbul" in *Archistorm*.
- 2007** *Space Magazine*. Project "Seoul Long Beach" published in international design journal.
- Surface Magazine*. Project "An Urban Hospital in Istanbul" published in international design journal.
- 2006** GSD Studio Works. Work selected for annual publication of outstanding student projects.

Patents

- 2022** US20220027526A1
Systems and methods for manufacturing personalized oral care devices
- 2015** US9152743B2.
Computer process for determining best-fitting materials for constructing architectural surfaces.
- 2008** US7356772B2.
Multi-column user interface for managing on-line threaded conversations.

Exhibitions

- 2022**
- Museum of the Future**, Dubai, UAE
The Observatory on permanent display in the exhibition "H.E.A.L. Institute"
 - Guangdong Science Centre**, Guangzhou, China
A Machine View of Guangzhou in the exhibition "AI: More than Human"
 - Cooper Union**, New York, New York, USA
Mine the Scrap and Twilight Crystalline Models Hunt Wistfully at "Model Behavior,"
 - Die Digitale Digital Arts Biennial**, Dusseldorf, Germany
A Google Tree on exhibition
- 2021**
- Aiiii Art Center**, Shanghai, China
Mine the Scrap, Kintsugi++, and Horizons in the exhibition "The Book of Sand"
 - Canadian Centre for Architecture**, Montreal, Canada
Home is Where the Droids Are in the exhibition "A Section of Now"
 - CityLAB**, Berlin, Germany
A Machine View of Berlin on exhibition
 - Dubai Expo 2020**, Dubai, UAE
Expo Circular on exhibition at German Pavillion
 - World Museum**, Liverpool, UK
A Machine View of Shanghai & Liverpool in the exhibition "AI: More than Human"
- 2020**
- Centre Pompidou**, Paris, France
Aerospheres in the exhibition "Neurones"
 - Pavillon de l'Arsenal**, Paris, France
Spatial Recognition in the exhibition "AI and 3D Architecture"
 - Harvard GSD**, Cambridge, MA
Richter Scale: A Homage to Hans projected on Gund Hall
- 2019**
- Barbican Centre**, London, UK
A Machine View of London in the exhibition "AI: More than Human"
 - Groningen Forum**, Groningen, Netherlands.
A Machine View of Groningen in the exhibition "AI: More than Human"
 - CLB**, Berlin, Germany
Mine the Scrap in the exhibition "Beyond Bauhaus: Prototyping the Future"
 - Roca Gallery**, London, UK
Home is Where the Droids Are in "Drawing Attention"

Copenhagen Architecture Festival, Copenhagen, Denmark
Home is Where the Droids Are on exhibition

Boston Cyberarts, Boston, MA, USA
A Machine View of Berlin in the exhibition "World Memory"

Boston Society of Architects Space, Boston, MA
FormMaps in the exhibition "Balancing Act"

2018 **Centre Pompidou**, Paris, France
Mine the Scrap. in the exhibition "Coding the World," 15 June - 27 August 2018

Futurium, Berlin, Germany
Cloudfill on long-term display

Angewante Innovation Lab, Vienna, Austria.
Cloudfill on exhibition

Le Laboratoire, Cambridge, MA
Kintsugi++ on exhibition

Le Laboratoire, Cambridge, MA
Quilting++ on exhibitio

Heritage Space, Hanoi, Vietnam
Horizons. in the exhibition "Art as Insight"

Univerisity of North Carolina, Charlotte, NC, USA
Horizons. in the exhibition "See-ing"

Boston Society of Architects Space, Boston, MA
ShowReel in the exhibition "2018 BSA Design Awards"

2017 **Boston Society of Architects Space**, Boston, MA
Chronorhythms in the exhibition "The New Inflatable Moment"

Ars Electronica: Export, Berlin, Germany.
Mine the Scrap in the exhibition "Endless Prototyping"

2016 **Haus der Kulturen der Welt**, Berlin, Germany
Mine the Scrap on exhibition

2011 **CAUP Exhibition Space**, Tongji University, Shanghai
DigitalFUTURE Exhibition.

2007 **Storefront for Art and Architecture**, New York, NY, USA
An Urban Hospital in Istanbul in "Storefront/Control Group Student Design Award"

Harvard GSD, Cambridge, MA.
Student work in exhibition "GSD Studio Works 2007"

2006 **Harvard GSD**, Cambridge, MA.
Student work in exhibition "GSD Studio Works 2006"

Exhibitions Organized

2018 "Outside the Lines: Across Disciplines with Harvard's Design Engineers."
Harvard GSD Exhibition.

2012 "Building Geometry: Mathematical Models and the History of Surface."
Harvard GSD Exhibition.

"Protosurfaces: Topological Experiments in Spatial Design."
Harvard GSD Exhibition.

Symposia Organized

2014 "Computation's Deep Ancestry," Harvard GSD, Piper Auditorium.
Speakers: Mario Carpo, Cameron Wu, George Legendre, Greg Lynn.
October 14, 2014

Invited Lectures

2022 *Upcoming*

"Design, Technology, Culture"

Amasya University, Amasya, Turkey
November 22, 2022

Completed

"Formulations"

Harvard University, Books and Looks series,
with Nicholas de Monchaux
November 08, 2022

"Certain Measures: Media, Worlds, Objects"

Harbin Institute of Technology Harbin, China
November 06, 2022

"The Reality and Unreality of Data"

TU Delft, Delft, Netherlands
The New Open Symposium
October 27, 2022

"Trans-scalar Design"

Google, UX Conference (Keynote), New York, NY
September 20, 2022

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| “Formulations” | Aalto University , Helsinki, Finland Bridges Conference on Mathematics and Art (Keynote) August 03, 2022 |
| “Biofutures” | The Bartlett UCL , London, UK Climate Fr(i)ctions Symposium April 27, 2022 |
| “The Past Futures of the Aerotropolis” | MIT , Cambridge MA Thresholds 50 Lauch Event April 26, 2022 |
| “AI and Superscalar Design” | Tongji University , Shanghai, China International Conference on AI & Art 2022 May 28, 2022 |
| “Formulations” | Center for Architecture , New York, NY March 26, 2022 |
| “Formulations” | TU Delft , Delft, Netherlands April 14, 2022 |
| “Formulations” | Carnegie Mellon University , Pittsburgh, PA Computational Design Lecture Series Apr 14, 2022 |
| “Through a Machine Lens” | INDA, Chulalongkorn University , Bangkok, Thailand Feb 3, 2022 |
| “Continuity and Discreteness” | Architecture Informatics Society , Tokyo, Japan February 25, 2022 |
| “Neural Image Classifiers” | ACSA 110th Annual Meeting Technology Architecture + Design: Intelligence and Histories Symposium May 20, 2022 |
| 2021 “Cartographies of Form” | EPFL , Lausanne, Switzerland Machine Learning Lecture Series December 13 2021 |
| “Through a Machine Lens” | University of Tokyo , Tokyo, Japan November 18, 2021 |
| “Through a Machine Lens” | Conference on Senses in Architecture + ULD , Katowice, Poland November 27, 2021 |

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| | “Reformatting Vision” | Tongji University , Shanghai, China International Conference on AI & Art 2021 May 21, 2021 |
| | “Machine Intelligence, Human Creativity” | Tecnológico de Monterrey , Monterrey, Mexico October 20, 2021 |
| | “Exact Imagination” | Tunghai University , Tunghai, Taiwan February 19, 2021 |
| 2020 | “Animals, Appliances, Autonomy” | Shenzhen Architecture Biennale , Shenzhen, China e-flux Software as Infrastructure Symposium January 11, 2020 |
| | “Catalogs of Reason and Fantasy” | Centre Pompidou , Paris, France |
| | “Exact Imagination” | The Bartlett UCL , London, UK BPro Prospectives Lecture Series November 05, 2020 |
| | “Superscalar Data” | Cornell University , Ithaca, NY Panel on Urban Design Apr 24, 2020 |
| | “Catalogs of Reason and Fantasy” | Architectural Association Visiting School , New York, NY July 20, 2020 |
| | “Catalogs of Reason and Fantasy” | University of Ljubljana , Ljubljana, Slovenia Oct 13, 2020 |
| | “Designing Waste” | Harvard Divinity School Oct 30, 2020 |
| 2019 | “Superscalar Data” | BSA Space , Boston, MA Panel Event: Data and/in Our Cities Sep 26, 2019 |
| | “Ron Resch and the New Media of Geometry” | Harvard GSD PhD Symposium Other Histories of the Digital April 02, 2019 |
| | “Recent Work” | Aerial Futures Conference , Cambridge, MA March 26, 2019 |
| | “Data, AI, and Creativity” | Harvard University , Committee on University Resources |
| 2018 | “Nonstandard Reality” | Venice Biennale , Venice, Italy |

Angewante Institute of Architecture Panel
May 26, 2018

“Certain Measures”

Centre Pompidou, Paris, France

“Recent Work”

Yale School of Architecture,
New Haven, Connecticut
February 27, 2018

“Recent Work”

California College of the Arts,
San Francisco, CA
August 6, 2018

“Quilting from Fragments”

Harvard University, Cambridge, MA
“A Look Across Harvard” Symposim,
Inauguration of President Larry Bacow
October 5, 2018

“Infrastructure / Architecture”

**Japanese Museum of Technology and
Innovation (Miraikan)**
Tokyo, Japan
July 29, 2018

“Certain Mesasures”

UCLA xLab, Tokyo, Japan
August 4, 2018

“Your New Eyes”

Univesity of Houston, Houston, TX
February 14, 2018

“Design’s New Eyes”

Harvard University

2017 “Your New Eyes”

Buildings 2.0 Conference, Chicago, IL
September 18, 2017

“The Machine Lens”

MIT, Cambridge, MA

“A Particular History of Solar Design”

Università della Svizzera Italiana,
Mendrisio, Switzerland
October 31, 2017

“Forensic Archives”

Library of Congress / National Gallery of Art
Washington DC
Digital Architecture, Design and Engineering
Assets Conference
November 16, 2016

“The Machine Lens”

Le Laboratoire, Cambridge, MA
March 1, 2017

“Recent Work”

IDEO, Cambridge, MA

- 2016** "Heuristic Ecology of Heliomorphism"
Harvard University, Cambridge, MA
 Symposium on Heliomorphism
 September 15, 2016
- "Digital Archives"
Society of Architectural Historians
 Annual Conference
 Pasadena, California
 April 08, 2016
- 2015** "Four Elements for a New Design"
Georgia Tech, Atlanta, Georgia
 November 05, 2015
- "Singular Mathematics in Design"
The Ohio State University, Columbus, Ohio
 Baumer Lecture Series
 March 11, 2015
- "Edge Cases"
Harvard GSD, Symposium on Architecture
 Organization or Design?
 October 15, 2015
- "Edge Cases / Hacker Ingenuity"
Rensselaer Polytechnic Institute, New York, NY
 October 22nd, 2015
- "The Crystalline and the Hypercubic"
Canadian Center for Architecture,
 Montreal, Canada
 July 16, 2015
- 2014** "Analytic Geometries"
Princeton University, Princeton, NJ
 October 15, 2014
- "Narratives of Design Science"
University of California, Berkeley, Berkeley, CA
 Public, Private, Protected Symposium
 April 07, 2014
- "Deep Ancestry of Computation"
Harvard GSD (Symposium Organizer)
 October 14, 2014
- 2013** "Pseudonym/Pseudocode"
Princeton University, Princeton, NJ
 SoA Conference: Anonymous
 November 9, 2013
- "Gehry Technologies: Case Studies"
BIM Futures Conference, USC, Los Angeles
 July 18, 2013
- "Gehry Technologies: Case Studies"
Revit Technology Conference,
 Vancouver, Canada
 10 July, 2013
- "Mechanism/Materialism"
The Bartlett, UCL, London, UK

MArch Open Lecture Series
29 January 2013

"Mechanism/Materialism"

Princeton University, Princeton, NJ
15 February, 2013

2012 "Computational Infrastructure"

Paulson Institute Cites of the Future Conference

"The Future of Design Technology"

Harvard GSD, Los Angeles Alumni Event
November 10, 2012

"Inverse History of Mechanized Drawing"

Yale School of Architecture,
New Haven Connecticut
"Is Drawing Dead?" Conference
February 12, 2012

"SuperNumeracy"

Aalto University, Helsinki, Finland

"Form Logics"

Berlage Institute, Rotterdam, Netherlands
April 04, 2012

"Concurrencies"

University of Cincinnati, Cincinnati, Ohio
Surface Conversations Conference
October 25, 2012

"Euclid: Cross-Platform Geometry Optimizer"

Advances in Architectural Geometry

"Fondation Louis Vuitton"

AIA National Convention, Washington, D.C.
Technology in Architectural Practice Awards
May 16, 2012

"Architecture and Technology"

AIA LA Design Awards

"BIM & Manufacturing Lifecycle Systems"

Construct 2012 Convention, Phoenix, AZ
September 11, 2012

"Recent Work"

Tunghai University, Tunghai, Taiwan
Parametric Thinking and Making Conference
November 24, 2012

2011 "Wikification of Design"

Ecobuild Conference, Washington D.C.
December 06, 2012

"Open Concurrent Design"

AEC Technology Futures Conference

"Gehry Technologies - Recent Work"

University of Southern California,
Los Angeles, CA
Extreme BIM Conference
July 8, 2011

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| | "Concurrent Design" | Harvard University , Cambridge, MA |
| 2010 | "Notes on Geometry in Architecture" | Ecole Nationale Supérieure d'Architecture Paris, France December 10, 2010 |
| | "Generative Parametrics and Optimization" | Stanford University , Palo Alto, CA |
| | "Material Geometry Constraints" | Harvard University , Cambridge, MA |
| | "Feedback Systems & Concurrent Design" | Swiss Federal Institute of Technology (EPFL) April 29, 2010 |
| | "Constraint Spaces & their Geometries" | MIT , Cambridge, MA |
| | "Gehry Technologies- Recent Work" | UPenn Paris , Paris, France June 10, 2010 |
| | "Gehry Technologies - Recent Work" | Oslo Association of Architects , Oslo, Norway |
| 2009 | "Large-Scale Concurrent Design" | Design Modeling Symposium , Berlin, Germany October 06, 2009 |
| | "Material Geometry Constraints" | Harvard University , Cambridge, MA |
| | "Digital Detailing Methods" | Swiss Federal Institute of Technology (ETH) , Zurich, Switzerland |
| | "Constraint Spaces & their Geometries" | MIT , Cambridge, MA |
| | "A Machine Epistemology in Architecture" | RWTH Aachen University , Aachen, Germany Constructing Knowledge Conference November 05, 2009 |
| 2008 | "Material Geometry Constraints" | Harvard University , Cambridge, MA |
| | "Constraint Spaces and their Geometries" | MIT , Cambridge, MA |
| | "Sustainability and Parametric Control" | Swiss Federal Institute of Technology (EPFL) Lausanne, Switzerland |
| 2007 | "Constraint Spaces and their Geometries" | MIT , Cambridge, MA |
| | "Parametric Design Methods and Cases" | Swiss Federal Institute of Technology (EPFL) Lausanne, Switzerland November 01, 2007 |
| 2006 | "Constraint Spaces and their Geometries" | MIT , Cambridge, MA |
| | "Material Geometry Constraints" | Harvard University , Cambridge, MA |

- 2005** "Constraint Spaces and their Geometries" **MIT**, Cambridge, MA
"Material Geometry Constraints" **Harvard University**, Cambridge, MA

Media About Work

- 2022** "A decade in the making, Dubai's Museum of the Future opens to visitors," Matt Hickman, *Architect's Newspaper*, February 23, 2022
- 2021** "Eine Boje fürs Leben," *Der Tagesspiegel*, September 11, 2021
Giovanni Borasi, ed., *A Section of Now: Social Norms and Rituals as Sites for Architectural Intervention* (Montreal: Canadian Centre for Architecture, 2021), 78.
- 2020** *Neurones: Les Intelligences Simulées* Paris: Editions HYX, 2020. Catalog of the Centre Pompidou exhibition *Neurones: Les Intelligences Simulées*.
- 2019** "Mapping London" in *Time Out London*, May 14, 2019, p.12.
- 2018** "Der Sprengstoff, der aus dem Rechner kam" ("Computational Fireworks") in *Frankfurter Allgemeine* July 27, 2018.
"Urban Mining and Computational Design" in *The Detail Atlas of Recycling*, Editions Detail, 2018.
"Kintsugi++", in *Issues in Science and Technology*, Summer, 2018.
"Kann das weg? Nein!" ("Bin it? No!") in *Brand Eins*, October 2018.
Coder le Monde. Paris: Editions HYX, 2018. Catalog of the Centre Pompidou exhibition *Coder le Monde*.
"Certain Measures" in *Arch+ 223*, November 2018.
- 2017** "Mine the Scrap" in *Detail*, Issue 04:2017, p. 78.
- 2015** "Data-Enabled Project Teams" in Randy Deutsch, *Data-Driven Design and Construction*, New York: Wiley.

Guest Critic

2022 *Upcoming*

Princeton University

Princeton, NJ

Yale University

New Haven, Connecticut

Completed

Architectural Association

London, UK

Yale University

New Haven, Connecticut

Rhode Island School of Design

Providence, Rhode Island

2021 Yale University

New Haven, Connecticut

The Bartlett (University College London)

London, UK

Machine Intelligence in Architecture 2.0

DIGITALFuture Workshop

Univeristy of New Mexico

Albuquerque, New Mexico

2020 The Bartlett (University College London)

London, UK

Yale University

New Haven, Connecticut

University of California, Berkeley

Berkeley, California

University of California, Los Angeles

Los Angeles, California

Carnegie Mellon University

Pittsburgh, Pennsylvania

École Polytechnique Fédérale de Lausanne

Lausanne, Switzerland

University of Pennsylvania

Philadelphia, Pennsylvania

2019 Yale University

New Haven, Connecticut

Massachusetts Institute of Tachnology (MIT)

Cambridge, Massachusetts

2018 University of Applied Arts (Angewante)

Vienna, Austria

Yale University

New Haven, Connecticut

2017 Massachusetts Institute of Technology (MIT)

Cambridge, Massachusetts

2016 Yale University

New Haven, Connecticut

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|-------------|--|--------------------------|
| | Cornell University | Ithaca, New York |
| | Georgia Institute of Technology | Atlanta, Georgia |
| 2015 | University of Toronto | Toronto, Canada |
| | University of California, Los Angeles (UCLA) | Los Angeles, California |
| | Massachusetts Institute of Technology (MIT) | Cambridge, Massachusetts |
| 2014 | University of California, Los Angeles (UCLA) | Los Angeles, California |
| 2013 | University of California, Los Angeles (UCLA) | Los Angeles, California |
| | Massachusetts Institute of Technology (MIT) | Cambridge, Massachusetts |
| 2012 | Berlage Institute | Rotterdam, Netherlands |
| | University of California - Los Angeles (UCLA) | Los Angeles, California |
| | University of Southern California (USC) | Los Angeles, California |
| | Massachusetts Institute of Technology (MIT) | Cambridge, Massachusetts |
| | Southern California Institute of Architecture | Los Angeles, California |
| 2010 | Ecole Polytechnique Federale de Lausanne (EPFL) | Lausanne, Switzerland |
| | ENSA Malaquais | Paris, France |
| | Massachusetts Institute of Technology (MIT) | Cambridge, Massachusetts |
| 2009 | Ecole Speciale d'Architecture - Paris | Paris, France |
| | Ecole Polytechnique Federale de Lausanne (EPFL) | Lausanne, Switzerland |
| | University of Applied Arts (Angewante der Kunst) | Vienna, Austria |

Thesis Advisees

| | | |
|----------------|-------------------|----------------|
| Current | Sulaiman Alothman | DDes Committee |
| | Suleiman Alhadidi | DDes Committee |
| | Yiou Wang | MArch |
| | Vanessa Wu | MArch |

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|--------------------|------------------------|---------------------|---|
| 2022 | George Guida | MArch | Digital Design Prize |
| | Tiange Wang | MArch | |
| | Karen Kuo | MArch | |
| | Nima Shariat Zamanpour | MArch | |
| | Dongyun Kim | MDes | |
| | Indrajeet Haldar | MDes | Daniel L. Schodek Award |
| | Henrik Ilvesmaki | MDes | |
| | Maximilian Mueller | MDE | |
| 2021 | Elisa Ngan | MDE | |
| | Juliet Ume-Ezeoke | SB, Harvard College | |
| | Bryan Ortega-Welch | MArch | |
| | Sharon Deng | MArch | |
| | Maria Roldan Castro | MDes | |
| | Siim Tuksam | PhD | PhD Examination Opponent, Estonian Academy of Arts |
| 2020 | Ian Miley | MArch | Kelley Thesis Prize, AIA Medal |
| | Gia Jung | MArch | Digital Design Prize |
| | Minyong Kim | MArch | |
| | Yungi Jung | MArch | |
| | Claire Djang | MArch | |
| | Shiyi Peng | MDes | |
| | 2019 | Humbi Song | MArch |
| Stanislas Chaillou | | MArch | |
| Meng Jiang | | MArch | |
| Jack Rendler-Oliva | | MArch | |
| 2018 | Hyojin Kwon | MArch | Kelley Thesis Prize |

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|-------------|-----------------------|----------------|---------------------------------|
| | Alexander Porter | MArch | Digital Design Prize, AIA Medal |
| | Esther Bang | MArch | |
| | Joanne Cheung | MArch | |
| | Diana Yan | MDes | |
| | Tom Ishida | MArch | |
| | Martin Fernandez | MArch | |
| | Eliza Pertigkiozoglou | MDes | |
| | Yuan Mu | MDes | |
| | Nate Peters | MDes | |
| | Betty Chen | MDes | |
| | Jasmine Roberts | MDes | |
| | Julian Siegelmann | MDE | |
| | Jonah Ross-Marrs | SMarch, MIT | |
| 2017 | Claire Kuang | MArch | |
| | Gavin Ruedisueli | MArch | |
| | Olivia Heung | MArch | |
| | Cody Glen | MDes | |
| 2016 | Zeina Koreitem | MDes | Digital Design Prize |
| | Aziz Barbar | MDes | |
| | Akshay Goyal | MDes | |
| | Joelle Bitton | DDes Committee | |
| 2015 | Catherine Soderberg | MArch | |
| | Drew Seyl | MArch | |
| | Zach Seibold | MDes | |
| 2014 | Michael Burton | MArch | |

Patricia Correa MDes

Tim Sullivan MDes

2013 Aurgcho Jyoti MDes

Additional Skills

Languages: English (native fluency), French (business fluency)

Lived in: United States, France, Russia, Hong Kong.

Worked in: United States, France, Germany, Hong Kong, China, United Kingdom, Netherlands, Austria, Switzerland, Canada.